SOCIAL SKILLS TRAINING FOR INDIVIDUALS WITH SCHIZOPHRENIA: EVALUATION OF TREATMENT OUTCOME AND ACQUISITION OF SOCIAL AND COGNITIVE SKILLS

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Social and cognitive skill acquisition were evaluated in 33 (male=24, female=11) outpatients with schizophrenia or schizoaffective disorder. A social skills training treatment group (*n*=19) was compared to a wait-list control (*n*=14). Participants' mean age was 41 years, mean number of hospitalizations 10.4, and mean number of years with diagnosis 15.8. Assessment measures included WAIS-III Picture Arrangement subtest, Social Cue Recognition Test, COGLAB, WMS-III Word List subtest, and SADS-C. Results did not support the main hypotheses of improved social and cognitive skills in the treatment group. Participants with better memory and attention at pre-testing also did not show an advantage in social skills improvement. Contrary to hypotheses, the control group improved the most on some social and cognitive measures. Several supplemental hypotheses yielded the following results: lack of volunteer participation from paranoid schizophrenia individuals; evidence that schizoaffective disorder participants may be less cognitively impaired and better able to benefit from social skills training; and younger, less chronic participants with better attentional capacities may benefit most from social skills training. Findings are discussed in light of the possibility that improving social skills might not improve social and cognitive functioning, at least with the dosage of social skills training provided in this study. Limitations such as a sampling bias and small study size are also considered as possible explanations for the pattern of findings. Clinical and research implications are discussed to apply and extend the current findings.

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INTRODUCTION

Schizophrenia is a leading public health problem, with lifetime prevalence rates as high as 0.5% to 1%, depending upon the definition (Andreasen & Carpenter, 1993). Frequently persons with schizophrenia face severe social and economical impairment, and, suffer functional impairment throughout their lives. Mueser and McGurk (2004) report that schizophrenia is among the world's top ten causes of long-term disability. Schizophrenia can cause great distress for both patients and their families. In addition, the cost of supporting those with schizophrenia who can no longer support themselves is also a significant burden on society. The National Foundation for Brain Research (1992) found the financial toll for schizophrenia to exceed that of cancer.

Schizophrenia is a clinical diagnosis and syndrome that is characterized by a variety of cognitive, neurologic, and social functioning deficits. The onset of schizophrenia typically occurs between the late teens and the mid-30s (Diagnostic and Statistical Manual of Mental Disorders – Fourth Edition (DSM-IV™); American Psychiatric Association, Washington, D.C., 1994), although current research has indicated that developmental pathology precursors may be present from a young age (Neumann, Baum, Walker, & Lewine, 1996; Neumann, Grimes, Walker; & Baum, 1995; Walker, 1994). Just at the time that normal adolescent and young adults are honing the social skills necessary for appropriate adult social functioning, the individual with schizophrenia is beginning to exhibit positive symptoms of psychopathology such as disordered thinking, hallucinations, and/or delusions. In addition, afflicted individual may have been lacking the attentional capacity throughout childhood to absorb the social modeling to which one had been exposed (Neuman et al., 1996). These events certainly

interfere with the usual learning that occurs in the social/emotional realm of functioning, and, thus, may impact later social functioning after the development of the disease and even during remission. Research has shown that poor social problem solving and a relatively small social network predict likelihood of a relapse of schizophrenia (Sullivan, Marder, Liberman, Donahoe, & Mintz, 1990). This finding emphasizes the possible importance of social functioning and its treatment for individuals with schizophrenia.

In general, characteristic symptoms of schizophrenia have been conceptualized into two broad categories: positive and negative. Positive symptoms reflect an excess or distortion of normal functions, including distortions or exaggerations of inferential thinking (delusions), of perception (hallucinations), of language and communication (disorganized speech), and of behavioral monitoring (grossly disorganized or catatonic behavior). Conversely, negative symptoms appear to reflect a loss of normal functions, including restrictions in the range and intensity of emotional expression (affective flattening), in the fluency and productivity of thought and speech (alogia), and in the initiation of goal-directed behavior (avolition). Table 1 shows the DSM-IV (American Psychiatric Association, 1994) diagnostic criteria. Continuous signs of the disturbance must be present for at least 6 months, with at least 1 month of active-phase symptoms, as listed above. The six-month period may include periods of prodromal or residual symptoms in attenuated form.

Five possible subtypes of schizophrenia can be diagnosed using the DSM-IV system. The diagnosis of a particular subtype is based upon the clinical picture and symptom presentation during the most recent evaluation, and it may change over time. The subtypes include Paranoid, Disorganized, Catatonic, Undifferentiated, and Residual

(see Table 2). Thus, substantial heterogeneity exists in the clinical presentation of schizophrenia. The signs and symptoms are diverse and comprise almost every aspect of cognition and behavior: perception, inferential thinking, speech and language, motor behavior, attention, volition, emotion, and executive functions. However, not all patients manifest signs and symptoms in all of these areas, and usually the clinical presentation for a patient does not remain stable throughout the course of the illness (Andreasen & Carpenter, 1993), therefore occasionally necessitating change in diagnosis subtype.

Schizophrenia is often characterized and portrayed as an illness with prominent features of delusions and hallucinations; however, the more stable characteristic feature of this illness--and sometimes the most debilitating aspect--can be the lack of social competence. Negative symptoms of anhedonia, avolition, and social withdrawal that permeate the life of an individual with schizophrenia can be very limiting and painful.

A review of the literature that follows will first focus on issues regarding the assessment of specific cognitive and attentional factors. Then social cognition and social skills will be discussed. Next, research describing the use of social skills training with individuals with schizophrenia will be presented. These reviews are designed to provide background for the present study and provide a rationale for undertaking the study. Finally, the present study is described, which evaluates the effects of a specific social skills training model on social cognitive and nonsocial cognitive skills in persons with schizophrenia.

Table 1

Diagnostic Criteria for Schizophrenia

A. *Characteristic symptoms:* Two or more of the following, each present for a significant portion of time during a 1-month period (or less if successfully treated):

(1) delusions
(2) hallucinations
(3) disorganized speech (e.g. frequent derailment or incoherence)
(4) grossly disorganized or catatonic behavior
(5) negative symptoms, i.e., affective flattening, alogia, or avolition

Note: Only one Criterion A is required if delusions are bizarre or hallucinations consist of a voice keeping a running commentary on the person's behavior or thoughts, or two or more voices conversing with each other.

B. *Social/occupational dysfunction:* For a significant portion of the time since the onset of the disturbance, one or more major areas of functioning such as work, interpersonal relations, or self-care are markedly below the level achieved prior to the onset (or when the onset is in childhood or adolescence, failure to achieve expected level of interpersonal, academic or occupational achievement).

C. *Duration:* Continuous signs of the disturbance persist for at least 6 months. This 6-month period must include at least 1 month of symptoms (or less if successfully treated) that meet Criterion A (i.e., active-phase symptoms) and may include periods of prodromal or residual symptoms. During these prodromal or residual periods, the signs of disturbance may be manifested by only negative symptoms or two or more symptoms listed in Criterion A present in an attenuated form (e.g., odd beliefs, unusual perceptual experiences).

D. *Schizoaffective and Mood Disorder exclusion:* Schizoaffective Disorder and Mood Disorder with Psychotic Features have been ruled out because either (1) no Major Depressive, Manic, or Mixed Episodes have occurred concurrently with active-phase symptoms; or (2) if mood episodes have occurred during active-phase symptoms, their total duration has been relative to the duration of the active and residual periods.

E. *Substance/general medical condition exclusion:* The disturbance is not due to the direct physiological effects of a substance (e.g., drug of abuse, a medication) or a general medical condition.

F. *Relationship to a Pervasive Developmental Disorder:* If there is a history of Autistic Disorder or another Pervasive Developmental Disorder, the additional diagnosis of schizophrenia is made only if prominent delusions or hallucinations are also present for at least a month (or less if successfully treated).

Note: From DSM-IV used with permission from American Psychiatric Association, 1994, pp. 285-286.

Table 2
Diagnostic Criteria for Schizophrenia Subtypes

Paranoid Type

A. Preoccupation with one or more delusions or frequent auditory hallucinations

B. None of the following is prominent: disorganized speech, disorganized or catatonic behavior, or flat or inappropriate affect

Disorganized Type

A. All of the following are prominent:
(1) disorganized speech
(2) disorganized behavior
(3) flat or inappropriate affect

B. The criteria are not met for Catatonic Type

Catatonic Type

A type of schizophrenia in which the clinical picture is dominated by at least two of the following:
(1) motoric immobility as evidenced by catalepsy (including waxy flexibility) or stupor
(2) excessive motor activity (that is apparently purposeless and not influenced by external stimuli)
(3) extreme negativism (an apparently motiveless resistance to all instructions or maintenance of a rigid posture against attempts to be moved) or mutism
(4) peculiarities of voluntary movement as evidenced by posturing (voluntary assumption of inappropriate or bizarre postures), stereotyped movements, prominent mannerisms, or prominent grimacing
(5) echolalia or echopraxia

Undifferentiated Type

A type of schizophrenia in which symptoms that meet Criterion A are present, but the criteria are not met for the Paranoid, Disorganized, or Catatonic Type.

Residual Type

A. Absence of prominent delusions, hallucinations, disorganized speech, and grossly disorganized or catatonic behavior.

B. There is continuing evidence of the disturbance, as indicated by the presence of negative symptoms or two or more symptoms listed in Criterion A for schizophrenia, present in attenuated form (e.g., odd beliefs, unusual perceptual experiences).

Note: From DSM-IV used with permission from American Psychiatric Association, 1994, pp. 287-290.

Cognitive Factors and Social Functioning

Cognitive deficits within the framework of schizophrenia play a central role in the social disabilities individuals exhibit. To remediate these problems in daily functioning and social skills, the underlying cognitive limitations must be understood. In recent years researchers seeking to better understand the behavioral difficulties of individuals with schizophrenia have shown a resurgence of research interest in both social and cognitive factors associated with the disorder. Penn and Corrigan (1997), in their introduction to a series of social cognition studies, emphasized a need for a conceptualization of cognition and social perception that is integrated into a systematic assessment and treatment package.

Green (1996), in a seminal paper, summarized a number of studies that documented the relationship between neuropsychological capacity and social functioning in skills training programs. Specifically, he found a correlation between measures of social competence and measures of verbal memory and attention. More recently, Green, Kern, Braff, and Mintz (2000) confirmed Green's previous conclusions that specific neurocognitive domains, such as secondary verbal memory, immediate memory, executive functioning as measured by card sorting, and vigilance are significantly associated with functional outcomes for individuals with schizophrenia.

Bellack, Gold, and Buchanan (1999) addressed cognitive rehabilitation for schizophrenia stating that "cognitive impairments play a central role in social disability and other daily problems for individuals with schizophrenia…[These] impairments must be rectified if we are to achieve effective rehabilitation, and …the prognosis for cognitive rehabilitation, as reflected in preliminary studies, is quite positive" (p.258). However,

choosing the cognitive targets for rehabilitation that are most appropriate remains difficult. Generalizability becomes one of the critical questions in selecting neurocognitive targets: How deep are the effects of training on any basic information-processing domain? What are the possible mechanisms of change both cognitively and socially?

Bellack et al. (1999) argued that basic cognitive processes probably do serve as critical building blocks for complex, functional behaviors and skills, such as social functioning, but their contributions to these complex and routinized behaviors may not have a direct linear link or additive effect. Bellack et al. proposed that, rather than reducing impairments in the domains of cognition such as verbal memory and vigilance, a compensatory model for rehabilitation is appropriate. This strategy would entail reducing the demands in these areas within the training program. “Overlearning of key skills and compensatory strategies could be sufficient to enhance competence in routinized activities. Similarly, the role of attention and working memory in learning may be minimized by modifying the format and content of training (p.260).

In one study, individuals with schizophrenia who were trained in a form of compensatory model showed improved Wisconsin Card Sorting Test (WCST®, Psychological Assessment resources, Inc., *www3.parinc.com*) scores. The training protocol included a teaching paradigm that explained the test information in small units and required subjects to repeat in their own words the same information (Bellack et al., 1990). Bellack et al. (1999) pointed out that other modest improvements have been seen in schizophrenic individuals’ performance as a result of practice, instruction, and practice plus incentives (Kern, Green, & Goldstein, 1995; Schmand et al., 1994). A

recent meta-analysis of WCST training studies suggested that, in general, efforts to improve WCST performance are successful, with a weighted mean effect size (Cohen's *d*) of 0.96 (Kurtz, Moberg, Gur, & Gur, 2001). Although these effects are usually not long lived, they do suggest that deficits present on initial formal testing likely represent a combination of stable as well as plastic factors such as demoralization and lack of motivation. Twamley, Jeste, and Bellack (2003) suggest that these studies underscore that individuals with schizophrenia can learn to perform better, and they provide information about potential therapeutic strategies.

In contrast, Spaulding et al. (1999) had a different approach to cognitive rehabilitation. They proposed that cognitive impairment in acute psychosis has prognostic significance. In addition, they posited that cognitive impairments respond to psychosocial interventions in the chronic course of schizophrenia and that cognitive improvement can benefit other aspects of recovery and rehabilitation.

Attempting to substantiate that cognitive impairment found at hospital admission in individuals with psychosis may have prognostic significance, Spaulding et al. (1999) re-examined data of 31 patients admitted to a long-term unit. Each patient was assessed with a structured interview, the Brief Psychiatric Rating Scale [BPRS]; a self-report symptom and problem inventory, the Symptom Checklist-90-Revised® [SCL-90-R] (Pearson Assessments, http://www.pearsonassessments.com); and with a neurocognitive test battery, COGLAB. A regression equation predicted about 65% of the variance in length of stay. Some powerful predictors of length of stay in the hospital were the patient's age, age at onset, and marital status; a BPRS and an SCL-90R subscale also contributed to a statistically significant degree. However, even after those

factors were taken into account, the perseverative error score on the COGLAB card sorting task, a measure of cognitive dysfunction, contributed uniquely to the prediction. Although it was the only score of the 11 derived from the COGLAB battery that was associated with length of stay, the sufficient size of the beta weight (0.52) lent confidence to its contribution. Patients who had more impaired card sorting abilities stayed in the acute ward longer and were more likely to be discharged to a residential or long–term hospital unit than to supported or independent community living. In addition, assessment after 6 weeks of hospitalization added another predictor from COGLAB, a backward visual masking task score, to improve the predictive equation to 75% of the variance in length of stay. Spaulding et al. (1999) stated that cognitive assessment in the acute and early post-acute phases can be useful for predicting post-acute and chronic baseline functioning.

However, can cognitive functioning improve in the chronic residual course? Can intervention change these predictions that early testing provides? Spaulding (1993), studying a sample of 110 severely disabled but stabilized patients in a State hospital long-term unit, found little or no change in cognitive functioning occurred over a 6-month period. However, in a more recent study, Spaulding's lab (1998) assessed chronic patients over the same time period, 6 months, but in an enriched psychosocial treatment environment. In this second study patients showed improvements in 9 of 12 measures of cognitive functioning. In particular, measures of memory and executive functioning showed improvement, whereas reaction time and continuous attention did not improve. Thus, under some conditions, some aspects of impaired schizophrenic cognition appear to be subject to improvement even in the chronic course. Spaulding et

al. identified three separate sources of variance that contributed to the cognitive changes: verbal processing, spatial information processing, and concept formation/manipulation. In general, Spaulding et al. (1998) reported that the cognitive changes observed appeared more robust at higher levels of cognition. This finding might lend support to the notion that improvement in cognition can transfer to improvement in social functioning, as social skills require higher, more complex levels of cognition.

Spaulding (1998) demonstrated that cognitive treatments were linked to improvements in social competence. Thus, cognitive improvement appears to benefit other aspects of rehabilitation. Social competence was measured by the Assessment of Interpersonal Problem Solving Skills (AIPSS), a test that involves viewing video vignettes, answering questions about the social problem viewed, and then also participating in a role-play solution. In a path analysis, Spaulding et al. (1999) showed that change in AIPSS scores was linked to the cognitive treatment patients received over a 6-month period. However, as the path analyses revealed, the cognitive treatment effect did not operate through any of the measured cognitive functions, and so the cognitive mechanisms remain unknown. Spaulding summarized that cognitive recovery, particularly in the areas of verbal learning and memory, have beneficial effects on various aspects of social skill and competence in the course of rehabilitation. However, a substantial portion of the improvements in social skill and competence remained unexplained, and it is unclear whether these specific improvements were directly associated with the cognitive treatment.

Cognitive Factors and Symptomotology

Cognitive factors within schizophrenia may be mediated by other aspects of the illness, such as clinical symptoms. It remains unclear whether the distinction between negative symptoms and cognitive deficits points to independent domains of the illness or, rather, to a complex interaction. Strauss, Buchanan, and Hale (1993) found two measures of information-processing, the Continuous Performance Test (CPT) and the Partial Report Span of Apprehension (SPAN), to be moderately correlated in 50 individuals with schizophrenia or schizoaffective disorder. In addition, the CPT and SPAN were each significantly correlated with a verbal composite score; neither correlated significantly with the nonverbal composite score. With respect to clinical symptoms, SPAN performance, but not CPT performance, correlated with negative symptoms, as measured by the BPRS factor 2. Conversely, CPT performance, but not SPAN performance, correlated with the positive symptom of thought disorder. However, the SPAN-BPRS factor 2 correlation appeared to be mediated by general verbal ability. Thus, general verbal ability appears to be an important component in the negative symptom area and also in information processing. However, thought disorder also influences the cognitive load of the individual with schizophrenia.

Other studies have failed to identify associations between clinical symptoms and social function. Mueser, Bellack, Douglas, and Wade (1991) found that clinical symptoms were not consistently related to pretreatment social skill or to changes in those skills after a two-week period of social skills training. They found that social skills improved moderately over time, an improvement independent of symptoms, as measured by the BPRS.

The apparent discrepancy between the Mueser et al. (1991) and Strauss et al. (1993) findings may be clarified by Penn et al.'s position of social cognition versus nonsocial information processing models (Penn, Corrigan, Bentall, Racenstein, & Newman, 1997b; Penn, Spaulding, Reed, & Sullivan, 1996). The performance of patients with schizophrenia may differ on social-cognitive versus nonsocial-cognitive tasks. It remains an open question as to whether social cognitive variables relate to clinical symptoms in similar ways that nonsocial variables relate to clinical symptoms.

Social Cognition

Penn et al. (1997b) defined social cognition as the "domain of cognition that involves the perception, interpretation, and processing of social information" (p.115). Penn and colleagues have conducted several studies investigating the relationship between information processing and social functioning in schizophrenia. Using the COGLAB battery to measure information processing, along with measures of affect, empathy, and sequencing of social scripts as representatives of social cognition, Penn, Spaulding, Reed, and Sullivan (1996) examined ward behavior. Results supported the hypothesis that among inpatients with chronic schizophrenia, social cognitive deficits were associated with impaired ward behavior. However, this relationship did not completely overlap with the relationship between ward behavior and information processing. Thus, ward behavior does not simply reflect the impact of general cognitive impairment. In fact, Penn et al. (1996) failed to find an overall significant relation between information processing and ward behavior. They proposed that the effects of cognition on ward behavior might be mediated by other factors, such as social

cognition. Therefore, cognition may have an indirect rather than direct impact on at least some social functions.

