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# Social Cognition and Interaction Training (SCIT) for Individuals with Schizophrenia Spectrum Disorders in Outpatient Treatment Settings

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# SOCIAL COGNITION AND INTERACTION TRAINING (SCIT) FOR INDIVIDUALS WITH SCHIZOPHRENIA SPECTRUM DISORDERS IN OUTPATIENT TREATMENT SETTINGS

by

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# SOCIAL COGNITION AND INTERACTION TRAINING (SCIT) FOR INDIVIDUALS WITH SCHIZOPHRENIA SPECTRUM DISORDERS IN OUTPATIENT TREATMENT SETTINGS

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The role of social cognition in severe mental illness (SMI) has gained much attention, especially over the last decade. The impact of deficits in socio-cognitive functioning has been found to have detrimental effects on key areas of day-to-day functioning in individuals with SMI, such as gaining and maintaining employment and overall experienced quality of life. Treatment of individuals with SMI is challenging, as the presentation of individual signs and symptoms is rather heterogeneous. There are several treatment approaches addressing deficits ranging from broader social and interpersonal functioning to neurocognitive and more intrapersonal functioning. As research in the domain of social cognition continues to identify specific deficits and its functional detriments, treatment options need to evolve to better target identified functional deficits. Social Cognition and Interaction Training (SCIT) was recently developed to address specific socio-cognitive deficits in an inpatient population of individuals with schizophrenia-spectrum disorders. This study applied SCIT in an outpatient SMI population as many deficits remain after individuals' symptoms are less severe and overall functioning is more stable than during the acute inpatient phase of their rehabilitation. Specifically, this study has two objectives. First, to demonstrate that deficits in social cognition persist after the acute phase of illness has abated. Second, to

demonstrate that these deficits can be ameliorated via targeted treatment such as SCIT. Data was gathered in local outpatient treatment settings serving a heterogeneous SMI population.

# Dedication

Für Mama – Wir vermissen Dich.

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## Chapter 1 – Introduction

Social Cognition and Interaction Training (SCIT) for Individuals with Schizophrenia Spectrum Disorders in Outpatient Treatment Settings

Social cognition has been defined as "the ability to construct representations of the relations between oneself and others, and to use those representations flexibly to guide social behaviors" (Adolphs, 2001). Research has established the adverse impact of socio-cognitive dysfunction on clinical as well as functional outcome for individuals with schizophrenia spectrum disorders (Brenner et al., 1994; Hogarty & Flesher, 1999). Schizophrenia spectrum disorders have wide-ranging and debilitating effects on peoples' lives. Social cognitive deficits have been an important domain of functioning with deficits manifested in peoples' ability to establish and maintain meaningful interpersonal relationships to gaining and maintaining employment as well as the overall perceived quality of life (Corin & Lauzon, 1994; Davidson, Stayner, & Haglund, 1998; Mueser, Becker, & Wolfe, 2001; Mueser, Salyers, & Muser, 2001). Further, cognitive impairments (such as deficits in memory, attention, and problem-solving) have been found to negatively impact psychosocial functioning (including skills needed in areas of vocational attainment and interpersonal functioning) as well as interfere with rehabilitation goals overall (Green, 1998; Penn, Corrigan, & Racenstein, 1998); and limited social competence has been linked to deficits in cognitive domains such as attention and memory (Hogarty, 2000). Using structural equation modeling, Sergi and colleagues suggested that social cognition and neurocognition are separate, yet closely linked constructs (Sergi, Rassovsky, et al., 2007). As such, social cognition has been called a *mediator* as it bridges more molecular domains (i.e. underlying neuro-cognitive

abilities) with a more molar domain, the interactive social realm of functioning (Brekke, Kay, Lee, & Green, 2005; Couture, Penn, & Roberts, 2006; Kee, Kern, & Green, 1998; Sergi, Rassovsky, Nuechterlein, & Green, 2006). Green, Uhlhass, and Coleheart (2005) suggested that functioning in the neurocognitive, socio-cognitive, as well as the broader psychosocial domain should be combined for a better understanding not only of schizophrenia but also for more informed treatment approaches aimed to improve functional outcome in people with serious mental illness (SMI[1]). The *vulnerability-stress* or *diathesis-stress* model (e.g. Zubin & Spring, 1975), and more recently the *neurodevelopmental* model (Murray, O'Callaghan, Castle, & Lewis, 1992) are theoretical formulations that incorporate multiple levels of organismic functioning, designed mostly to clarify the etiology of SMI. The *biosystemic* model (e.g. Spaulding, Sullivan, & Poland, 2003) is a similar formulation designed mostly to inform clinical assessment, treatment and rehabilitation. Together these formulations create the broader theoretical paradigm in which current research on social cognitive impairments and their treatment proceeds.