Penn et al. (1993) examined the relationship between information processing and social information processing in a group of adolescents with schizophrenia. They found that better social cognition problem solving (SCPS) behavior during both symptom exacerbation and remission was associated with a “liberal response style” on an information processing task (CP/SPAN). In other words, participants showed an increase in both hits and false alarms during this vigilance task. Additionally, as task demands increased, the relationship between hit/false alarm rate and SCPS became stronger, suggesting that subjects were attempting to increase their response rate in light of increased task demands. Those individuals with schizophrenia who exhibited this more liberal response style on the vigilance task demonstrated better SCPS both cross-sectionally and longitudinally. Penn et al. (1993) suggested that this increased response rate may be a compensatory strategy, indicating that these individuals may have an awareness of their cognitive deficits and that metacognition is an important factor in social cognition problem solving (SCPS).

Penn, Mueser, Spaulding, Hope, and Reed (1995) investigated whether a relationship exists between information processing and social competence during a social interaction. The authors found that specific deficits in cognitive functioning were related to specific social variables. The associations found between information processing and social information processing were not simply attributable to demographic or symptom variables. Rather, higher global social competence during an unstructured role-play was associated with better vigilance, that is, more hits and *fewer*

false alarms. These findings appear to be inconsistent with the Penn et al. (1993) finding that a liberal response style, that is, more hits and *more* false alarms on the CP/SPAN task was associated with better social cognitive problem solving. However, it is important to consider the differences in the characteristics of the samples. The Penn et al. (1993) study used acutely ill adolescents with schizophrenia, whereas Penn et al. (1995) utilized a sample of chronically ill schizophrenic individuals. Perhaps the stage of illness, chronicity, and the age of the subjects may impact the relationship between information processing and social functioning. This difference in information processing data may suggest that with age and maturity, even in a population of chronically schizophrenic individuals with cognitive deficits, learning has occurred that enables them to better discriminate and increase their vigilance.

Spaulding, Penn, and Garbin (2002) also found support for the finding of increased vigilance associated with improved social behavior when they examined ward behavior and its association with information processing variables. The subjects were 112 chronic psychiatric inpatients who were assessed with COGLAB. In addition, ward behavior was measured by the Nurse's Observational Scale for Inpatient Evaluation, 30-item version (NOSIE-30). Improvements in ward behavior over six months as measured by the NOSIE-30 were associated with a decrease in false alarms on the CT/SPAN task. Thus, improvement in vigilance performance appears to be associated with improvement in overall ward functioning.

Two other important findings emerged from the Penn et al. (1995) study. First, poorer paralinguistic skills were associated with slower reaction time. Finally, the overall

pattern of correlations between information processing and the three indices of social competence suggests a differentiated rather than a single global relationship.

To summarize the findings regarding social cognition, a review of the above three studies by Penn, Spaulding, Reed, Sullivan, & Hope (1997c) concluded that performance on vigilance and reaction time tasks, an ability to maintain set (or readiness to respond), and memory for social schemas are the important information processing and social cognitive variables associated with social functioning. Thus, these are the skills upon which future treatment should focus in the arena of social skills training.

The correlational findings discussed above show that better cognitive skills can be associated with better social skills. However, the direction of causality remains unestablished. It remains possible that interventions designed to enhance social skills will also result in an increase in cognitive skills. Roder et al. (2002) utilized a social skills training subprogram from the Integrated Psychological Therapy for Schizophrenia Patients (IPT); they observed significant improvements in cognitive variables at post-testing. Correlational analyses suggested associations between improvement of social behaviors with some improvement in the cognitive domain, specifically a large effect size for the 'speed' factor and a small effect size for improvements in concentration.

Social cue perception.

Corrigan, Green, and Toomey (1994) examined the relationship between social cue perception, thought to be an early component of social skill learning, and various information-processing deficits and psychiatric symptoms. They used the Social Cue Recognition Test (SCRT) (Corrigan & Green, 1993) to assess sensitivity to

interpersonal cues. They instructed participants to watch eight videotaped vignettes of two or three people interacting, and then to answer 36 true-false questions per vignette about the interaction they viewed. Cue perception was significantly related to measures of early visual processing, recognition memory, and negative symptoms for schizophrenia that manifested as symptoms of withdrawal/retardation on the BPRS. SCRT false alarm rates, but not hit rates, were significantly associated with more severe symptoms and poorer processing. Corrigan et al. hypothesized that information-processing deficits and negative symptoms may diminish patients' sensitivity to social cues such that they mistakenly identify absent cues as being present. Therefore, targeting negative symptoms, early visual processing, and recognition memory for enhancement in social cue perception may yield beneficial social function effects.

Corrigan and colleagues have found social perception skills for individuals with schizophrenia to be affected by a number of different variables. Level of abstraction of cue descriptors appears to be a consistent variable for both low and high symptom individuals with schizophrenia (Corrigan & Nelson, 1998). Researchers have found false positive rates to be greater for items rated as more abstract. Likewise, performance on the SCRT is better with concrete rather than abstract questions (Corrigan & Nelson, 1998; Corrigan, 1997). Level of arousal, whether emotional or situational also seems to be related to the sensitivity individuals with schizophrenia have for interpersonal cues. Moderate levels of arousal, as opposed to low arousal, appeared to increase performance on the social perception task (Corrigan & Green, 1993), indicating that individuals with schizophrenia are more attentive to situations that are emotionally poignant rather than sedate (Corrigan, 1997). Thus, it would be appropriate for social

skills remediation treatment to use emotionally lively situations in the training. Interestingly, normal control subjects did not show a differential performance to social cues as a function of situational arousal.

Corrigan and Addis (1995) added support for the above finding that social cue perception is enhanced in emotionally arousing situations. Twenty-five individuals with schizophrenia listened to SCRT vignettes, half of which were presented with simultaneous emotionally arousing stimuli in the background, specifically, an audiotaped segment of *Star Trek*™ (Paramount Pictures Corporation, www.paramount.com) which was previously found to be emotionally arousing. Subjects were more sensitive to interpersonal cues when the *Star Trek* episode was presented simultaneously, whereas normal controls showed no differences in cue sensitivity. Rather than becoming more confused by too much stimulation as one might assume for a person with schizophrenia, it appears that the emotionally arousing stimuli may have helped them to become more alert and consequently to increase their performance. This finding lends support to the notion that persons with schizophrenia can function relatively well--perhaps even better--in the presence of some stressors, and that they may not need as much protection from the real world as first believed. Thus, social skills training should include emotionally arousing stimuli in order to closely simulate real world events.

Neuropsychological factors.

Evaluating the neuropsychological deficits and studying cognitive functioning in schizophrenia have become useful tools to aid better understanding of the neurobiology associated with the illness. Examining the putatively “stable” traits or neuropsychological deficits in relation to social functioning, some correlations have

emerged. Wong, Voruganti, Heslegrave, and Awad (1997) found striking correlations between various neurological scores and psychosocial performance. Neurological signs were related to poorer social functioning as measured by the Global Assessment of Functioning (GAF) Scale. They found a consistent association between subtle neuropsychological impairment and lower psychosocial performance. This pattern was evident in the frontal, soft, and total neurological deficit scores, without any one subscale being more important than the others. In addition, measures of poor frontal lobe function were correlated with negative symptoms but not with positive symptoms. This finding is consistent with current theories of frontal lobe function. The frontal and prefrontal cortex play important roles in planning and organization of behavior and, therefore, poor functioning in these areas appears to be linked to observed behavioral problems with motivation and initiative.

Social functioning requires complex behaviors that involve many brain areas, several of which evidence deficiency in people with schizophrenia. Addington and Addington (1999) further evaluated associations between neurocognitive and social functioning, as well as concomitant psychiatric symptoms. Their hypothesis that neurocognitive functioning would predict social functioning was partially confirmed. Neurocognitive functioning predicted social problem solving, whereas only one measure of community functioning was related to one neurocognitive test. Performance on verbal memory, verbal ability, and cognitive flexibility predicted three aspects of social problem solving-- receiving, processing, and sending skills. Visual-spatial ability and vigilance were associated with sending skills. Positive symptoms were not associated with any of the neurocognitive factors. High levels of negative symptoms were significantly

associated with low scores on verbal ability, visual memory, fluency, and cognitive flexibility. When negative symptoms were statistically controlled, significant associations remained between the AIPSS subscales that assess social problem solving and scores on verbal ability, verbal memory, and cognitive flexibility; however, the association between a measure of community functioning --the Quality of Life Scale--and cognitive flexibility was no longer significant.

Kern, Green, and Satz (1992) also found that measures of verbal memory, sustained attention (vigilance), and freedom from distractibility showed a significant relation to skills training outcome. Participants had participated in social skills training for two hour sessions, 5 days a week, for eight months. The researchers administered neuropsychological tests once at baseline and compared them with outcome measures of specific skill acquisition. Increased verbal learning (Rey Auditory Verbal Learning Test), sustained vigilance (Degraded-Stimulus Continuous Performance Test), and decreased susceptibility to distraction (Digit Span Distractibility Test) were associated with better skills training performance and appropriate classroom behavior.

Nopoulos, Flashman, Flaum, Arndt, and Andreasen (1994) evaluated the longitudinal course of neuropsychological deficits in 35 inpatients who had experienced their first psychiatric hospitalization in the previous five years. They tested patients for cognitive and neuropsychological functioning at initial assessment and then had patients complete a follow-up assessment one or two years later. Nopoulos et al. (1994) found that the majority of neuropsychological deficits in schizophrenia remained unchanged over the longitudinal course of the study, indicating that these dysfunctions may be a stable “trait” of schizophrenia. These deficit areas included motor speed,

verbal and nonverbal memory, and verbal learning. However, a smaller subset of cognitive functions did show improvement over time. Three subtests, Trails B, Stroop-Colored Dots, and Stroop-Interference demonstrated significant improvements, indicating complex attention and response inhibition as two areas that may be considered “state” dependent. Additionally, the changes in cognitive functioning did not appear related to changes in medication doses; however, they did appear to be related to changes in symptom severity. As symptoms improved, functioning improved. Specifically, positive and disorganized symptoms positively correlated with measures of response inhibition (Stroop-Colored Dots and -Interference, respectively), and improvement in negative symptoms showed a correlational trend with an improved time trial for Trails B, a measure of attention. These findings may be illustrative of some areas of functioning for individuals with schizophrenia that remain stable and some that are more changeable. It may also be important to note that the results of the unchanged cognitive functions or stable “traits” were measured from patients who did not necessarily receive any formal or concentrated effort of rehabilitation of these specific areas or functions. In other words, it may not be the case that these cognitive areas are unchangeable, but rather that they did not change when no specific treatment was administered.

Cognitive Factors and Atypical Antipsychotic Medications

With the advent of the atypical antipsychotic drugs, such as clozapine, risperidone, and olanzapine, cognitive improvements have been attributed to drug treatment as well as to cognitive training. These medications appear not only to produce fewer extrapyramidal symptoms than typical neuroleptic drugs, but also appear to be

superior to typical neuroleptics with regard to the improvement of cognitive function. In fact, some evidence suggests that typical antipsychotics may cause selective impairment in cognitive functions, particularly motor function and memory (Earle-Boyer et al., 1991 as cited in Meltzer & McGurk, 1999; Heaton & Crowley, 1981)

Metzler and McGurk (1999) reviewed the effects of clozapine, risperidone, and olanzapine on cognitive functioning in schizophrenia. After reviewing 12 studies on the effects of clozapine, they concluded that there was a robust effect on two cognitive domains: verbal fluency and attention. In addition, some evidence indicated improvement in some types of executive function, verbal learning, and memory. Clozapine may improve some types of executive functioning, as measured by Weschler Adult Intelligence Scale- Revised (WAIS-R™, Psychological Corporation, San Antonio, Texas, *www.psychcorp.com*) similarities and Trials B, but improvement was not consistently found, as measured by WCST-Categories. Little evidence indicated improvement in working memory. A history of therapeutic response to typical neuroleptic drugs was a good predictor of improvement in cognition with clozapine. Three studies finding the most robust improvements in cognition in association with clozapine included patients who responded best to typical neuroleptic drugs. In contrast, the most treatment resistant patients showed the least robust cognitive improvements.

The improved attention and verbal fluency from clozapine, which has appeared robust, does not appear to be due to practice effects. In addition, the cognitive effects of clozapine appear to be lasting. Fujii, Ahmed, Jokumsen, and Compton (1997) found significant gains on the WAIS-R Full Scale, Verbal, and Performance IQs and on the WAIS-R similarities and Digit Symbol subtests in patients who had been treated with

clozapine for a minimum of 1 year. The improvements in verbal learning and memory may be important to social competence areas, such as community outcome, social problem solving, and skill acquisition (Green, 1996). Finally, Metzler et al. (1999) also found a significant relationship between improvement in cognitive measures with clozapine and quality of life.

Metzler and McGurk (1999) evaluated six studies and found risperidone to be effective in improving some measures of perceptual/motor processing, reaction time, executive function, working memory, verbal learning and memory, and motor function, but not verbal fluency or motor learning. Researchers in two of the three studies on executive function found improved cognition, as assessed by the WCST-Categories and Total Errors, and Trail Making B. Researchers in four studies found improvements in cognition to be unrelated to symptom improvement.

Because no published studies were available on the efficacy of olanzapine on cognition and schizophrenia; Metzler and McGurk (1999) reported their own preliminary data. Olanzapine had no effect on participants' scores on the WCST-Categories of Percent Perseveration, the Weschler Intelligence Scale for Children- Revised (WISC-R™, Psychological Corporation, San Antonio, Texas, *www.psychcorp.com*) Mazes, or the Trailmaking A and B, all of which are measures of executive functioning. However, olanzapine was associated with significant improvement on one measure of executive function (Stroop Color Word Interference), verbal learning and memory, verbal fluency, and reaction time. The magnitudes of the effects found were generally greater than those previously reported for clozapine and risperidone.

Bellack et al. (2004) investigated the effects of clozapine and risperidone on social competence and problem solving in persons with schizophrenia and found clinical improvement with both medications. However, they found virtually no medication effects on either social competence or problem solving. Social competence was evaluated with the Maryland Assessment of Competence, and problem solving was assessed using the Wisconsin Card Sorting Test. No significant changes in social skills were found in patients receiving risperidone, and a small but significant decrease in verbal skill was observed for patients given clozapine. A small decrease in percent of perseverative errors on the WCST for patients receiving risperidone was found, but no other significant changes were observed in the WCST performance for either drug. These findings suggest the possible independence of social functioning from clinical symptoms. In addition, it highlights the importance of pairing pharmacological interventions with psychosocial treatments.

Evidence suggests that verbal learning and memory are particularly important for community functioning (Green, 1996) and can assist in acquisition of social skills needed for future community and occupational functioning. Although cognitive improvements from atypical neuroleptic medications may not directly affect social competence and problem solving, they may set the stage for greater attention, comprehension, and learning potential required for acquisition of social skills. Thus, the current state of pharmacological interventions seems to have created an environment ripe for the more successful teaching of social skills to schizophrenic individuals than has been possible in the past. The outcome may be an additive effect of cognitive re-

training, medication efficacy, and social skill training, leading to an overall improved quality of life for persons with schizophrenia.

Social Skills and Schizophrenia

Social skills training has become a widely accepted component of treatment for persons with schizophrenia. Practitioners have used social skills training with the goals of teaching appropriate social behaviors, enhancing social functioning, and improving overall social competence. They also have, at times, included more indirect goals of symptom reduction, reduction of relapse, and improved adjustment. Ultimately, the goals of most treatments for persons with schizophrenia are to improve the quality of life.

Many studies to date have documented the effectiveness of social skills training for this population. Three meta-analytic studies have been completed to date (Benton & Schroeder, 1990; Corrigan, 1991; Dilk & Bond, 1996). Benton & Schroeder (1990) examined 27 studies between 1972 and 1988. Most of these were completed in the U.S. (81%); were inpatient settings (85%); and had mixed samples of psychotic, long term, and schizophrenic patients. Researchers concluded that social skills training leads to significant improvement in social behavior, with a marginal but significant reduction in symptoms and improved general functioning.

Corrigan's (1991) meta-analysis included studies between 1970 and 1988 including several populations of people diagnosed as developmentally disabled, "psychotic", "nonpsychotic", and legal offenders. The effect size was largest for those with developmental disabilities and smallest for the offenders. The findings for the psychotic group indicated that the effect size for social behavior change was

substantial, although the number of studies was small (*n*=17) and the groups were mixed samples of disorders.

Dilk and Bond (1996) assessed a much larger group of studies (*n*=68) including all types of skills training for persons with severe mental illness. The studies included were completed between 1970 and 1992. Most were conducted in psychiatric hospitals. Overall conclusions were that social skills treatment is effective for teaching inpatients social skills; however, few were able to demonstrate improvement in functioning beyond the hospital setting. Of interest was a tentative finding suggesting a dose-effect relationship.

In a recent review, Bellack (2004) examined the empirical literature on psychosocial rehabilitation strategies for schizophrenia and other severe mental illnesses. The three best supported approaches were social skills training, cognitive behavior therapy, and cognitive remediation. Of the three, social skills training had the strongest empirical support and, thus, can be considered an evidence-based treatment. The 2002 PORT (Patient Outcomes Research Team) update (Lehman, 2002) concluded that social skills training should be made available to patients who have interpersonal problems and poor social role functioning. However, the evidence also stipulates its use as specialized treatment for social impairment, not as general treatment for psychotic symptoms. Improving social skills can be expected to reduce stress and improve quality of life, which may in turn reduce psychotic symptoms and the risk of relapse.

Hersen and Bellack (1976) provided a definition of social skills that encompasses a broad array of social behavior. They emphasized that it is the specific situation, or the

context of the interaction, that becomes important in helping to determine the appropriate social action to be taken. In addition, they posited that social skills involve the

> ability to express both positive and negative feelings in the interpersonal context without suffering consequent loss of social reinforcement. Such skill is demonstrated in a large variety of interpersonal contexts…and it involves the coordination and delivery of appropriate verbal and nonverbal responses. (p. 562).

Bellack, Mueser, Gingrich, and Agresta (1997) pointed out that the socially skilled individual must also know what, where, and when different behaviors are allowed or appropriate. Therefore, social skill also involves an ability to perceive and analyze cues that define a situation and the knowledge of what is an appropriate response. In addition, social competence also involves a maximization of reinforcement. Some of the powerful sources of reinforcement that are connected to social skills are marriage, friendship, sexual gratification, employment, and service, such as in restaurants and stores. A person who is unable to use social skills correctly may be apt to fail in these arenas. Social failure can lead to anxiety, frustration, and isolation, all of which can be particularly detrimental for persons with schizophrenia. Hence, social skill deficits may increase a risk of relapse, whereas social competence may decrease that risk (Bellack et al., 1997).

The social skills model proposed by Bellack et al. (1997) described the elements of social skills and the reasons for dysfunction (see Table 3).

Table 3

Social Skills Model

1. Social Competence is based on a set of component response skills.
2. These skills are learned or learnable.
3. Social dysfunction results when:
a. The requisite behaviors are not in the person's behavioral repertoire.
b. The requisite behaviors are not used at the appropriate time.
c. The person performs socially inappropriate behaviors.
4. Social dysfunction can be rectified by skills training.

Social competence is based on a set of *learned* performance abilities --hence the term "social *skills*"-- whereas poor social behavior is usually the result of social skills deficits. Children learn basic aspects of socialization; more complex behavioral interactions, such as dating or job interviews, are assimilated during adolescence and young adulthood. Research in the area of social learning theory (Bandura, 1969; Skinner, 1938, 1953) indicates that virtually all social behaviors are learnable or able to be modified by training.

Of the three instances in which social dysfunction results, as outlined in Table 3, the first is particularly common for a person with schizophrenia: the lack of a skill repertoire. Bellack et al. (1997) outlined three specific reasons for this phenomenon. First, as previously mentioned, people who have developed schizophrenia in adulthood often were children who would otherwise have seemed normal. Nonetheless, they may have had subtle attention deficits in childhood. These deficits could have interfered with the acquisition of social skills and the normal development of appropriate social relationships. Second, during adolescence and young adulthood, not only were those subtle deficits interfering with social learning, but the schizophrenia syndrome may have manifested itself, particularly with positive or psychotic symptoms. Thus, during a critical

period for mastery of adult social roles, such as dating and sexual behaviors, work-related skills, and the ability to form adult relationships, many individuals with schizophrenia were gradually isolating due to their symptoms, and, oftentimes to their lengthy stays in psychiatric hospitals or outpatient community programs. These events removed the individuals from a "normal" peer group and provided little opportunity to engage in age-appropriate social roles. Social contacts for these individuals were often limited to other severely ill persons and mental health professionals. These circumstances do not present an opportunity to acquire and practice appropriate adult roles. Social functioning deficits have been found to be present and particularly debilitating near the onset of schizophrenia, when individuals are suffering from their first psychotic symptoms (Grant, Addington, Addington, & Konnert, 2001). Third, even the skills that may have been mastered earlier in life may be lost due to lack of use and/or to lack of reinforcement from the environment (Bellack et al., 1997).

Regarding the second item for social dysfunction in Table 3, several factors may influence whether or not a person will use behaviors in one's repertoire. For people with schizophrenia, a number of different factors can influence successful enactment of social skills (Bellack & Mueser, 1993). These factors are reviewed below.

Factors affecting social functioning.

Psychotic symptoms, such as hearing intrusive voices or feeling persecuted or jeopardized by malevolent forces, can interfere with a person's ability to focus on social interaction. In a study conducted in Japan with individuals with schizophrenia (Ikebuchi et al., 1996), psychiatric symptoms, particularly positive symptoms as assessed by BPRS scores, showed a significant negative correlation with social perception on a role

play test. In contrast, Bellack, Morrison, Wixted, and Mueser (1990) found correlations between BPRS factors and role play measures to be uniformly low and nonsignificant. Research indicates that people with schizophrenia still show significant deficits in social functioning when their positive symptoms of delusions or hallucinations are under control (Bellack, Morrison, Wixted, & Mueser, 1990; Bellack, Mueser, Wade, & Sayers, 1992; Bellack, Sayers, Mueser, & Bennet, 1994). In addition, research results also suggest that social skills are not related to symptom subscales on the BPRS (Bellack et al., 1990), nor are symptoms predictive of social skill improvements during a treatment period (Mueser, Bellack, Douglas, & Wade, 1991). These findings suggest that individuals with schizophrenia are able to benefit from social skills training even when their positive symptoms persist. Psychotic symptoms can impair social performance; however, they do not explain a preponderance of the social disability in persons with schizophrenia (Bellack et al., 1997).

In contrast, social skills training and psychosocial interventions have been found to impact clinical status and promote reduction of such positive symptoms. Dogan et al. (2004) found a significant reduction on the BPRS (Brief Psychiatric Rating Scale), as well as improvement in quality of life and perceived social support, after three months of bi-monthly psychosocial home visits from a mental health professional team consisting of one psychiatrist and one psychiatric nurse.

Motivational factors are important to consider in social interactions. Many people with schizophrenia avoid social interactions and seem to have little motivation to develop relationships with others. A number of factors may contribute to this dynamic. Most people with chronic schizophrenia have experienced rejection, failure, and

censure in their attempts at social interaction. As a result, they have learned to minimize their efforts in the social arena rather than be rebuked or criticized again. In addition, the stress accompanying endeavors to interact socially may pose a very real threat to their ability to control their symptoms, so they may choose to take less demanding social roles to minimize the risk to their continued mental health (Bellack et al., 1997).

Affective states are also an influencing factor in social behavior. As indicated above, for many people with schizophrenia, social interaction, is anxiety provoking. Bellack, Mueser, Wade, Sayers, and Morrison (1992) found that patients with schizophrenia had an impaired ability to cope with both high expressed emotion (EE) and even mild negative affect. These patients would withdraw from potential conflict situations even if they were being taken advantage of or being unjustly accused. However, as previously mentioned in the *Social Cue Perception* section, Corrigan and Addis (1995) found that emotionally arousing stimuli--in this case, positive stimuli--helped to increase performance on a social cue perception task for individuals with schizophrenia. Thus, the valence of the stimuli and the mood of the subject appear to influence effective social behavior.

Bellack et al. (1997) also pointed out that environmental factors often make it difficult for individuals with schizophrenia to use their social skills successfully. They identified three factors specifically hindering social interactions. First, individuals with schizophrenia often have strange idiosyncrasies that are judged by others to be odd. Consequently, they are often treated unsympathetically, critically, or even with hostility, and thus, are not reinforced for their efforts to be social. Second, many people with schizophrenia are unemployed and have poor financial situations. These

circumstances can prevent them from being able to participate in social-recreational activities in which they might otherwise be able to succeed and find pleasure. Finally, the diagnosis of schizophrenia is stigmatizing. People in society often avoid those known to have a stigmatizing illness. Hence, these individuals are often isolated and have poor social networks. They might have few if any people with whom to practice social skills. Stays in hospitals or community mental health programs can limit their interactions to other severely mentally ill individuals, mental health staff, and family members. Thus, individuals with schizophrenia are often excluded from the opportunities most people have to build friendships via work, school, childrearing, or hobbies.

Several neurobiological factors also affect social behavior. As discussed in the *Neuropsychological Factors* section, individuals with schizophrenia have difficulties in receiving, encoding, and sending information, particularly social information. Attention is impaired, so it can be difficult for persons with schizophrenia to discern between a person talking with them, the voices in their heads, or voices on the TV or radio. Persons with schizophrenia often have poor memory skills, specifically verbal memory skills, which appear to be integral to social interactions. Mueser, Bellack, Douglas, and Wade (1991) found that poorer memory skills found in patients with schizophrenia or schizoaffective disorder were significantly associated with a slower acquisition of social skills during a two week period of social skills training.

Complex information processing also may be associated with neurobiological aspects of schizophrenia. People with schizophrenia show deficits in performance involving abstract thinking tasks (Corrigan, 1997). Problem solving is difficult for

persons with schizophrenia because of this lack of ability to process abstractions and deduce relationships between events. In addition, they have difficulty ordering actions in a temporal sequence and initiating and maintaining a plan of action (Bellack et al., 1997). Reasoning and problem solving often are disorganized or random for people with schizophrenia. However, these deficits are not always easily noticed at first; this oversight can add to the negative effect for patients with schizophrenia. Family members and others may get frustrated or angry with them because they fail to respond properly or do the things asked of them when it appeared they understood the directive, such as instructions for taking medications or following directions. This part of the disability is less obvious and often is mistaken for laziness or disrespect (Bellack et al., 1997).

Negative symptoms may also relate to other significant neurobiological deficits. Avolition, anergia, and generalized lack of motivation are common symptoms of schizophrenia. These symptoms can also be brought on by bouts of depression and social isolation or by large doses of antipsychotic medication. The lack of motivation and energy often make it especially difficult for persons with schizophrenia to participate in or enjoy social activity with others. This is one of the most deleterious aspects of schizophrenia and is the least responsive to medication (Bellack et al., 1997).

Components of social skills.

In their treatment manual for social skills training for schizophrenia, Bellack et al. (1997) made a division between two broad sets of social skills: expressive skills and receptive skills. Expressive skills are comprised of three major areas: verbal skills, or

speech content; paralinguistic behaviors, such as voice volume, tone, pitch and intonation; and nonverbal behaviors, such as body posture, and eye contact.

Persons with schizophrenia can have poor verbal behaviors in part because they use language in an odd or unusual manner, as in the case of neologisms. They often have a paucity of relevant or appropriate and interesting things to say, due to limited experiences resulting from not working or going to school. The conversation may also be dominated by their preoccupation with personal delusions or other psychotic content. Appropriate paralinguistic behaviors are also difficult for those with schizophrenia. A particular feature of the deficit syndrome of schizophrenia is a monotonic voice tone and slow rate of speech. From the perspective of potential social contacts, this type of speech can be unpleasant to listen to and difficult to interpret. This lack of skill puts individuals with schizophrenia at a disadvantage for developing emotional relationships, given that pace, volume, and intonation are especially important in communicating affect or emotion (Bellack et al., 1997).

Nonverbal behaviors, the third expressive skill, also have an influential role in interpersonal impact. Facial expression is a primary cue to emotional state, and eye contact is a good indicator of a person's involvement in the social interaction. Schizophrenia patients are typically gaze-avoidant. They are often uncomfortable in social situations; it seems to be difficult for them to maintain eye contact. Posture can also indicate certain feelings, such as interest or authority. "Proximics," a category of non-verbal behavior, refers to the distance between people during their interactions. Various behaviors, personal roles, and circumstances, including culture, dictate the appropriate distances between people in a social interaction. For example, strangers

keep further distances between each other than friends do, and romantic partners may get quite close. However, strangers in a crowded bus can also be quite close; or a familiar person, such as one's boss, might necessitate a larger interpersonal distance. These rules are quite clear within a culture; however they are unwritten and are usually not directly taught. Rather, the rules are tacitly assimilated during social development. However, for reasons stated above, persons with schizophrenia often have not learned these rules. Being anxious in close interpersonal situations, they will often maintain inappropriately large interpersonal distances. Some persons with schizophrenia may be better with proxemics, paralinguistic behaviors, or verbal content; nonetheless it may remain difficult to put together all these aspects of communication appropriately. Thus, persons with schizophrenia are often socially misunderstood due to their poor integration and execution of these expressive behaviors (Bellack et al., 1997).

Receptive skills can also be understood as social perception. Regardless of the individual's ability to express socially skillful responses, an accurate perception of the social situation is necessary for social competence. As mentioned previously, Corrigan and colleagues have found that individuals with schizophrenia have distinct deficits in this area (Corrigan & Green, 1993; Corrigan, Green, & Toomey, 1994). Bellack et al. (1997) described social perception as a combination of attention, analysis, and knowledge. It appears that persons with schizophrenia have deficits in each of these components.

Persons with schizophrenia consistently show poorer performance in comparison to normals on attention-oriented tasks (Spaulding, Garbin, & Dras, 1989; Spaulding et al., 1999). Corrigan and Green (1993) showed that individuals with schizophrenia are

less sensitive than the general population to interpersonal cues in social situations. Their sensitivity to cues varies depending on the level of abstraction. The more abstract cues are, the less people with schizophrenia are able to successfully identify the cue. Concrete items are easier for them to comprehend (Corrigan, 1997). Corrigan, Green, and Toomey (1994) concluded that information processing deficits and negative symptoms in schizophrenia may diminish sensitivity to social cues such that abstract cues are mistakenly identified as being present. Toomey, Wallace, Corrigan, Schuldberg, and Green (1997) found a sample with schizophrenia to be less skillful than normal subjects on measures of social problem solving and of understanding social sequences, and social judgement; they found all of these deficits related to inadequate or erroneous nonverbal social perception. Toomey et al. (1997) speculated that poor nonverbal social perception skills make it more difficult for people with schizophrenia to learn the social conventions of the culture at large.

When considering knowledge as the third component of social perception, individuals with schizophrenia are again at a disadvantage. As stated previously, just as most normal adolescents and young adults are learning and honing their social skills and knowledge, individuals with schizophrenia are contending with psychotic symptoms and learning how to negotiate a psychiatric hospital or outpatient community center. In addition, their knowledge of social skills from childhood was most likely also compromised. Research has indicated that adults with schizophrenia showed more problems with attention and behavioral problems also during their first sixteen years (Neumann, Baum, Walker, & Lewine, 1996; Neumann, Grimes, Walker, & Baum, 1995),

which most likely made it difficult for them to learn appropriate behaviors even as a small child.

In addition to recognition of interpersonal cues and situations, perceiving emotion is also an integral part of receptive social skills. Mueser, Penn, Blanchard, and Bellack (1997) have found that schizophrenia patients have poor performance on tasks of affect recognition. In particular, affect recognition appeared to be poorest for those patients with schizophrenia who had more chronicity and had inpatient status.

Conversational skills are another important aspect of social skills that combine the use of both expressive and receptive skills. Participating in a conversation requires both verbal and nonverbal responses. Bellack et al. (1997) outlined specific components needed for conversation, such as verbal responses for 1) starting conversations, 2) maintaining conversations, and 3) ending conversations. Simple greetings such as “hi” or “good morning” can be used for initiation. Facilitating comments like “isn’t today a beautiful [miserable] day?” or open-ended questions serve to keep a conversation going. Ending a conversation or leaving a group is often more difficult, particularly for a person with schizophrenia. Comments can include: “I have to go; see you later,” “What time is it? I have to meet someone,” or “It was nice talking with you. See you tomorrow.” Often individuals with schizophrenia will just leave abruptly or go on talking ad infinitum (Bellack et al., 1997). Another factor important in complex conversations is being able to distinguish when to answer a specific question, such as “What was the score of the game?” or to reply to a question such as “Hi. What have you been doing today?” with general conversation. The latter question does not require a specific run down of daily activities but, rather, serves as a conversation initiator. For persons with schizophrenia,

who have more concrete thinking, this subtlety of conversation may not be immediately understood. Still another important factor for conversation is providing a partner with reinforcement for their conversation, such as “Uh-huh,” “yeah,” “that’s right,” or “Mm-hmm.” A number of other nonverbal responses improve conversations and social behaviors in general. Table 4 lists those elements that contribute to successful social interactions.

Table 4

Nonverbal Social Skills

1. Eye contact should be maintained intermittently, interspersed by gazing in the direction of the partner.
2. Voice volume should approximate a “conversational” level, neither too loud nor too low.
3. Voice tone should not be monotonic, but should employ inflection to communicate emphasis, affect and so on.
4. Response latency to input from the interpersonal partner should generally be brief. Mediators such as “Let me think about that” and “Hmm” can be employed when a response must be contemplated.
5. Speech rate should coincide with normative conversational style.
6. Speech dysfluencies should be at a minimum.
7. Physical gestures such as head nods, hand movements (for emphasis), and forward leaning all add to the qualitative impact of the individual.
8. Smiles, frowns, and other facial gestures should be employed in conjunction with verbal content.
9. Physical distance should be maintained according to preferred social norms.
10. Posture should be relaxed, rather than wooden.

Note: (Adapted from Bellack, Mueser, Gingerich, & Agresta, 1997, pp. 15-16.)

In addition to conversational skills, social skills training should include some specific target behaviors that are particularly problematic for individuals with schizophrenia, such as assertiveness, dating, romantic and sexual interaction, independent living, and medication management (Bellack et al., 1997). Individuals with schizophrenia often avoid or retreat from situations in which they might be criticized or encounter conflict. Persons with schizophrenia lack assertiveness, and their ability to

cope with even mild negative affect is impaired (Bellack, Mueser, Wade, Sayers, & Morrison, 1992). They often are faced with frustration directed towards them from family members or staff for refusing or failing to deal directly with difficult issues. “Appropriate assertiveness is one of the most critical skills for chronic patients to learn in order to avoid and reduce distress and avoid mistreatment” (Bellack et al., 1997, p. 18). To improve quality of life, it is particularly important for social skills training to include dating, romantic involvement, and sexual interactions. Information about dating etiquette, such as making telephone calls, and selecting and planning activities and about sexual functioning are essential to provide. These areas are particularly complex and sometimes require sophisticated discrimination of social advances or responses. Particularly for female clients who may be more vulnerable to unwanted sexual advances, assertion skills focusing on condom use and saying “no” are important to reduce the risk of sexually transmitted diseases or manipulation and abuse.

Independent living skills, including job skills and activities of daily living such as cooking, grocery shopping, managing money, and using public transportation, may be addressed by vocational training. However, other aspects of these skills contain social components. Thus, social skills training can target some of the more subtle aspects. For example, when interviewing for a job, individuals with schizophrenia should be taught what to disclose and what not to share about their psychiatric history and symptoms, as well as how to present themselves and their history in the best light possible. How to find a place to live, how to get along with a roommate, and how to interact with neighbors are all skills with which persons with schizophrenia may have difficulty. Thus,

they might require some instruction from the social arena to aid them in the successful negotiation of such tasks.

Finally, medication management is a critical area in which social skills training might help to reduce risk of relapse and poor community integration. Bellack et al. (1997) stated that problems with communication between the client with schizophrenia and the health service provider often contribute to difficult or poor readjustment into the community. Helping the person with schizophrenia to effectively voice to their health service providers their concerns, reactions, expectations, and desires about their treatment and medications could likely increase treatment compliance as well as reduce relapse. In addition to necessary education about medication, including its importance and side effects, medication management skills also include specific conversational and assertiveness skills to use when discussing questions or concerns effectively with physicians and nursing staff.

Efficacy of social skills training.

Substantial support for the efficacy of social skills training with persons with schizophrenia can be found in the literature. Bellack, Turner, Hersen, and Luber (1984) treated 20 individuals with schizophrenia in a 12-week day hospital program and 44 patients in the same program to whom they also provided comprehensive social skills training. Both groups improved on measures of social competence (Hopkins Symptom Checklist, Psychiatric Status Schedule, and the Wolpe-Lazarus Assertiveness Inventory), with the social skills training groups improving more uniformly than the day hospital patients. However, at the six-month follow-up, the social skills training groups (SST) did consistently better than the day hospital patients (DH) on the assessment

instruments. The SST either continued to improve or maintained their gains on most measures, whereas the DH group either maintained gains or lost them. In addition, the changes observed were notable in three respects. The effects were not limited to specific behavioral responses such as a change in voice volume/tone or eye contact. Rather the changes were evident in important areas of functioning and core symptoms as noted by the gains on the Psychiatric Status Schedule and the Hopkins Symptom Checklist. Second, the effects were discernible above and beyond the core day treatment program, which was itself a viable therapeutic intervention. These findings indicate that highly focused and structured training is a worthwhile endeavor and makes an independent contribution to rehabilitation. Third, the effects were durable. Significant gains or maintenance were found six months following treatment. This study underscores the fact that social skills training can produce meaningful, lasting changes.

Mueser, Bellack, Douglas, and Wade (1991) examined patient characteristics and the acquisition of social skills among schizophrenia and affective disorder patients in a brief inpatient social skills training group. Group sessions were conducted for one hour, three times per week over a two-week period. The researchers assessed memory (Weschler Memory Scale (WMS™, Psychological Corporation, San Antonio, Texas, *www.psychcorp.com*)) and symptomtolgy (BPRS) before and after treatment to determine whether impairments in these areas would interfere with ability to learn and retain the social skills curricula. A moderate improvement in social skills was found, even after a brief period of two weeks. In addition, improvements in social skills of individuals with schizophrenia or schizoaffective disorder were consistently predicted by memory impairments but not by symptomology or demographic characteristics. The

pattern of correlations indicated that social skills deficits were related to impairments in memory within the schizophrenia group, but not within the affective disorder group. However, those schizophrenic individuals with more pronounced memory deficits still improved their skills over the two-week period and maintained those gains at the one-month follow-up. Therefore, individuals with greater memory impairment are capable of learning social skills, although at a slower rate than those less impaired individuals.

Mueser et al. (1991) conducted a multiple regression in which verbal memory was the strongest predictor of improvements in social skills for the schizophrenia group. The verbal nature of social skills training may account for the importance of verbal memory to skill acquisition. In addition, concentration was also a predictor of improvement in social skill, supporting the notion that attentional impairments may also contribute to a slower rate of learning in some patients. The researchers also examined memory factors (Digits Forward and Digits Backward on the WMS) for changes over time. Digit span scores from pre-treatment to one-month follow-up were stable. These results are encouraging and illustrative of the interaction between cognitive factors and social functioning. But with respect to efficacy, the results must be interpreted with caution. Due to the lack of a no-treatment control group, the question still remains as to whether the social skills training intervention resulted in improvements in social skill independently or whether such improvements would have occurred in the absence of a skills training program. This question will be addressed in the present study.

Kern, Green, and Satz (1992) examined neuropsychological functioning and social skills training to help target those cognitive abilities necessary for skill acquisition. They followed 16 psychotic inpatients (10 schizophrenia, 3 schizoaffective disorder, 2

bipolar disorder, and 1 psychotic disorder-not otherwise specified) during their involvement in a skills training program over an eight-month period. The researchers held daily two-hour sessions, concentrating on the skills related to symptom management and medication management. They administered neuropsychological measures once at baseline, and collected outcome measures throughout the duration of the training period. As expected, the patients as a group showed skill acquisition as they progressed through the skill areas of the modules. In addition, better verbal memory, sustained vigilance, and less susceptibility to distraction were associated with better skills training performance and more appropriate classroom behavior.

The generalizability of Kern et al.'s (1992) findings is limited due to the heterogeneous diagnostic group and the small number of subjects. It is also worthy to note that the researchers examined cognitive factors via neuropsychological tests only as predictor variables. They conducted no post-treatment assessments on these factors. The present study will address this gap by conducting assessment of cognitive/attentional components at both pre- and post-assessment.

Interactions between cognition and social functioning.

As previously described, a correspondence exists between cognitive factors and social functioning for persons with schizophrenia. However, the nature of the information processing-social functioning relationship is still not completely understood. Penn et al. (1997) examined this correspondence in a review of three studies: (Penn et al., 1993; Penn, Mueser, Spaulding, Hope, and Reed, 1995; Spaulding, Penn and Garbin, 2002)**.** They noted that, in general, better cognitive skills including, attention/vigilance, and reaction time, were associated with better social competence.

However, particularly from the results of Penn et al. (1995), it appears that the overall pattern of correlations between information processing and indices of social competence reflect a differentiated correspondence rather than a single global dimension. In other words, specific deficits in cognitive functioning were related to specific variables. For example, successful role-play behaviors were associated with better vigilance, and poor paralinguistic behaviors were associated with slower reaction time.

Further illustration of the relation between information-processing variables and social functioning was found when naturally occurring social behaviors on the ward were examined. Researchers assessed both information processing and ward behavior on two occasions: during initial entry into psychiatric rehabilitation and approximately six months later. They found an increase in ward functioning as measured by the NOSIE-30 was associated with a decrease in false alarms on the CP/SPAN task. After six months of treatment, they found improvement in vigilance performance to be associated with improvement in overall ward functioning. The implications of this finding are exciting. Could improvement in social functioning be facilitative of cognitive changes as well?

Present Study

The present study was designed to evaluate the impact of a specific social skills training program for individuals with schizophrenia or schizoaffective disorder (Bellack et al., 1997) upon social and nonsocial cognitive factors. Bellack's specific social skills training program was chosen in part due to the user friendly treatment manual, and detailed lesson plans that lend themselves to ease of use with mental health

professionals with varied training levels (Wirshing, 2000). Both social skill acquisition and cognitive/attentional factors were assessed at pre- and post-treatment to discern improvements in social functioning and nonsocial cognitive functioning. The effectiveness of social skills training has been shown in numerous studies (e.g., Bellack et al., 1984; Kern et al., 1992; Mueser et al., 1991; Roder et al, 2002). Correlations between cognitive deficits and social functioning deficits have been reported as well (e.g., Mueser et al., 1991; Penn et al., 1993, 1995; Spaulding, 1978). Penn et al. (1997) made the distinction that purely cognitive or "nonsocial information-processing models" are less explanatory of social dysfunction than social cognitive measures. However, it is unclear whether nonsocial cognitive factors are acting upon social competence factors or whether the relationship is reciprocal with social information processing factors also influencing nonsocial cognitive factors.

Much of the literature has focused upon cognitive factors as predictors of the patient's ability to acquire social skills from training. The question to be examined is as follows: After a regime of social skills training, might the yield be not only an improvement in social functioning but also an improvement in some cognitive functions? Might the social skills training provided to individuals with schizophrenia show a by-product of improvement in some cognitive skills? The current study used a pre- and post- assessment design to measure both non-social information-processing variables and social cognitive variables before and after an eight-week period of social skills training. To date, no studies have compared the impact of a social skills training program within a day treatment program to the impact of the regular day treatment program by itself, incorporating assessment of both social and nonsocial cognitive

variables before and after the treatment intervention. In addition, most studies in this area lacked a control group. The present study also included a wait-list control group.

Overall, this study was designed to address three major research questions: (1) Does the social skills training model proposed by Bellack et al. (1997) lead to significant improvements in social skills knowledge and functioning for outpatients with schizophrenia or schizoaffective disorder over and above the typical day treatment option? (2) What information-processing variables distinguish those individuals who respond most effectively to treatment? (3) What variables, if any, within the information-processing domain also show improvement after the social skills training?

Main Hypotheses

1. The social skills training treatment group will increase social functioning to a greater degree than the wait-list control group. This hypothesis is supported by past research showing the effectiveness of social skills training over and above typical day hospital treatment (e.g., Bellack et al., 1984).

2. Those individuals receiving social skills training will show improved scores on measures of *both* social cognition *and* information-processing variables at post-testing as opposed to the wait-list control group, who will not be expected to show improved scores at post-testing.

3. Those individuals showing higher scores for measures of memory and attention at pre-testing will show greater improvements on those measures from social skills training at post-testing.

    a. Specifically, those individuals showing the greatest ability on the Wisconsin Card Sorting Task section of COGLAB at pre-testing will show the most

improvement in social functioning and social cognition at post-testing after social skills training. This hypothesis is supported by previous research indicating a predisposition to treatment response (Penn et al., 1993).

Supplemental Hypotheses

1. Individuals with schizophrenia – paranoid subtype will respond better to the treatment intervention of social skills training than will persons with other subtypes. Corrigan (1997) has shown that social perceptual deficits are more pronounced in patients with nonparanoid schizophrenia than comparison groups comprised of individuals with paranoid schizophrenia or normal controls.

2. Individuals with the diagnosis of schizoaffective disorder will show differential improvements and also will respond better to the treatment intervention of social skills training than will those individuals with the diagnosis of schizophrenia. This is supported by Mueser et al. (1991) who found memory to be one of the strongest predictors of improvements in social skills for the schizophrenia group. At initial assessment for the study, Mueser also reported that those individuals with Schizoaffective Disorder had higher verbal memory scores than did those with Schizophrenia. If the Schizoaffective disorder individuals showed higher memory skills than do those with Schizophrenia, and if increased memory functioning is correlated with increased social skill acquisition, then it stands to reason that individuals with Schizoaffective disorder who have better memory skills may have a better response to the skills training.

3. Tasks of vigilance and discrimination will show a stronger relation with social skills improvement for older and more chronic persons with schizophrenia than for younger persons with schizophrenia. In other words, stage of the illness in

schizophrenia, and also chronicity and age of participants, may mediate the relationship between information-processing and social functioning (Penn et al., 1993; Penn, Mueser, Spaulding, Hope, & Reed, 1995).

METHOD

Participants

Participants were 35 individuals diagnosed with schizophrenia spectrum disorders. Criteria for participation in this study was a Diagnostic and Statistical Manual of Mental Disorders – Fourth Edition (DSM-IV) diagnosis of schizophrenia or schizoaffective disorder, as evidenced by pre-existing medical/mental health records. The Schedule of Affective Disorders & Schizophrenia – Change Version (SADS-C, Spitzer & Endicott, 1978b), a diagnostic structured interview, was used at post-testing to confirm a diagnosis of schizophrenia or schizoaffective disorder before inclusion in the data analysis. Participants were recruited from two outpatient psychosocial rehabilitation facilities in Maryland: 1) Way Station, Inc., and 2) Revisions Behavioral Health Systems. Participation in the study was voluntary. Thirty-five individuals participated in this study altogether, 19 individuals in the treatment condition (54.3%) and 16 in the wait-list control condition (45.7%). All individuals were adults age 21 and over. None of the participants were married; 80% of the sample were single, and the remaining 20% were either divorced, separated, or widowed. The majority of the sample (82.9%) had no children; the remaining participants (17.1%) had anywhere from 1 to 8 children. Tables 5-11 contain further demographic information for this sample such as gender and ethnicity (Table 5), age, number of hospitalizations, and years with a psychiatric diagnosis (Table 6), housing status (Table 7), diagnoses (Table 8), and types of medications (Table 9, 10, & 11).

Table 5

Gender and Ethnicity of Participants

	ETHNICITY				
	Caucasian	African-American	Asian-American	Other	Total
Males	16	6	1	1	24
Females	6	1	3	1	11

Table 6

Age, Number of Hospitalizations, and Years with Psychiatric Diagnosis

	MEAN	SD	RANGE
AGE	41 years	8.6	21 – 58 years
# OF HOSPITALIZATIONS	10.4	10.5	0 - 50
# OF YEARS W/ DX	15.8 years	9.8	1 - 38

Table 7

Housing Status of Participants

	# OF PARTICIPANTS	PERCENTAGE
Group Home- maximum support	15	42.9%
Group Home – minimal support	6	17.1%
Lives with Family	4	11.4%
Lives w/ roommate- staff support	5	14.3%
Lives alone –staff support	4	11.4%
Other	1	2.9%

Table 8

Diagnoses of Participants from SADS-C Structured Interview

SADS-C DIAGNOSES	# OF PARTICIPANTS
295.30 Schizophrenia- Paranoid Type	2
295.10 Schizophrenia- Disorganized Type	3
295.90 Schizophrenia- Undifferentiated Type	8
295.70 Schizoaffective Disorder	18
298.90 Psychotic Disorder - NOS	1
TOTAL	32

Note. Table includes only 32 participants of the original 35 participants due to exclusion of one participant for inappropriate diagnosis and 2 participants who did not remain in study after pre-testing phase and did not complete any post-test measures. SADS-C interviews were conducted at post-testing.

Table 9

Types of Medications

CLASS OF MEDICATION	% OF PARTICPANTS IN SAMPLE
Atypical Anti-Psychotics	100%
Typical Anti-Psychotics	31.4%
Anti- Depressants	51.4%
Anti- Anxieties	34.3%
Mood Stabilizers	42.9%

Table 10

Types of Atypical Medications

	# OF PARTICIPANTS	PERCENTAGE
Risperdal	11	31.4%
Zyprexa (Olanzapine)	10	28.6%
Clozapine	6	17.1%
Seroquel	4	11.4%
Other or Combinations of Above	4	11.4%
TOTAL	35	100%

Table 11

Dosage Levels of Atypical Anti-Psychotics

DOSAGE LEVEL	# OF PARTICIPANTS	PERCENTAGE
Low	7	20%
Medium	17	48.6%
High	9	25.7%
Unknown	1	2.9%
TOTAL	35	100%

Recruitment, Sites, and Consent Procedures

Treatment groups were advertised as an “Interaction Skills for People with Schizophrenia” group within the three psychosocial programs where the participants received mental health services: 1)-Way Station Inc., Frederick, MD; 2)- Revisions, Inc. – Savage, MD; 3) Way Station, Inc., Columbia, MD. In addition, the study was presented to relevant staff and mental health professionals who provided appropriate

referrals to the group. Table 12 includes total counts of the number of participants in control and treatment conditions at each site location.

Table 12

Site of Testing & Treatment by Type of Group

SITE	CONTROL	TREATMENT	TOTAL
Way Station, Inc.-Frederick, MD	7	7	14
Revisions, Inc.-Savage, MD	4	5	9
Way Station, Inc.-Columbia, MD	5	7	12
TOTAL	16	19	35

Initially, the researcher provided participants with an oral explanation of the research project/group treatment at a group meeting and individually. Voluntary participation was explained as well as participants' right to withdraw from the study at any time. Participants were informed of the anticipated benefits to individuals with a diagnosis of schizophrenia, specifically in the area of social functioning.

Following this brief overview, participants were asked to read their written copy of the informed consent information and to provide their signatures if they agreed to participate in the research project. Included in the informed consent form was a statement that required participants to give permission to the principal investigator to have access to their records for the purposes of a file review to gain demographic information. Participants were assured that this information would remain confidential. Participants were provided with a copy of the informed consent form and reminded that this form provided them with contact telephone numbers should they have any questions or concerns regarding their participation in the research project.

Measures

Schedule of Affective Disorders & Schizophrenia – Change Version (SADS-C; Spitzer & Endicott, 1978b). The SADS-C is a brief diagnostic interview that is intended to measure important dimensions of psychopathology. It is abbreviated from the SADS (Spitzer & Endicott, 1978a) and includes only 45 items assessing key psychiatric symptoms. Both the SADS and SADS-C were designed primarily for the assessment of mood and psychotic disorders. Regardless of the brevity, the SADS-C has been shown to have a high degree of reliability for symptoms (median ICC = .88) and summary scales (median ICC = .93), and results strongly suggested that prior knowledge of patients' histories or diagnosis does not confound reliability (McDonald-Scott & Endicott, 1984). Furthermore, Johnson, Magaro, and Stern (1986) demonstrated convergent and divergent validity of the SADS-C in relation to other psychometric measures. Administration time varied from 30-60 minutes depending upon the participant.

Weschler Adult Intelligence Scale-Third Edition (WAIS-III™, Psychological Corporation, San Antonio, Texas, *www.psychcorp.com*)*: Subtest- Picture Arrangement.* The ability to comprehend and evaluate social situations was measured by the picture arrangement subtest of the WAIS-III. This subtest involves an assessment of planning ability, anticipation, and temporal sequencing, all skills needed for successful social interactions. Subtest results reflected skills such as the ability to anticipate the consequences of initial acts or situations, as well as the ability to interpret social situations. This test requires the participant to place a series of pictures in logical order. The subtest contains 11 series, or items, similar to short comic strips. Individual cards, each containing a picture, are placed in a specified disarranged order, and the

participant is asked to arrange the pictures in the “right” order to tell a story that makes sense. Each item is timed. The subtest is discontinued after three consecutive failures. Schizophrenic patients have been found to have significantly lower scores on Picture Arrangement and also require more time to complete the stories than do normal controls (Toomey, Wallace, Corrigan, Schuldberg, & Green, 1997). Picture arrangement was found to be the single variable that accounted for the most classification success between schizophrenic patients who were classified as Good Vocational Outcome and Poor Vocational Outcomes in an archival study presented preliminarily in Bellack, Gold, and Buchanan (1999).

COGLAB (Spaulding, Garbin, & Dras, 1989). Information processing capacity was assessed with COGLAB, a computer-based battery of cognitive tests developed for research on cognitive deficits in schizophrenia (Spaulding, Garbin, & Dras, 1989). COGLAB has been used to assess cognitive functioning in schizophrenia in the United States (Spaulding et al., 1989), the Netherlands (Penn et al., 1993), Taiwan (Tam, Sewell, & Deng, 1998), and Norway (Rund, 1993). It is composed of validated test paradigms chosen from experimental psychopathology literature. For the purposes of this study, a shortened version of the original COGLAB battery was used in order to reduce the time of assessment and the fatigue of subjects. Specifically, the tasks pertinent to reaction time were omitted due to the length of their administration. The following tasks were administered via the computer-based program: a concept manipulation task based on the Wisconsin Card Sorting Test (WCST; Heaton, 1981); the Muller-Lyer illusion (Cromwell & Spaulding, 1978); size estimation; backward masking (MASK); and a combination continuous performance/span of apprehension

task (CP/SPAN; Neale 1971; Orzack & Kornetsky, 1971). A full description of the procedure for administering and scoring COGLAB can be found in Spaulding et al. (1989). A summary description of each task administered for this study can be found in Appendix A.

Summary measures of cognitive performance were provided by COGLAB for: size estimation; the Muller-Lyer effect; false alarms on the CP/SPAN; hits across the three CP/SPAN conditions (i.e., single target, same target among array of six distractors, new target among array of six distractors); correct identification across the three conditions (i.e., no mask, 40 and 80 msec stimulus onset asynchrony [SOA]) on backward masking; and total errors on a version of the Wisconsin Card Sorting Test. Administration time for this reduced COGLAB measure was approximately 30 minutes. Pre-test mean administration time was 31.8 minutes; post-test mean administration time equaled 26.3 minutes. A paired-samples *t*- test was conducted to evaluate this difference. There was a statistically significant decrease in amount of time to complete the reduced COGLAB tasks from pre-test (M=31.8, SD= 11.1) to post-test (M=26.3, SD=1.18), t (32)=3.871, p=.001.

Social Cue Recognition Test (SCRT: Corrigan, Davies-Farmer, & Stolley, 1990; Corrigan & Green, 1993). Sensitivity to cues in social situations were assessed using the SCRT (Corrigan & Green, 1993), an appropriate instrument for assessing social cue perception in emotional contexts. The SCRT has been shown to correlate with recall memory and iconic memory for individuals with schizophrenia (Corrigan, Green, & Toomey, 1994) and has been used in several studies to test hypotheses about social

cognition in schizophrenic individuals (Corrigan, Davies-Farmer, and Stolley, 1991; Corrigan & Green, 1993; Corrigan, Green, & Toomey, 1994; Corrigan & Nelson, 1998).

The measure is comprised of eight videotaped vignettes, each lasting approximately 2 or 3 minutes, and including an interaction between two or three actors. The vignettes vary in emotional intensity. Four vignettes, consisting of quiet pleasant interactions such as two friends putting a puzzle together, constitute the low-arousal condition. Four additional vignettes including problematic situations such as a husband and wife arguing about the TV that end with angry outbursts and hard feelings constitute the moderate-arousal condition. The content of each vignette is summarized in Table 13.

Participants were tested individually. They were seated about 2 meters from a videotape monitor and instructed to watch eight short vignettes carefully in order to answer accurately some true-false questions about what had been seen. Low-arousal and moderate-arousal scenes were presented in counterbalanced orders across participants to control for order effects. Immediately after viewing each vignette, the examiner read aloud 36 true-false questions specific to that scene and recorded the participants' responses.

Table 13

Scenes in the Social Cue Recognition Test

Vignette	Scene Description
A	Two friends gossiping while assembling a puzzle
B	Three friends discussing a movie while playing cards
C	An employee discussing a deal with her boss
D	Two friends discussing good old days
E	A husband and wife arguing about their children
F	A husband and wife quarreling about the TV
G	A friend discussing his depression with a peer
H	A wife discussing a hit-and-run accident with her husband

Responses to items were combined to yield hit and false positive rates across four conditions: concrete cues for low-arousal situations, abstract cues for low-arousal situations, concrete cues for moderate-arousal situations, and abstract cues for moderate-arousal situations. Concrete cues were regarded as specific behaviors the person did in the vignette or words spoken; abstract cues were targeting intentions of the actors, such as what the person hoped to achieve in the vignette.

The SCRT has shown correlations between hit and false positive rates for each vignette and the sum of those rates for the three remaining vignettes across each of the arousal conditions, low and moderate (Corrigan & Green, 1993). Correlations for the low-arousal conditions range from 0.45 to 0.91, and correlations for the moderate-arousal vignettes range from 0.54 to 0.98. These Pearson product-moment correlations represent moderate to high reliability of the social cue recognition task for schizophrenic subjects. Concurrent validity of the social cue recognition task has been supported by Corrigan and Green (1993) by patterns of correlations between hit and false positive rates of the SCRT and the modified Assessment of Interpersonal Problem-Solving

Skills. Hit rates for the SCRT were highly correlated with the overall hit rate for the modified skills assessment (correlations range from 0.50 to 0.70). A Canadian test (SCRT-C) comparable in reliability and validity with the original SCRT, with professional actors portraying interpersonal interactions in the video vignettes, has also been developed. The SCRT-C is available in English and French versions (Beaupre', King, Bauer, Hess, Debruiile, & Corrigan, 2002).

Group Format

The groups were conducted by a leader, the present author, who was an advanced graduate student at the time, and a co-leader, a staff member from the participating psychosocial rehabilitation program. In each setting the leaders conducted the groups based upon the treatment manual, *Social Skills Training for Schizophrenia: A Step-by-Step Guide* (Bellack, Mueser, Gingerich, & Agresta, 1997). Group sessions lasted one hour and met twice a week for eight weeks. Co-leaders taught a new skill each week, with the final week consisting of a short review and party, providing an occasion to use some of the skills learned. Group size ranged from 5-7 individuals per group.

The group is designed to teach individuals with schizophrenia social skills, taking into consideration the cognitive deficits that are predominant. Sessions were highly structured, and the primary activity was behavioral rehearsal. Each skill was broken down into small steps and, when possible, were accompanied by illustrative posters and handouts. First, a rationale was provided to help the clients understand why it was important to learn the skill being taught. Second, the leader and co-leader demonstrated (modeled) the skill in a role play. Third, the leaders engaged each client in a role play.

Fourth, the leaders provided the participants with both positive and corrective feedback. Fifth, the leaders assigned homework and encouraged clients to practice on their own during the upcoming week (Bellack et al., 1997). An important emphasis was placed upon providing clients with praise, encouragement, and positive feedback to maximize their involvement and interest, as well as their motivation. A wide variety of skills can be taught using this format. The leaders chose the following skill areas for the curriculum based upon the typical client's needs and interests: listening to others, making requests, expressing positive feelings, expressing unpleasant feelings, coping with unpleasant feelings, asking questions about medications, and asking someone for a date (see Appendix B for a sample group session).

The group leader and co-leader prepared for group by familiarizing themselves with the lesson plans and format available in the Bellack et al. (1997) treatment manual. Leader and co-leader met independently of the group prior to the onset of the treatment group for training and preparation on average of 1-3 occasions for approximately 1 hour sessions. Co-leaders were also assigned to read chapters 1-4 of the treatment manual to provide them with the appropriate knowledge base and mind set for conducting social skills training. Leader and co-leader also routinely met for 20-30 minutes following each treatment group session to assess progress of the participants and also to allow for any necessary supervision time.

Procedure

Participants were assessed individually before and after a regimen of eight weeks of group treatment (social skills training). All assessments were conducted by the present researcher, with the exception of the COGLAB testing. Due to the nature of

the COGLAB tasks, which involve auditory feedback, and may have indicated a certain level of cognitive impairment in participants, a research assistant administered the COGLAB portion of the assessment battery. This allowed the group leaders to be blind to any feedback received during this task, which may have biased their administration of the social skills training. The mean total amount of time for pre-testing was 133.70 minutes (approximately 2 hours and 18 minutes). Participants were provided with breaks during the testing phase as needed; often, testing was completed over a period of several days. Table 14 includes the assessment measures that were utilized in both pre-assessment and post-assessment phases in a rotating counterbalanced order to prevent any order effects.

Table 14

Measures used during Pre-Post Assessments

TESTS ADMINISTERED	AREA OF ASSESSMENT
Picture Arrangement subtest of the Wechsler Adult Intelligence Scale- Third Edition (WAIS-III)	Social skills knowledge and sequencing of appropriate behaviors
Social Cue Recognition Test (SCRT)	Perception of social situations
COGLAB	Cognitive skills (sustained attention)
Word List Subtest of Wechsler Memory Scale	Cognitive skills (memory & attention)

A total of three treatment groups were conducted. Assignments to group were based on a wait-list control procedure. Control participants, matching the approximate number of treatment participants, were also assessed using the same measures of cognitive and social functioning at intervals equaling those experienced by the treatment participants

(approx. 7-10 weeks). Control participants did not receive the treatment (group therapy participation) during their time as control subjects. Individuals who desired treatment were placed in groups on a first come, first serve basis, and those persons waiting for the next group served as control subjects during the duration of their wait. Treatment was not withheld from control subjects if they desired such intervention following their time as a control subject. The co-leader at each facility was trained to provide continuing social skills treatment groups for those individuals on the wait-list who desired treatment. Finally, the SADS-C was conducted last, in the post-assessment phase, to confirm current diagnosis.

RESULTS

Thirty-five individuals volunteered to participate in this study. However, one participant was excluded from analyses because the chart diagnosis of Depressive Disorder NOS, and a Schedule of Affective Disorders & Schizophrenia – Change Version (SADS-C) diagnosis of Obsessive Compulsive Disorder did not meet criteria for inclusion in this study of individuals with diagnoses of schizophrenia spectrum of disorders. Therefore, the following analyses contained 34 participants with pre-test scores and 32 individuals with post-test scores. Two participants in the study were unable to complete post-testing. Final data analyses examined scores for 19 treatment participants, and 13 control participants.

Diagnoses

The SADS-C structured interview was utilized for diagnostic confirmation. Table 15 summarizes the diagnosis changes from the original chart review to the SADS-C diagnosis.

Table 15

Diagnosis Method	S-D	S-P	S-U	SA	P-nos	Bipolar		Total
Chart Review								
control		2	3	3	6	1	0	15
treatment	2	3	6	6	1	1		19
total	4	6	9	12	2	1		34
SADS-C								
control		1	1	3	8	0	0	13
treatment	2	1	5	10	1	0		19
total	3	2	8	18	1	0		32

Note. S-D = Schizophrenia- Disorganized type, S-P = Schizophrenia- Paranoid type, Schizophrenia-Undifferentiated, SA = Schizoaffective Disorder, P-nos = Psychotic Disorder- NOS, Bipolar= Bipolar I Disorder, Most Recent Episode Manic

Transformations

Some specific variables in the sample evidenced skewed distributions. Therefore, transformations were applied when appropriate and useful to ensure all variables in the analyses met the assumption of a normal distribution needed for multivariate parametric tests. Table 16 lists the variables transformed and type of transformation used.

Table 16

Transformations Used for Data Analysis

Variable	Type of Transformation Used
WAIS-III Picture Arrangement scaled score	Log
SCRT sensitivity score - low emotion concrete	Log (reflect) [a]
SCRT sensitivity score - low emotion abstract	Log (reflect) [a]
SCRT sensitivity score - moderate emotion concrete	Log (reflect) [a]
SCRT sensitivity score - moderate emotion abstract	Log (reflect) [a]
COGLAB subtest- size estimation overestimates	Sqrt
COGLAB subtest- WCST number correct	1/(reflect) [a]

Note. Matching transformations were applied to time 1 variables and time 2 variables.
[a]when reflect was used as a transformation the formula applied was (K-(old variable)) where K= largest variable value +1.

Transformed variables were used for significance testing, whereas means reported for interpretations reflected the original untransformed variables, as seen in Tables 17 and 19.

Hypothesis 1

Hypothesis 1 predicted that posttest measures of social functioning on the Wecshler Adult Intelligence Scale-Third Edition (WAIS-III) Picture arrangement subtest and the Social Cue Recognition Test would show a significant difference between the social skills treatment group and the wait-list control group, with the treatment group

evidencing higher scores. An ANCOVA and a MANCOVA were used to test for differences. Analyses of covariance were used because the study involved pre- and post-tests of all measures, and the post-test scores, therefore, could be adjusted to take into account any initial differences between groups on the pre-test scores. Thus the pre-tests were used as covariates, and the post-tests were used as dependent variables.

Table 17

Pre- and Post-Test Means for Social Variables included in Analyses for Treatment and Control Groups

Group		Picture Arrangement		SCRT-lec		SCRT-lea		SCRT-mec		SCRT-mea	
		Pre-	Post	Pre-	Post	Pre-	Post	Pre-	Post	Pre-	Post
Treatment											
	M	5.63	6.37	.84	.86	.85	.77	.84	.85	.84	.83
	SD	1.71	2.22	.18	.09	.09	.32	.13	.13	.11	.14
	n	19	19	19	19	19	19	19	19	19	19
Control											
	M	7.33	7.31	.85	.82	.82	.86	.83	.86	.79	.83
	SD	3.85	4.07	.12	.20	.13	.10	.15	.13	.17	.13
	n	15	13	15	13	15	13	15	13	15	13

Intercorrelations of Social Variables of Picture Arrangement and Social Cue Recognition Test

Variable	SCRT-lec2	SCRT-lea2	SCRT-mec2	SCRT-mea2	Picture Arrangement
SCRT-lec1	.620**	.919**	.910**	.909**	.420*
SCRT-lea1	.695**	.451**	.661**	.742**	.492**
SCRT-mec1	.785**	.760**	.888**	.862**	.435**
SCRT-mea1	.858**	.686**	.851**	.881**	.481**
Picture Arrangement1	.472**	.398*	.608**	.564**	.870**

*p<.05, **p<.01 Note. SCRT =Social Cure recognition Test, lec = low emotion concrete, lea = low emotion abstract, mec = moderate emotion concrete, mea = moderate emotion abstract

A one-way between-groups analysis of covariance was conducted to compare the effectiveness of a social skills treatment group designed to increase social functioning, as measured by an increase in picture arrangement scores. The independent variable was the type of group (treatment or wait-list control) and the dependent variable consisted of post-test scores on the WAIS-III subtest Picture Arrangement. Participants' pre-test scores on the WAIS-III subtest picture arrangement were used as the covariate in this analysis. After adjusting for pre-test scores, there was no significant difference between the two groups on post-test scores for the WAIS-III Picture Arrangement subtest (F (1,29) = 1.33, p = .26).

A one-way between groups multivariate analysis of covariance was performed to compare the effectiveness of a social skills treatment group designed to increase social functioning, as measured by four subscales of the Social Cue Recognition Test (SCRT). The independent variable was the type of group (treatment or wait-list control). Specific dependent variables were post-test computed sensitivity scores of the combined hits and false positive ratios for each of the four conditions of low emotion concrete, low emotion abstract, moderate emotion concrete, moderate emotion abstract. The index of sensitivity score (A') was arithmetically determined from the hit ratio and false positive (FP) ratio in each condition (Corrigan & Green, 1993):

$$A' = \tfrac{1}{2} + \frac{(\text{hits-FP})\,(1 + \text{hits} - \text{FP})}{4 \times \text{hits}(1-\text{FP})}$$

A perfect score for these sensitivity variables would entail all correct hits and no false positives, yielding a score of 1.00. Participants' pre-test scores for the same four conditions on the SCRT were used as covariates in this analysis. After adjusting for the

pre-test scores, a significant difference was found between the treatment group and wait-list control on the combined dependent variables (λ = .58, $F(4,22) = 3.85$, $p = .02$). Univariate ANCOVAs were obtained to determine which specific dependent variable(s) were responsible for this finding. Table 18 provides results of the subsequent ANCOVAs.

Table 18

Analyses of Covariance for Social Cue Recognition Test

Source	*df*	*MS*	*F*	*p*
Low Emotion Concrete	1, 25	.00	.04	.90
Low Emotion Abstract	1, 25	.47	10.73**	.00
Moderate Emotion Concrete	1, 25	.01	2.89	.10
Moderate Emotion Abstract	1, 25	.01	.04	.85

*$p<.05$, **$p<.01$

Sensitivity scores for the SCRT condition of low emotion abstract were responsible for the significant finding. Specifically, the treatment group showed a decline in scores from pre-testing to post-testing on the SCRT condition of low emotion abstract, while the control group showed some improvement from pre-testing to post-testing on scores for this condition. Table 17 shows the pre- and post-test means for each of the social variables in the analysis, as well as the intercorrelations of the social measures of Picture Arrangement and the SCRT conditions. The univariate follow-up tests (Table 18) did not reveal any other significant differences between groups on the mean adjusted post-test sensitivity scores for the SCRT conditions of low emotion concrete, moderate

emotion concrete, moderate emotion abstract. However, a trend toward a significant difference was observed for the post-test sensitivity scores for moderate emotion concrete. As Table 17 shows, the treatment group evidenced a small improvement from pre-testing to post-testing, whereas the control group showed more of an improvement from pre- to post testing. Therefore, it is concluded that hypothesis 1 was not supported.

Hypothesis 2

Hypothesis 2 predicted that individuals receiving social skills training would show improved post-test scores on measures of both social cognition and information processing variables at post-testing, as opposed to the wait-list control group who would not be expected to show improved scores at post-testing. Given that the analyses in Hypothesis 1 addressed the social cognitive variables (SCRT scores and Picture arrangement scores), the following analyses examined the information processing variables (COGLAB summary scores) with a series of four between groups MANCOVAs with group (treatment, control) as the independent variable. As stated previously, analyses of covariance were used because the study involved pre- and post-tests of all measures, and the post-test scores, therefore, could be adjusted to take into account any initial differences between groups on the pre-test scores. Thus the pre-tests were used as covariates while the post-tests were used as dependent variables. Table 19 contains pre- and post-test means for each of the variables used in the following analyses.

Table 19

Pre- and Post-Test Means for COGLAB Variables for Treatment and Control Groups

Group		WCST-TT		WCST-#COR		WCST-CC		WCST-PE		WCST-RE	
		Pre-	Post	Pre-	Post	Pre-	Post	Pre-	Post	Pre-	Post
Treatment	*M*	87.37	86.21	22.68	23.21	4.47	4.58	29.05	31.89	35.79	31.11
	SD	27.36	28.53	5.66	4.88	1.26	1.02	19.37	25.90	15.92	16.16
	n	19	19	19	19	19	19	19	19	19	19
Control	*M*	90.00	75.92	23.33	23.85	4.60	4.77	26.73	24.00	39.93	28.08
	SD	29.76	28.44	4.48	4.16	1.06	0.83	13.25	16.95	32.05	25.43
	n	15	13	15	13	15	13	15	13	15	13

Group		ML-mean		Backwrd Msk		SE-over		SE -under	
		Pre-	Post	Pre-	Post	Pre-	Post	Pre-	Post
Treatment	*M*	-78.31	-72.84	36.00	36.95	4.58	5.05	5.42	4.95
	SD	15.48	9.50	13.99	13.03	2.67	2.41	2.67	2.41
	n	19	19	19	19	19	19	19	19
Control	*M*	-60.78	-78.31	32.20	38.62	4.13	4.38	5.87	5.62
	SD	36.91	19.39	16.92	14.65	2.20	3.18	2.20	3.18
	n	15	13	15	13	15	13	15	13

Group Errors		Vigilance		Discrimination		Perseverative	
		Pre-	Post	Pre-	Post	Pre-	Post
Treatment	*M*	25.84	26.05	5.37	6.21	1.00	0.68
	SD	7.74	6.29	6.48	6.41	1.56	1.25
	n	19	19	19	19	19	19
Control	*M*	25.14	27.00	8.29	3.23	1.57	0.85
	SD	6.43	3.65	13.26	3.32	2.87	1.68
	n	14	13	14	13	14	13

Note. WCST= Wisconsin Card Sorting Test, TT=total trials, #COR= number correct, CC= Categories complete, PE= Perseverative errors, RE= Random errors, ML-mean= Mean of Mueller-Lyer, Backwrd Msk= Backward Masking Task, SE-over= Size Estimation-overestimates, SE-under= Size Estimation underestimates.

Specific dependent variables for the first MANCOVA were the post-test mean score of all three conditions of the Mueller Lyer Test, the post-test score of random errors on the Wisconsin Card Sort Test (WCST), and the post-test summary variable of all conditions on the Backward Masking Task. After adjusting for the pre-test scores, a significant difference was not found between the treatment group and wait-list control on the above combined dependent variables ($\lambda = .93$, $F(3,25) = .674$, $p = .57$).

The second MANCOVA examined variables for the Size Estimation task. Specific dependent variables were post-test scores for underestimates and overestimates on this test. After adjusting for pre-test scores, no significant difference was found between the treatment and control groups for these combined dependent variables ($\lambda = .92$, $F(2,27) = 0.35$, $p = .35$).

The third MANCOVA was conducted for the COGLAB version of the Wisconsin Card Sorting Test (WCST). Post-test scores for the remaining WCST summary variables that were not tested in the first MANCOVA were the specific dependent variables in this analysis: WCST total trials, WCST number correct, WCST perseverative errors, WCST categories complete. After adjusting for pre-test scores, no significant difference was found between the treatment or control group for these combined dependent variables ($\lambda = .98$, $F(4,23) = 0.10$, $p = .98$).

The fourth MANCOVA examined the CP/SPAN. Specific dependent variables were vigilance (the sum of hits for all three conditions in the task), discrimination (the sum of all false alarms for all three conditions in the task), and a score of perseverative errors. After adjusting for the pre-test scores, a trend toward a statistically significant difference was found between the treatment group and wait-list control on the combined

dependent variables (λ = .76, $F(3,25) = 2.68$, $p = .07$). Thus univariate ANCOVAs were obtained to determine which specific dependent variable(s) were responsible for this finding. Table 20 provides results of the subsequent ANCOVAs. Mean adjusted post-test scores for Discrimination appear to be responsible for the finding that approached significance. Specifically, Table 19 shows that the number of false alarms for the treatment group increased slightly from pre- to post-testing, whereas number of false alarms for the control group decreased a significant amount from pre- to post-testing. Support for hypothesis 2 would have yielded fewer false alarms for the treatment group, indicating more accuracy on the task; thus, it was concluded that hypothesis 2 was not supported.

Table 20

Analyses of Covariance for Asarnow Task on COGLAB

Source	*df*	*MS*	*F*	*p*
Vigilance	1, 27	15.70	1.43	.24
Discrimination	1, 27	75.93	3.91	.06
Perseverative Errors	1, 27	.01	0.09	.77

*$p<.05$, **$p<.01$

Hypothesis 3

Hypothesis 3 predicted that individuals with higher scores for measures of memory and attention at pre-testing would show greater improvements in social skills at post-testing. Specifically, it was expected that individuals showing the greatest initial ability on the Wisconsin Card Sorting Task (WCST) of COGLAB would show the most

improvement from social skills training (thus, only the treatment group was analyzed for this hypothesis). This question was addressed by five hierarchical multiple regressions. The predictor variables measuring memory and attention used in this regression were 1) pre-test scores for WCST total trials completed, and 2) WCST number correct. The above stated hypothesis is concerned with improvement in social skills; thus, the criterion variables used for each regression are calculated gains scores (time 2 – time 1), which best reflect any improvement in the scores. Post-test scores alone would not be appropriate, because they do not take into account any original differences at pre-test. The specific criterion variables were the gain score for picture arrangement scaled score and the gain scores for sensitivity in each of the four Social Cue Recognition Test (SCRT) conditions: low emotion concrete, low emotion abstract, moderate emotion concrete, moderate emotion abstract. The WCST pretest total trial scores were entered on the first block, followed by the pretest WCST number correct scores on the second block for all regressions.

The above mentioned gain score variables were examined for normality assumptions, and two variables, gain score for sensitivity low emotion concrete and gain score for low emotion abstract evidenced skewed distributions. Therefore transformations were applied. In both cases the variables were transformed using the reflect of the variable and a log transformation.

The first four regressions investigated the gain scores of sensitivity on the four conditions of the SCRT. The first regression pertained to the criterion variable of sensitivity for low emotion concrete. As the summary table for this analysis shows (Table 21), neither variable set was significant. Thus, it was concluded that pre-test

measures of memory and attention from the COGLAB version of the Wisconsin Card Sorting Test were not able to predict scores on the SCRT for the condition of low emotion concrete.

Table 21

*Summary of Hierarchical Regression Analysis for Variables Predicting Gain Score for Sensitivity Score – Low Emotion Concrete (*n=*19)*

Predictor Variable	*R* Square	Adjusted *R* Square	Std Error	*R* Square Change	*F* Change	*df*	*p*
WCST total trials -time 1	.06	-.003	.14	.056	0.94	1,16	.35
WCST correct -time 1	.20	.10	.13	.15	2.75	1,15	.12

The second regression pertained to the criterion variable of sensitivity for low emotion abstract. As the summary table for this analysis shows (Table 22), neither variable set was significant. Thus, it was concluded that pre-test measures of memory and attention from the COGLAB version of the Wisconsin Card Sorting Test were not able to predict scores on the SCRT for the condition of low emotion abstract.

Table 22

*Summary of Hierarchical Regression Analysis for Variables Predicting Gain Score for Sensitivity Score – Low Emotion Abstract (*n=*19)*

Predictor Variable	*R* Square	Adjusted *R* Square	Std Error	*R* Square Change	*F* Change	*df*	*p*
WCST total trials -time 1	.10	.05	.19	.10	1.97	1,17	.18
WCST correct -time 1	.22	.12	.18	.12	2.35	1,16	.14

Table 23

*Summary of Hierarchical Regression Analysis for Variables Predicting Gain Score for Sensitivity Score – High Emotion Concrete (*n=*19)*

Predictor Variable	*R* Square	Adjusted *R* Square	Std Error	*R* Square Change	*F* Change	*df*	*p*
WCST total trials -time 1	.01	-.05	.005	.01	.08	1,17	.78
WCST correct -time 1	.04	-.08	.005	.03	.53	1,16	.48

The third regression pertained to the criterion variable of sensitivity for moderate emotion concrete. As the summary table for this analysis shows (Table 23), neither variable set was significant. Thus, it was concluded that pre-test measures of memory and attention from the COGLAB version of the Wisconsin Card Sorting Test were not able to predict scores on the SCRT for the condition of moderate emotion concrete.

Table 24

*Summary of Hierarchical Regression Analysis for Variables Predicting Gain Score for Sensitivity Score – High Emotion Abstract (*n=*19)*

Predictor Variable	*R* Square	Adjusted *R* Square	Std Error	*R* Square Change	*F* Change	*df*	*p*
WCST total trials -time 1	.03	-.03	.006	.03	.55	1,17	.47
WCST correct -time 1	.10	-.02	.006	.07	1.17	1,16	.30

The fourth regression pertained to the criterion variable of sensitivity for moderate emotion abstract. As the summary table for this analysis shows (Table 24), neither variable set was significant. Thus, it was concluded that pre-test measures of

memory and attention from the COGLAB version of the Wisconsin Card Sorting Test were not able to predict scores on the SCRT for the condition of moderate emotion abstract.

Table 25

Summary of Hierarchical Regression Analysis for Variables Predicting Gain Score for Picture Arrangement Scaled Score (n=19)

Predictor Variable	*R* Square	Adjusted *R* Square	Std Error	*R* Square Change	*F* Change	*df*	*p*
WCST total trials -time 1	.01	-.05	1.77	.01	.15	1,17	.71
WCST correct -time 1	.01	-.11	1.82	.00	.05	1,16	.83

The fifth regression pertained to the criterion variable of the gain score for the picture arrangement scaled score. As the summary table for this analysis shows (Table 25), neither variable set was significant. Thus, it was concluded that pre-test measures of memory and attention from the COGLAB version of the Wisconsin Card Sorting Test were not able to predict scores on the Picture Arrangement subtest of the WAIS-III.

Measures of recall and recognition from the word list subtest of the Weschler Memory Scale – Third Edition (WMS-III™, Psychological Corporation, San Antonio, Texas, *www.psychcorp.com*) were also examined as an alternative memory predictor for improvement in social skills. Correlations between the variables of recall and recognition with total trials completed and number correct on the WCST were not significant, indicating that these two measures may have been tapping into different aspects of memory functioning. Duplicate analyses as those above were conducted using pre-test scores of recall and recognition on the word list WMS-III as predictor

variables in hierarchical multiple regressions containing all social measures as the criterion variables. No significant results were obtained in these additional analyses. Therefore, it was concluded that hypothesis 3 was not supported.

Supplemental Hypothesis 1

The first supplemental hypothesis predicted that individuals with schizophrenia-paranoid subtype would respond better to treatment intervention than persons with other subtypes. The analysis proposed for the treatment group only, examining the measures of social cognition (WAIS-III Picture Arrangement, SCRT scores) and measures of information processing (COGLAB summary scores) by group (paranoid, non-paranoid) was unable to be performed due to lack of an appropriate sample size. Total number of participants in the treatment group were 19, and the number of paranoid schizophrenia subtypes within that group was not appropriate for statistical analysis. Using the original chart review diagnosis, there were only 3 individuals with a diagnosis of paranoid schizophrenia. Using the SADS-C, only 1 individual had the diagnosis of paranoid schizophrenia. Therefore, this analysis was not conducted.

Supplemental Hypothesis 2

Supplemental hypothesis 2 proposed that those individuals with a diagnosis of schizoaffective disorder would respond better to the treatment intervention than would those with a diagnosis of schizophrenia. This hypothesis was examined using a series of one-way between groups ANCOVAs for the measures of social cognition (WAIS-III Picture Arrangement, SCRT scores) and measures of information processing (COGLAB summary scores). The independent variable was the type of diagnosis (schizoaffective or other-schizophrenia). Using the grouping variable of original chart diagnosis, of the

19 individuals in the treatment group, 6 (32%) were diagnosed with Schizoafffective disorder and the remaining 13 (68%) had diagnoses of Schizophrenia or Psychotic Disorder – NOS. Participants' pre-test scores on each dependent variable were used as the covariate in these analyses.

Of all the variables tested, one dependent variable, the SCRT sensitivity score for low emotion concrete, evidenced a significant difference between the two diagnostic groups of schizoaffective versus schizophrenia. After adjusting for pre-test scores, there was a significant difference between the two diagnostic groups on post-test scores for the SCRT sensitivity score for low emotion concrete, (F (1,16) = 10.74, p = .01). Specifically, the schizoaffective group had a higher mean post-test score (M = .89, SD = .11) than the schizophrenia group (M = .85, SD = .08). The pre-test mean for the schizoaffective group (M = .77, SD = .30) indicated an increase in sensitivity scores for the SCRT low emotion concrete condition, whereas the pre-test mean for the schizophrenia group (M = .86, SD = .08) indicated a slight decrease in sensitivity scores for the SCRT low emotion concrete condition. Therefore, supplemental hypothesis 2 was partially supported.

All other ANCOVAs for the remaining social cognition measures and information processing variables showed no significant differences between the two diagnostic groups. Among the six participants in the schizoaffective diagnostic group, using chart diagnosis, four were women and two were men. Table 26 summarizes the results of these analyses.

Duplicate analyses as above for all of the same variables were run using the different grouping variable of the SADS-C structured interview diagnosis. Of the 19

individuals in the treatment group, 10 (53%) were diagnosed by the SADS-C with Schizoafffective disorder and the remaining 9 (47%) had diagnoses of Schizophrenia or Psychotic Disorder – NOS. One trend approached significance for the dependent variable of number correct on the Wisconsin Card Sorting Test (F (1,16) = 3.40, p = .08). Specifically, the schizoaffective group had a higher mean post-test score (M = 25, SD = .00) than the schizophrenia group (M = 21.22, SD = 6.72). The pre-test mean for the schizoaffective group (M = 25, SD = .00) indicated this group was scoring all items correct at both pre- and post-test, whereas the pre-test mean for the schizophrenia group (M = 20.11, SD = 7.61) indicated a slight increase in scores overtime. No other significant differences between these two diagnostic groups on social cognition measures and information processing variables on each *ANCOVA* were found. Among the ten participants in the schizoaffective diagnostic group, using SADS-C diagnosis, gender was equally distributed with five women and five men. Table 27 summarizes the remaining results of these additional analyses.

Table 26

Summary of all Non-significant ANCOVAs- Supplemental Hypothesis 2 Schizoaffective Disorder vs. Schizophrenia by Chart Diagnosis

Dependent Variable	*df*	*MS*	*F*	*p*
Picture Arrangement	1, 16	.004	.281	.60
SCRT sensitivity score low emotion abstract	1, 16	.027	.387	.54
SCRT sensitivity score moderate emotion concrete	1, 15	.021	1.04	.32
SCRT sensitivity score moderate emotion abstract	1, 16	.167	2.01	.18
COGLAB Mueller-Lyer Mean of 3 conditions	1, 16	21.83	.225	.64
COGLAB size estimation overestimates	1, 16	.117	.467	.50
COGLAB size estimation underestimates	1, 16	4.436	1.01	.33
COGLAB –WCST total trials	1, 16	840.42	1.51	.24
COGLAB -WCST number correct	1, 16	.110	1.08	.32
COGLAB - WCST perseverative errors	1, 16	.004	.050	.83
COGLAB - WCST random errors	1, 16	82.92	.417	.53
COGLAB - WCST categories complete	1, 16	.005	.902	.36
COGLAB backward masking	1, 16	.587	.006	.94
COGLAB- Asarnow vigilance- sum of hits	1, 16	.777	.062	.81
COGLAB- Asarnow discrimination- sum f.a.	1, 16	8.30	.218	.65

Note. Pre-test scores were used as covariates for each post-test dependent variable listed. SCRT = Social Cue Recognition Test, WCST = Wisconsin Card Sorting Test, f.a. = false alarms

Table 27

Summary of all Non-significant ANCOVAs- Supplemental Hypothesis 2 Schizoaffective Disorder vs. Schizophrenia by SADS-C Diagnosis

Dependent Variable	*df*	*MS*	*F*	*p*
Picture Arrangement	1, 16	.092	.055	.82
SCRT sensitivity score low emotion abstract	1, 16	.012	.178	.68
SCRT sensitivity score low emotion concrete	1, 16	.071	.965	.34
SCRT sensitivity score moderate emotion concrete	1, 15	.020	1.00	.33
SCRT sensitivity score moderate emotion abstract	1, 16	.040	.437	.52
COGLAB Mueller-Lyer Mean of 3 conditions	1, 16	95.13	1.03	.33
COGLAB size estimation overestimates	1, 16	.130	.524	.48
COGLAB size estimation underestimates	1, 16	4.27	.970	.34
COGLAB –WCST total trials	1, 16	201.23	.338	.57
COGLAB - WCST perseverative errors	1, 16	.010	.128	.73
COGLAB - WCST random errors	1, 16	.136	2.79	.12
COGLAB - WCST categories complete	1, 16	156.31	.805	.38
COGLAB backward masking	1, 16	78.09	.903	.36
COGLAB- Asarnow vigilance- sum of hits	1, 16	12.86	1.09	.31
COGLAB- Asarnow discrimination- sum f.a.	1, 16	7.61	.200	.66

Note. Pre-test scores were used as covariates for each post-test dependent variable listed. SCRT = Social Cue Recognition Test, WCST = Wisconsin Card Sorting Test, f.a. = false alarms

Supplemental Hypothesis 3

The third supplemental hypothesis stated that tasks of vigilance and discrimination would show a stronger relation with social skills improvement for older and more chronic persons with schizophrenia than for younger persons with schizophrenia. This hypothesis was examined by obtaining partial correlations for the variables that applied. Again, only the treatment group was examined for this hypothesis. The specific task of vigilance was operationalized as the sum of hits on the CP/SPAN and discrimination was operationalized as the sum of false alarms on the CP/SPAN. Social skills measures were the WAIS-III Picture Arrangement subtest and the four conditions of the SCRT sensitivity scores (low emotion concrete, low emotion abstract, moderate emotion concrete, and moderate emotion abstract). Variables representing chronicity were age, number of years with diagnosis, and number of hospitalizations. An index of chronicity was created by combining the above variables in the following equation: chronicity = (# of years with diagnosis) * (# of hospitalizations) / age. An independent samples t-test was conducted to compare the chronicity scores for participants in the treatment versus control groups. There was no significant difference (t (32)=-1.605, p=.118), between treatment participants (M=5.42, SD=5.36) and control participants (M=2.82, SD=3.69). A median split was performed on the entire sample to categorize participants into low and high level chronicity groups. Table 28 summarizes the counts for number of participants from the two groups of chronicity in both control and treatment groups.

Table 28

Number of Participants from Low and High Chronicity Groups in Treatment and Control Groups

Type of Group	Low Chronic	High Chronic	Total
Control	9	5	14
Treatment	7	12	19
Total	16	17	33

Oneway ANOVAs were conducted to further explore any differences in impairment or chronicity between the control and treatment groups on their GAF (Global Assessment of Functioning) scores and individuals items from the SADS-C structured interview. No significant difference between the two groups on GAF scores was found, (F (1,32) =.879, p = .355). Of the forty individual items on the SADS-C, one item, indicating expressed anger, evidenced a significant difference, (F (1,30) = 9.088, p = .005) between control participants (M=5.08, SD=1.12) and treatment participants (M=3.32, SD=1.89). Higher scores from the control group on this item indicate more overt expressed violence such as throwing or breaking things and being occasionally assaultive, whereas lower scores from the treatment group represent a felt irritation and argumentativeness when angry.

For purposes of the partial correlation analysis, a median spilt was performed on the treatment group alone. Table 29 summarizes the counts for number of participants from the two groups of chronicity in the treatment group alone.

Table 29

Number of Participants from Low and High Chronicity Groups in Treatment Group

Type of Group	Low Chronic	High Chronic	Total
Treatment	10	9	19

Partial correlations were obtained separately for these two groups between the vigilance and discrimination variables and the social variables, controlling for pre-test scores on the social variables (WAIS-III Picture Arrangement, SCRT scores). Table 30 summarizes the partial correlations obtained after controlling for pre-test scores on social variables. For the low chronic group of participants in the treatment group, a significant positive partial correlations were found between pre and post-test scores of vigilance (sum of hits) and the post-test measure for the low

Table 30

Partial Correlations Between Vigilance & Discrimination and Social Variables for Participants in Treatment Group

Variable[a]	Vigil1	Vigil2	Discrim1	Discrim2
	Low Chronic (*n*=7)			
SCRT sensitivity score low emotion concrete	-.105	-.291	-.594	-.333
SCRT sensitivity score low emotion abstract	.942***	.901**	.441	.147
SCRT sensitivity score moderate emotion concrete	-.075	-.075	-.712*	-.680*
SCRT sensitivity score moderate emotion abstract	-.287	-.413	-.843**	-.848**
Picture Arrangement	-.314	-.182	-.066	-.271

(*table continues)*

Table 30 (*continued)*

Variable[a]	Vigil1	Vigil2	Discrim1	Discrim2
	High Chronic (*n*=6)			
SCRT sensitivity score low emotion concrete	-.420	-.244	-.026	-.546
SCRT sensitivity score low emotion abstract	.407	.452	-.569	-.663
SCRT sensitivity score moderate emotion concrete	-.115	.467	.396	-.318
SCRT sensitivity score moderate emotion abstract	-.328	.430	.189	-.506
Picture Arrangement	.225	.333	.280	-.338

Note. Vigil1= Vigilance pre-test (sum of cond. 1-3 hits Asarnow subtest of COGLAB), Vigil2= Vigilance post-test (sum of cond. 1-3 hits Asarnow subtest of COGLAB), Discrim1= Discrimination pre-test (sum of cond. 1-3 false alarms Asarnow subtest of COGLAB), Discrim2 = Discrimination post-test (sum of cond. 1-3 false alarms Asarnow subtest of COGLAB).
[a] Social Variables listed are all post-test scores, partial correlations were obtained after controlling for pre-test scores on social variables listed.* p <.05, ** p <.01, *** p<.001

emotion abstract condition of the SCRT. These partial correlations indicate higher scores for hits on CP/SPAN were associated with improvement in sensitivity in the low emotion abstract condition of the SCRT. Significant negative partial correlations were found between pre- and post-test scores of discrimination (sum of false alarms) and the post-test measures for the conditions of moderate emotion concrete and abstract of the SCRT. These partial correlations indicate that lower scores for false alarms on the CP/SPAN were associated with improvement in sensitivity in the moderate emotion concrete and abstract conditions of the SCRT for low chronic participants.

After controlling for pre-test scores on social measures, no significant partial correlations between vigilance and discrimination variables and post-test social

measures were found for high chronic participants in the treatment group. Thus, supplemental hypothesis 3 was not supported. Although not predicted, there is some preliminary evidence to suggest that among low chronicity patients, those with better attentional capacities will benefit most from social skills training.

Ancillary Analyses

An additional measure of verbal memory, the word list subtest of the Weschler Memory Scale- Third Edition (WMS-III), was added at pre- and post- testing. Exploratory analyses of the word list subtest of the WMS-III variables and their association with social measures (WAIS-III Picture Arrangement, SCRT scores) were examined with Pearson Correlations for both the control and treatment groups. Table 31 summarizes the correlations found between these sets of variables for pre-test scores, and Table 32 summarizes the correlations found between these sets of variables for post-test scores. Table 33 summarizes the correlations found between pre-test scores on the Word List subtest of the WMS-III and post-test scores for the social measures of the SCRT sensitivity scores and the Picture Arrangement scores.

The pre-test correlations indicated that the Word List total recall scaled score showed strong positive correlations with performance on the social measures, all four SCRT scales, and Picture Arrangement for both control and treatment groups. The Word List recognition scaled score showed strong positive correlations with performance on the social measures, all four SCRT scales, and Picture Arrangement, for only the control group. In contrast, the treatment group yielded just one significant positive correlation between the Word List recognition scaled score and the picture arrangement pre-test score.

The post-test correlation matrix indicated more significant correlations between the Word List subtest scores and the social measures for the treatment group as opposed to the control group. However, in the control group the Word List recognition scaled score did evidence significant positive correlations for three of the SCRT conditions (low emotion concrete, low emotion abstract, and moderate emotion abstract).

Post-test scores for the treatment group evidenced more consistent positive correlations between Word List 1st recall scores and the four SCRT scales. The post-test score for Word List % retention scaled scores indicated significant negative correlations with three of the SCRT conditions (low emotion abstract, moderate emotion concrete and moderate emotion abstract) suggesting that lower memory retention scores were associated with higher sensitivity or accuracy on the SCRT.

In the final table (Table 33) for the ancillary analyses, the word list pre-test scores correlated with post-test scores for social measures indicated a pattern of significant positive correlations, in the control group only, between the Word List recognition scaled score and all five social measures. For the treatment group, the Word List 1st recall scaled score evidenced a significant positive correlation with the SCRT moderate emotion concrete condition post-test score. Also in the treatment group, the pre-test Word List total recall scaled score showed significant positive correlations with the SCRT moderate emotion concrete condition, and Picture Arrangement post-test scores.

Table 31

Pre-Test Pearson Correlations Between Word List Subtest of the WMS-III and Social Variables (WAIS-III Picture Arrangement, SCRT scores)

Variable	WL 1st recall	WL total recall	WL recognition	WL % retention
		Control (*n* = 15)		
SCRT sensitivity score low emotion concrete	.650**	.702**	.818**	.139
SCRT sensitivity score low emotion abstract	.596*	.569*	.680*	.334
SCRT sensitivity score moderate emotion concrete	.512	.605*	.697**	.025
SCRT sensitivity score moderate emotion abstract	.568*	.643**	.710**	.068
Picture Arrangement	.402	.572*	.714**	.009
		Treatment (*n* = 19)		
SCRT sensitivity score low emotion concrete	.452	.702**	.098	-.042
SCRT sensitivity score low emotion abstract	.249	.569*	-.045	-.484*
SCRT sensitivity score moderate emotion concrete	.580**	.605*	.201	-.101
SCRT sensitivity score moderate emotion abstract	.395	.643**	.210	-.121
Picture Arrangement	.452	.572*	.469*	.083

* correlation is significant at the .05 level, ** correlation is significant at the .01 level

Table 32

Post-Test Pearson Correlations Between Word List Subtest of the WMS-III and Social Variables (WAIS-III Picture Arrangement, SCRT scores)

Variable	WL 1st recall	WL total recall	WL recognition	WL % retention
		Control (*n* = 15)		
SCRT sensitivity score low emotion concrete	.210	.446	.649*	.148
SCRT sensitivity score low emotion abstract	.360	.364	.561*	.159
SCRT sensitivity score moderate emotion concrete	.237	.439	.453	.088
SCRT sensitivity score moderate emotion abstract	.345	.419	.568*	.021
Picture Arrangement	.434	.380	.548	.064
		Treatment (*n* = 19)		
SCRT sensitivity score low emotion concrete	.461*	.351	.529*	-.169
SCRT sensitivity score low emotion abstract	.556*	.314	.415	-.547*
SCRT sensitivity score moderate emotion concrete	.617**	.470*	.439	-.456*
SCRT sensitivity score moderate emotion abstract	.543*	.366	.459*	-.584**
Picture Arrangement	.412	.468*	.067	-.075

* correlation is significant at the .05 level, ** correlation is significant at the .01 level

Table 33

Pearson Correlations Between Pre-test Scores on Word List Subtest of the WMS-III and Post-test Social Variables (WAIS-III Picture Arrangement, SCRT scores)

Variable[a]	WL 1st recall[b]	WL total recall[b]	WL recognition[b]	WL % retention[b]
		Control (*n* = 15)		
SCRT sensitivity score low emotion concrete	.409	.606*	.667*	-.127
SCRT sensitivity score low emotion abstract	.407	.558	.866**	.196
SCRT sensitivity score moderate emotion concrete	.345	.606	.840**	.007
SCRT sensitivity score moderate emotion abstract	.429	.622	.808**	.082
Picture Arrangement	.449	.695**	.767**	-.010
		Treatment (*n* = 19)		
SCRT sensitivity score low emotion concrete	.198	.235	.036	.059
SCRT sensitivity score low emotion abstract	.413	.346	.134	.243
SCRT sensitivity score moderate emotion concrete	.543*	.481*	.192	.098
SCRT sensitivity score moderate emotion abstract	.413	.301	.138	.039
Picture Arrangement	.127	.533*	.405	-.042

* correlation is significant at the .05 level, ** correlation is significant at the .01 level
[a] post-test scores [b] pre-test scores

DISCUSSION

Hypothesis 1 predicted a significant difference between the social skills treatment group and the wait-list control group, with the treatment group evidencing higher scores on posttest measures of social functioning on the Weschler Adult Intelligence Scale-Third Edition (WAIS-III) Picture arrangement subtest and the Social Cue Recognition Test (SCRT). This hypothesis was not supported in that group differences were not found on Picture Arrangement. There was a significant difference found between the control and treatment groups at the multivariate level for the SCRT conditions. However, this difference was in the opposite direction of the hypothesis. The control group improved more on two of the tasks than the treatment group. Specifically, control participants showed more accuracy improvement for abstract content questions about the video scenes that contained low emotion situations, and also improved slightly more for concrete content questions about the video scenes that contained moderate emotion situations. The treatment group also showed a decline in accuracy from pre- to post-testing for the low emotion abstract questions on the SCRT.

These results suggest that the treatment and control groups may differ in their response to varying levels of emotional/social situations. However, in this study, it appears that improvements were not prompted by social skills training. Thus, the group differences that could be influencing this differential responding may have been present prior to the treatment intervention. As Table 28 from the Results section indicates, there was a larger proportion of high chronic patients in the treatment group. Perhaps the higher number of more impaired individuals may have dampened the efficacy of the skills training intervention. Earnst and Kring (1999) examined emotional responding

among individuals with schizophrenia and categorized their participants as “deficit patients” or “non-deficit patients.” Although these two groups of participants did not differ significantly on medication levels or number of hospitalizations, the deficit syndrome participants were characterized by restricted affect, diminished emotional range, poverty of speech, curbing of interests, diminished sense of purpose, and diminished social drive. All participants viewed emotional films, and the deficit patients were less emotionally expressive than non-deficit patients or controls. Perhaps the present study’s treatment group, comprised of a higher number of “high chronic” patients, were similar in characteristics to the profile of the “deficit patient” with schizophrenia. Therefore, their accuracy or ability to express correct emotional information was diminished in comparison to the control group, which contained more “low chronic” participants and who may have been more similar to “non-deficit” responders.

The second hypothesis expected a significant difference between the social skills treatment group and the wait-list control group, with the treatment group evidencing higher scores on posttest measures of information processing variables, such as summary variables from the COGLAB tasks. This hypothesis was not supported. Performance improvements on the Mueller-Lyer task, Backward Masking, Size Estimation, and a modified Wisconsin Card Sorting Test showed no significant differences between the treatment and control groups. For the Asarnow CP/SPAN task, there were some marginal differences between the treatment and control groups. However, the source of this difference was a trend showing the control group improving more on false alarms and discrimination than the treatment group.

This finding also suggests that additional social skills training as an intervention was not directly influential upon cognitive functioning for individuals with schizophrenia. The slight group difference observed may be attributable to inherent differences between the groups prior to intervention that went undetected by the present study's measurements. The control group's slight improvement may be explained by practice effects in the context of considering the extent of neurocognitive deficits. In other words, the control group's neurocognitive capacity may have been slightly higher than the treatment group's and therefore they may have exhibited some improvements from practice effects. Smith, Hull, Romanelli, Fertuck and Weiss (1999) found that neurocognitive capacity is significantly predictive of skill acquistion, and that pre-treatment skill level accounted for 47% of the variance in post-treatment skills. These authors suggest, as may be apparent in this study's findings, that neurocognitive deficits are rate limiting; although not necessarily eliminating the effects of intervention, it is possible for neurocognitive capacity to influence capacity and rate of skill acquistion.

Hypothesis 3 pertained only to the treatment group, expecting higher scores for measures of memory and attention at pre-testing, specifically the Wisconsin Card Sorting Test (WCST), to be predictive of improvements in social skills at post-testing. This hypothesis was not supported. WCST total trials and WCST number correct could not predict gains made on Picture Arrangement or SCRT variables. This lack of association is surprising considering that there is considerable evidence in the literature to support that the card sorting task of the WCST, a measure that assesses ability to attain, maintain, and shift cognitive set, can be predictive of or influence functional social outcomes (Green, Kern, Braff, & Mintz, 2000). In addition, Corrigan and Green

(1993) found that more arousing emotional situations appeared to increase performance on the social perception task of the SCRT, and that individuals with schizophrenia were more attentive to situations that were emotionally poignant rather than calm (Corrigan, 1997). Given this previous research one would expect indicators of improvements and predicative validity for the moderate emotion conditions of the SCRT; however, such an association was not found in this study. Perhaps this relationship between attention and improved scores on social perception does not appear to exist in this study due to the lack of observed improvement from the treatment group on the social perception task. If there were no significant score increases, as the results of hypothesis 1 showed, it would be difficult to show predictive validity for a measure that did not improve. It may also be reasonable to consider that the SCRT was not an ecologically valid measure to use for the assessment of social skill acquistion. Perhaps outcome measures that included assessments of daily living and community functioning, and dynamic assessments of capacities for learning potential, may have yielded different results (Green, Kern, Braff, & Mintz, 2000).

With regard to the lack of observed improvements in the treatment group, it is difficult to ascertain why no significant changes were observed in either social or cognitive measures. As stated above, perhaps the treatment group contained a larger proportion of more chronically impaired or “deficit” participants, and therefore the present eight week treatment intervention did not have a long enough duration to effect change for this more ‘treatment resistant’ group. Heissen, Liberman, and Kopelowicz (2000) acknowledge that skills training must be provided on a long-term basis to be effective in schizophrenia. A relation between treatment “dose” and clinical or functional

outcome has been previously suggested with regards to social skills training (Dilk & Bond, 1996). Penn and Mueser (1996) compared results from several short- and long-term social skills training investigations, and concluded that for positive results to accrue, treatment must be provided over an extended period of time.

It may also be important to consider that the treatment participants' performance on their post-test tasks may have been compromised due to a different motivational pattern than control participants. Due to more extended contact with the researcher, who served as their "teacher" in the social skills training group, as well as their assessor in post-testing, treatment participants may have developed a stronger desire to do well on the tests. This 'pleasing response bias' may have served to increase efforts, and possibly anxiety, on the part of treatment participants. Such a response bias could reasonably account for the increased false alarms on the combination continuous performance/span of apprehension task (CP/SPAN) found in the treatment group. The effect of such a response bias on other tests could have been either enhancing or debilitating; this possibility cannot be directly tested with the present data.

Alternatively, it may be that the present study's findings are accurate, and in fact the null hypothesis is true: that no relationship exists between social skills training and cognitive functioning. A treatment intervention of social skills training does not have an impact upon social skills training participants' information processing capacities in either the social cognitive or cognitive domains. In addition, this relation between social functioning and cognitive capacity has been reported almost exclusively from a correlational standpoint. The majority of research in this area indicates these concepts may indeed be associated, possibly in a forward direction of causality: Prior to

treatment, good attentional capacities or cognitive functioning is thought to facilitate better social skill acquisition and subsequent social functioning. Spaulding et al. (1999) posited this concept as cognitive impairments having prognostic significance for treatment interventions. However, the present study investigated a reciprocal or reverse direction of causality of this relationship: did teaching social skills improve any cognitive capacities? This direction of causality in the relation between cognitive and social factors was not supported in the present study. Given these non-findings, it is logical to consider that this reciprocal relationship between social functioning and cognitive functioning may not exist. Results from two of the three main hypotheses showed the opposite effect from the one hypothesized. In fact, the control group improved on some measures of social cognition and information-processing. Therefore, this evidence may lead us to consider acceptance of the null hypothesis of no effect (Weisburd, Lum & Yang, 2003): social skills training does not improve social cognition or cognitive functioning. Thus, the next logical step would be to consider that previous findings in this area may have specific limitations that compromise our ability to accept the purported relations between social and cognitive domains. Perhaps the behavioral rehearsal received in the skills training sessions serves as rote repetition which promotes an increased use of certain social skills, leading to increase functional outcomes, however this effect may be simply behavioral, with no deep or lasting changes occurring within information-processing systems. Previous studies suggesting a link between cognitive capacities and the acquisition of social skills may have been based upon spurious findings that could have been attributable to practice effects, other extraneous factors such as spontaneous recovery, or selection bias, such as a sample

comprised of individuals possessing higher cognitive capacities or learning potential from the onset of treatment. Speculations such as these are provocative; however, the presence of methodological flaws or erroneous findings in previous research on this topic are not apparent. Therefore, the limitations of the present study and the need for further empirical research on this particular question are important considerations.

Supplemental hypotheses 1-3 each pertained only to the treatment group. The ability to evaluate these hypotheses was compromised by the small number of participants in the study. Supplemental hypothesis 1 predicted that individuals with schizophrenia-paranoid subtype would respond better to treatment intervention than persons with other subtypes on measures of social skills and information processing. Unfortunately, this hypothesis was unable to be tested due to insufficient numbers for appropriate comparisons. The Schedule of Affective Disorders & Schizophrenia – Change Version (SADS-C) structured interviews used for confirmatory diagnoses yielded one paranoid schizophrenia diagnosis, and eighteen other schizophrenia diagnoses. This number of paranoid schizophrenia diagnoses is surprisingly small. However, when considering that this study recruited volunteers to participate in a "research study" by a student at a university, it is understandable that the participant pool would contain a larger proportion of individuals with schizophrenia whose primary symptoms do not involve paranoid delusions. A research study, requiring testing and observations, may have played into or exacerbated any paranoid thinking for those individuals diagnosed specifically with paranoid schizophrenia. They therefore may have declined participation, or sign up for participation was at a lowered proportion from individuals with paranoid schizophrenia due to their hypervigilance or paranoia. The

recruitment processes for studies within the schizophrenia population are often not described in detail. It may be the case that researchers simply pay close attention to ensure a balanced and heterogeneous sample of different schizophrenia subtype diagnoses, and the recruitment process of those individuals with paranoid schizophrenia may involve more effort. Schubert, Patterson, Miller and Brocco (1984) investigated whether informed consent was a source of bias in clinical research and found that patients with paranoid schizophrenia were more likely to refuse participation in a research study. The characteristics of patients with schizophrenia such as suspiciousness, negativism, and ambivalence were suggested as possible sources of their refusal to participate.

Supplemental hypothesis 2 proposed that individuals with a diagnosis of schizoaffective disorder would respond better to the treatment intervention than those with a diagnosis of schizophrenia. When this hypothesis was tested using the original chart diagnoses to differentiate schizoaffective disorder participants and participants diagnosed with other types of schizophrenia, partial support for this hypothesis was obtained. There appeared to be a difference in improvement between the control and treatment group for the SCRT condition low emotion concrete. Specifically, the 6 individuals in the treatment group diagnosed with Schizoaffective disorder showed sensitivity improvement for low emotion concrete, after adjusting for pre-test scores, than the remaining 13 individuals diagnosed with Schizophrenia or Psychotic Disorder-NOS.

This result suggests that individuals with schizoaffective disorder received some benefit from the social skills training, allowing them to process social information more

accurately. Perhaps the diagnosis of schizoaffective disorder indicates a lesser degree of social and cognitive impairments than those diagnosed with schizophrenia, and therefore a greater capacity for social skill acquisition or improvement. Mueser et al. (1991) found that individuals with schizophrenia performed worse on verbal memory, a good predictor of social skill acquisition, than schizoaffective or major affective disorder patients, who did not differ.

It is interesting to note that the concrete content questions from the SCRT appeared to produce some significant differences between the control and treatment groups and between the schizophrenia and schizoafective groups within the treatment group, indicating some improvements in this area at post-testing. Corrigan suggested that performance on the SCRT is better overall with concrete questions rather than with abstract (Corrigan & Nelson, 1998; Corrigan, 1997). Thus, changes in concrete performance may be easier to provoke in general and also via social skills training. This finding may lend support to a dose effect relationship for social skills training (Heissen, Liberman & Kopelowicz, 2000). One wonders if the skills training intervention could have been provided for a longer duration and more frequently, if improvements among the schizoaffective participants would have been observed in the remaining SCRT conditions and other social and cognitive variables. Glynn et al. (2002) provided one group of individuals with schizophrenia clinic-based skills training alone and another group the same clinic-based skills training, supplemented with manual-based sessions in the community. Social functioning improved modestly over time from both psychosocial treatments; however, those individuals who received augmented skills

training in the community (in other words, a greater dose of skills training) showed significantly greater and/or quicker improvements.

Using the SADS-C to differentiate schizoaffective disorder participants and participants diagnosed with other types of schizophrenia, more accuracy for the group of schizoaffective participants from the treatment group on the Wisconsin Card Sorting Test was demonstrated at both pre- and post-testing, with the maximum number correct at both pre- and post-test. WCST number correct appeared to improve slightly for the Schizophrenia group, but did not show maximum scores as the Schizoaffective group had demonstrated. These results are encouraging. Taken together with the observed improvements in SCRT scores for individuals with schizoaffective disorder as compared to individuals with schizophrenia who showed no significant improvements, they support the notion that deficits in the area of attention may contribute to slower learning and acquisition of skills. Apparently, individuals with schizoaffective disorder, who may be less attentionally impaired, were able to attend well enough at both pre- and post-testing to obtain the maximum number correct on the WCST. These individuals also evidenced improvement on a social perception task after receiving social skills training over an eight-week period. Specifically, the gains participants diagnosed with schizoaffective disorder exhibited were in the areas of detecting and remembering concrete information during low emotion situations, and they demonstrated a strength in accuracy for a categorization task, which falls within the area of executive functioning. These findings help to illustrate an apparent interaction between cognitive factors and social functioning in which the degree of deficits in the areas of attention and executive functioning influence the capacity to improve upon or acquire social skills, and the rate at which this

can be accomplished. However, a study by Holthausen, Wiersma, Knegtering and Bosch (1999) advises that it is also important to consider other symptoms, such as depression, which can be concurrent with schizophrenia, which may be impacting cognitive deficits. Patients with schizophrenia and depressive symptoms may exhibit less efficient information processing; however, this may be compensated for by increased mental effort. Appropriate assessment and distinction between true cognitive limitations and cognitive impairments as a results of depressive symptoms will be important to consider in future research and clinical applications in the area of social skills training and psychosocial rehabilitation.

The third supplemental hypothesis predicted tasks of vigilance and discrimination would show a stronger relationship with social skills improvement for older, and more chronic persons with schizophrenia in the treatment group. Chronic was defined by a formula combination of (# of years with the diagnosis) * (# of hospitalizations) / age, in order to form an index score. A t-test indicated no significant difference between the control and treatment groups on this index of chronicity. However, comparisons between the low chronic and high chronic participants within the treatment group indicated differences between these two groups. Support for the hypothesis of stronger relationships for high chronic participants was not found. In contrast, some significant partial correlations were evidenced for the low chronic treatment participants between vigilance and sensitivity for low emotion abstract, and discrimination and moderate emotion concrete and abstract content questions on the SCRT. It appears that the stronger relationship among these variables was found in the low chronic treatment participants rather than high chronic participants in the treatment group. Perhaps age of

participants influenced treatment efficacy in this case. Younger, less chronic participants may have benefited more from the social skills training, thus evidencing stronger relationships among the cognitive and social measures. In a survey of elderly outpatients with Schizophrenia, Auslander and Jeste (2002) found patients' perceptions of high priority treatment areas were in the areas of physical health, memory and social functioning. Older patients appear to be aware that memory skills and social functioning are difficult tasks for them, and they believe they are in need of remediation in these areas.

Additional exploratory analyses examining the word list subtest, a measure of verbal memory, and its correlations with social variables yielded some interesting patterns for the control and treatment groups. Recall of words from the word list appeared to be a strong factor in predicting social cognition in both the treatment and control groups at pre-testing, whereas recognition, a less difficult task, appeared important in predicting social cognition for the control group only. These results are consistent with findings from Mueser et al. (1991) who found that verbal memory was the strongest predictor of improvements in social skills for a schizophrenia group. The verbal nature of social skills training may account for the importance of verbal memory to skill acquisition. In addition, Spaulding et al. (1999) found that patients whose scores were improved on a verbal learning test were more likely to improve on the functional assessment of interpersonal problem solving. This finding of significant verbal memory correlations with social variables is somewhat consistent with recent research from Reeder, Newton, Frangou and Wykes (2004) who found improvements in verbal working memory among participants with schizophrenia receiving cognitive remediation

therapy, and no improvements in control or 'treatment as usual' groups. In addition, verbal working memory for the improved group was found to be significantly associated with social functioning. In the present study, different correlational patterns of social measures with verbal memory measures may suggest that the two groups differed in their clinical presentations from the onset, indicating a sampling bias. However, explorations of factors such as paranoia and chronicity being more highly represented in one group relative to the other were not substantiated, thus making it difficult to explain this difference.

Verbal memory appears to have a distinct relationship with social information processing in the present study. Good verbal memory may be predictive of better acquisition and possibly performance on social skills. These findings support previous research from Green (1996) documenting a correlation between measures of social competence and measures of verbal memory and attention, and from Mueser et al. (1991) who found that poorer memory skills in patients with schizophrenia or schizoaffective disorder were significantly associated with a slower acquisition of social skills. In addition, these results are somewhat consistent with research from Addington and Addington (1999) evaluating associations between neurocognitive and social functioning. They found aspects of social problem solving were predicted by performance on verbal memory, verbal ability, and cognitive flexibility.

In the present study, the control group improved their performance on some social perception tasks and information-processing tasks more than the treatment group. One possible explanation for these findings is the issue of level of chronicity of participants' illness and the number of participants with higher levels of chronicity in

each group. A t-test comparing the two groups on the index score of level of chronicity (a combination of the variables age, years with diagnosis, and number of hospitalizations) revealed no significant differences. However, as Table 28 reveals, the control group appeared to be comprised of more low chronic participants and less high chronic participants than the treatment group. This may be a possible explanation of why the tests of main hypotheses 1 and 2 yielded some improvements in accuracy from pre-test to post-test in the control group, and a decline in accuracy from the treatment group on low emotion abstract questions. In general, participants in the control group may have been slightly less impaired by their illness and were able to benefit from the practice the assessment provided, even without training.

The issue of recruitment procedures for participation in this study likely impacted this amount and level of chronicity difference between the two groups. Because the study was designed as a wait-list control, participants who were signed up first received treatment, while those who were later in agreeing to participate in the study were assigned to the control group. Referrals from appropriate staff were encouraged and solicited throughout the recruitment process; however, staff were approached for referrals more actively earlier in this process. Thus, it was likely that staff working with individuals at the psychiatric rehabilitation programs (PRP) had a significant influence on the make-up of treatment groups. It was also understandable that staff were more likely to refer individuals for the actual treatment group who attended the PRP on a daily or regular basis and who were in greater need of social skills training. Those individuals who were later in signing up for the study, and thus relegated to the control group, were usually individuals who attended the PRP more sporadically or less regularly and may

have been more independent in nature. These individuals may have been less closely tied with staff and possibly more socially skilled at the onset. It may have been the case that the treatment group may have had a higher number of more impaired individuals, and the control group was comprised of less individuals considered to have high chronicity levels, which thus impacted the mean scores for social functioning, respectively, when compared with each other.

However, it appears that when we examined the treatment group alone, some improvements could be noted. For example, improved performance from individuals with schizoaffaective disorder over individuals with other diagnoses of schizophrenia on the low emotion concrete SCRT condition and on the number correct for the Wisconsin Card Sorting Test. The ancillary analyses of the additional verbal memory measure of the word list subtest from the Weschler Memory Scale- Third Edition (WMS-III) were also illustrative of differential patterns of response between the control and treatment groups on measures of verbal memory and their association with social competence.

Clinical Implications

Results from this study may be useful to consider in clinical practices when working with individuals diagnosed with schizoaffective disorder and schizophrenia. It may be helpful to consider the robustness of specific cognitive tests as assessment tools for amenability of patients to acquire social skills. The Wisconsin Card Sorting Test and word list subtest of the WMS-III may prove to be useful tests to utilize in a psychological assessment battery when the referral question includes whether the patient would benefit from individual or group social skills training. Each of these tests provides fairly brief and targeted assessments of cognitive skills that appear to be

associated with social competence, and therefore could shed some light on the patients' receptiveness to such socially oriented treatments.

The present findings may also speak to consideration of patients' specific diagnoses and their amenability for treatment and capacity for growth in the area of social competence and cognitive skills. Partial support was obtained for the hypothesis that individuals with schizoaffective disorder would perform better on social and cognitive measures. Thus, a diagnosis of schizoaffective disorder may indicate to the mental health professional that those individuals may be less impaired in the social and cognitive areas or that they would benefit more from the social skills training that may be available. In addition, as a group leader selecting participants in a social skills training group it is important to tailor the heterogeneity or homogeneity of the group's composition for appropriate treatment needs of the patients. For example, it may be useful to have a combination of lower functioning and higher functioning individuals in one group, for the purpose of modeling. Higher functioning individuals will have quicker success with social skill acquisition and serve as role models for other lower functioning participants. Given that a diagnosis of schizoaffective disorder may indicate higher social functioning, it may be important to group leaders to limit the number or ratio of individuals diagnosed with schizoaffective disorder versus other types of schizophrenia, depending on the desired composition of their group.

Limitations of the Study

One of the primary limitations of this study was the small sample size. Research in the area of chronic mental illness is difficult to conduct often due to the very nature of the debilitating aspects of the illnesses. In particular, individuals with schizophrenia are

often non-compliant and unmotivated, and therefore do not readily volunteer for participation in projects or studies without concerted effort and prompting from mental health professionals. People with schizophrenia can also be reluctant to participate in research due to paranoid ideations about the nature of the research and its relevance to them specifically. Thus, these factors often limit the pool of participants from which one can recruit. In a recent review article of studies for cognitive training in schizophrenia (Twamley, Jeste, & Bellack, 2003) the first recommendation for future research was to obtain adequate sample sizes, indicating this is a common problem in most schizophrenia research.

Additionally, the small number of individuals in this study limited the statistical power of the multivariate tests used to evaluate potential changes, and while small changes may have occurred for the individuals who received the social skills training, these changes may not have been dramatic enough to be detected due to the limited power of the tests as a result of a low number of participants.

A limitation to obtaining peak performance from participants on social and cognitive tasks was the inability to keep the time of day for assessment consistent. D'Reaux, Neumann, and Rhymer (2000) found optimal performance on specific cognitive tasks can differ significantly from morning to afternoon administration times. Therefore, if participants were tested at different times of the day, their performances may not have been consistently optimal. Unfortunately, a number of factors prevented holding the time of day for testing constant for all participants. Having only one evaluator for all the assessments, scheduling restraints at the program sites, and participants who required short periods of time over the span of several different days to

complete the assessment process, interfered with attempts to maintain consistent time of day for testing.

Another limitation was an apparent recruitment bias, which may have created a higher ratio of individuals with more severe or chronic schizophrenia in the treatment group. Active solicitation of referrals to the study from staff early in the project, combined with a first come first serve basis for the wait-list control may have encouraged more chronic individuals who were in greater need of treatment to be placed on the list first, whereas less chronic individuals were likely to sign up on their own, placing them lower in the list. This recruitment procedure was not planned, but rather seemed to develop as a response to initial difficulties encountered generating interest and participation at some of the psychiatric rehabilitation program sites. Thus, the issue of non-random assignment appeared to be a genuine limitation as well for this study. Random assignment was not possible because pre-testing and treatment groups were sometimes begun before the sign-up list was completed at a particular site. This may have been avoided if sign-up for the study was conducted during an independent time period, and participants on the list were randomly assigned to control or treatment groups and is recommended for future research.

A final limitation to consider may also be regarded as a strength of the treatment program provided in this study, which is the concept of a contamination effect. Enthusiasm for the social skills training groups was fairly high within the psychosocial program sites, from both participants and staff. Some participants in the treatment groups appeared to enjoy their status as research participants, and enjoy the extra amount of attention and activity in their daily routine that the groups provided. The co-

leaders of the different groups also appeared to enjoy their increased positive relationships with treatment group participants as a result of the social skills training group. It is possible that treatment participants may have discussed the social skills they learned with control participants, and that staff at the program sites may have incorporated some of the techniques from the skills training groups into their additional interactions or groups within the day program, which also contained the control participants. Thus, the social skills gained by the treatment participants as a result of the skills training group may have been passed along to the control participants due to regular daily contact among all the research participants and the staff, as well as enthusiasm and positive attitude toward the skills groups.

Research Implications

Replication of this study with a much larger sample size would be the most logical step to take with regards to future research in this area of social and cognitive skill acquisition in response to social skills training. However, results from this study suggest there may be evidence of differential responding from schizoaffective disorder and schizophrenia. Ensuring data collection from a larger sample with separate diagnostic groups would assist in clarifying these findings. The heterogeneity of a sample of individuals diagnosed with schizoaffective and all other subtypes of schizophrenia could serve as confounding to the clarity of results. Therefore, four separate groups are needed, comprised of two control groups (one Schizoaffective and one Schizophrenia), and two treatment groups (one Schizoaffective and one Schizophrenia).

With respect to pre- and post- assessment of social skills acquisition, an additional method of social competence assessment would help to provide a more comprehensive picture of improvements in the area of social functioning. The Social Cue Recognition Test was quite useful in providing four different aspects of social receiving skills or social perception. However, utilizing a tool to assess other social competence areas, such as expressive skills, might capture more actual gains made directly from the skills training groups. The format of the skills training groups conducted, which used curriculum from Bellack et al. (1997), concentrated mostly on role plays and modeling of appropriate expressive social skills and nonverbal body language. An assessment tool such as the Assessment of Interpersonal Problem Solving Skills (AIPSS) might be useful. The AIPSS involves viewing video vignettes, answering questions about the social problem viewed, and then also participating in a role-play solution. The AIPSS used in conjunction with the SCRT would provide a more comprehensive assessment of actual perceptive and expressive skills in the area of social functioning. In addition, a brief measure of current daily functioning that elicits ratings from staff would provide a fuller picture of social competence.

Cognitive assessments from the COGLAB tests should also be utilized with this larger sample. It is recommended that in addition to this computer-based battery of information processing tests, more measures of verbal memory be incorporated into the information-processing assessment at pre- and post- testing. The word list subtest of the Weschler Memory Scale-III provided some strong correlations with social measures. This suggests that additional memory assessments that incorporate verbal abilities may

be associated with the mechanisms at work for social cognition, and therefore useful to add into the assessment battery.

The connections among cognitive performance, social functioning, and everyday functioning in individuals with schizophrenia should continue to be investigated with empirical research. Twamley et. al (2003) concluded that cognitive training can lead to generalized improvements in cognitive test performance for individuals with schizophrenia, and that assessment of change on cognitive tests is necessary, as suggested above. However, Twamley et. al (2003) also concluded that measuring real-world change is critical. Researchers need to develop and utilize performance based measures of social communication, medication management, and the ability to function in the community by shopping, using transportation, preparing food, and so forth. Patterson, Goldman, McKibbin, Hughs, and Jeste (2001) have evaluated real-world abilities in persons with severe mental illness by using: the UCSD Performance-Based Skills Assessment, the Medication Management Ability Assessment, and the Social Skills Performance Assessment. Measures such as these might provide a comprehensive assessment of functioning before and after a regime of social skills training.

Finally, it is recommended that replication and extension of the present study be designed to investigate the effectiveness of a social skills training program with a large sample and utilize truly randomized groups. Recruitment procedures would likely be most successful if conducted at a treatment facility (or facilities) that would ensure access to a large pool of participants diagnosed with schizoaffective disorder and schizophrenia. Participants need to be recruited to one sign up list by uniform methods,

such as referrals alone or independent sign up alone. Given the propensity for individuals with chronic mental illness to have difficulties with treatment compliance and follow-up, a significant drop out rate should be expected, thus underscoring again the tremendous importance of a large sample.

APPENDIX A

SUMMARY OF COGLAB TASKS

The following is a summary of each task to be used from COGLAB in the present study. A detailed description of the entire contents of COGLAB can be found in Spaulding, W., Garbin, C.P. and Dras,, S.R. (1989). Cognitive abnormalities in schizophrenic patients and schizotypal college students. The Journal of Nervous and Mental Disease, 177, 717-728.

1. Mueller-Lyer illusion: The participant has to adjust the arrow figure on the screen until the two line segments appear equal. There are 3 trials. The ratio of lengths of the two line segments is recorded for each trial.

2. Size estimation: A geometric graphic figure is presented on the screen for 5 seconds. Then, after 5 seconds of no stimulus, the screen shows two duplicates of different size. The participant has to indicate which of the two is closer in size to the standard. The two choices are actually proportionally equidistant from the standard. There are 10 trials. The number of over- and under-estimations are recorded.

3.Wisconsin Card Sorting Task: This computerized version of the Wisconsin Card Sorting Test (WCST) uses a scoring and decision rule scheme that lowers the potential floor effect at the WCST. The test demands that the participant discern through trial and error three sorting parameters (color, number, and shape). Feedback of "right" and "wrong" is provided for each card sorted. After five correct sorts, the relevant sorting parameter changes. The total numbers of correct trials, perseverative errors, and categories completed are recorded.

4. Backward masking: In each trial, a pair of digits is presented for 16 milliseconds on the screen. It is followed either by no mask or a patterned mask (two X's) of equal duration with stimulus onset asynchronies (SOAs) of 32 or 48 milliseconds. There are 10 trials for each of the conditions of no mask, the short SOA mask, and long SOA mask. Each digit in the pair of the participant's responses is scored separately, and the total number of digits apprehended in each condition is recorded.

5. Asarnow Continuous Performance: The participant has to watch the screen for a specified target digit and to press a button when it appears. Target and distractor digits are presented for 128 milliseconds at the rate of 1 per second. In the first condition, targets and distractors are presented 1 digit at a time. In the second condition, an array of 8 digits is presented which may or may not contain the target digit. The third condition is the same as the second condition, except that the participant has to respond to a new target digit. There are 10 target digits in each condition. The number of hits and false alarms are recorded in each condition, as well as perseverative errors in the third condition.

APPENDIX B

SAMPLE GROUP SESSION

Sample Group Session

Total time -1 hour

First 5 minutes	**Review homework given and reinforce efforts**
Next 15 minutes	**Engage group members in individual role plays, feedback, corrective instruction based on homework or other real-life situations**
Next 30 minutes	**Introduce new skill area:** **1. establish rationale for importance of skill** **2. model skill** **3. role play skill with group members** **4. provide feedback-corrective and reinforcing**
Last 10 minutes	Assign homework, individual assignments as possible

Skill: Listening to Others

Rationale: Whenever you are in conversation, it is important to show the other person that you are listening, that you are paying attention. When the other person can tell you are listening, he or she is more likely to want to continue talking to you. There are some specific things you can do to show your interest to the other person.

Steps of the Skill:
1. Maintain eye contact.
2. Nod your head.
3. Say " Uh-huh" or "Okay" or "I see."
4. Repeat what the other person said.

Scenes to use in Role Plays:
1. Listening to someone who is talking about a favorite hobby.
2. Listening to someone who is talking about a favorite TV show.
3. Listening to a staff member who is talking about the rules at the Community Meeting.
4. Listening to your doctor telling you about your medication.
5. Listening to a friend talk about a recent outing.

Special Considerations When Teaching this Skill:
1. Role plays should be set up using two people: One person talks about a topic, while the person practicing the skill follows the steps.
2. Clients often have difficulty paying attention when someone is speaking to them. It is important to keep the role plays short (30 seconds or less) and simple when first practicing the skill.

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