The main hypotheses of this study examined the effectiveness of a newly developed treatment approach looking to ameliorate social cognitive functioning in individuals with schizophrenia spectrum disorders. The chosen treatment modality, Social Cognitive and Interaction Training (SCIT), was developed by Penn et al. at the

[1] SMI is an umbrella term used in mental health services policy and administration, and more generally to connote people with chronic, disabling psychotic disorders including schizophrenia and severe affective disorders. For scientific and scholarly purposes, SMI is often, but not always, interchangeable with diagnostic terms such as "schizophrenia" or paradiagnostic terms such as "schizophrenia-spectrum." In this discussion, SMI refers to the broader population, and other terms are used when reviewing specific studies that use those terms as inclusion or independent variables.

University of North Carolina and is currently undergoing rigorous testing in order to be established as best practice in the field of SMI treatments. This study hypothesizes that individuals receiving SCIT will show improvement in socio-cognitive domains after receiving the treatment as compared to individuals who do not receive SCIT treatment. As this study employed a waitlist-control format, all participants received SCIT by the end of the study. It is hypothesized that by the end of the study, all participants will have improved in socio-cognitive domains as addressed by SCIT.

Study participants were assigned to two groups: 1) SCIT then TAU (treatment as usual), or 2) TAU then SCIT. Participants completed a comprehensive testing battery three times over the course of the study: pre-treatment (baseline, testing time 1), after the first set of SCIT groups ended (half of the participants are post-treatment, testing time 2), and again after the second set of SCIT groups ended (all participants are post-treatment, testing time 3). The testing battery included measures assessing current symptomatology, neurocognitive functioning, and socio-cognitive functioning.

# Chapter 2 – Literature Review

## Social Cognition in Severe Mental Illness

The term "social cognition" has gained increased attention, especially during the past 15 years, and refers to "mental operations underlying social interactions, which include the human ability and capacity to perceive the intentions and dispositions of others" (Brothers, 1990). As established by the National Institute of Mental Health (NIHM) initiative "Measurement and Treatment Research to Improve Cognition in Schizophrenia (MATRICS)," essential components of social cognition include emotion perception, social perception, social knowledge, theory of mind (ToM) and metacogntive abilities, as well as attributional style (Green, Olivier, Crawley, Penn, & Silverstein, 2005; Green & Leitman, 2008). However, other studies refer to three (of the above named five) components as primary domains: emotion perception, ToM, and attributional style (Combs, et al., 2009; Penn, Sanna, & Roberts, 2008). Of these, emotion perception and processing appears to be the most studied area of social cognition (Kee, et al., 2009). These findings highlight the need for further study in order to identify the specific factor structure and inter-relationships of these overlapping domains of social cognition.

Research has shown that individuals with schizophrenia-spectrum disorders have difficulty with the skills and abilities mentioned above (Edwards, Jackson, & Pattison, 2002; Corrigan & Nelson, 1998; Corrigan & Toomey, 1995; Addington & Addington, 1998; Grant et al., 2001; Frith & Corcoran, 1996; Pickup & Frith, 2001). Further, research has confirmed that social cognition mediates the relationship between neurocognition and functional outcome (Brekke, et al., 2005; Gard, Fisher, Garrett, Genevsky, & Vinogradov, 2009; Yager & Ehmann, 2006 ). As such, findings indicate

that individuals with schizophrenia-spectrum disorders have difficulty with community functioning and social adjustment and has identified cognitive deficits in the areas of working memory, executive functioning and attention as underlying factors to these socio-cognitive deficits (Green, Kern, Braff, & Mintz, 2000; Tso, Grove, & Taylor, 2009). In addition, studies utilizing techniques such as functional magnetic resonance imaging (fMRI) and regional cerebral blood flow (rCBF) monitoring have found that people with schizophrenia-spectrum disorders show a different pattern of brain response compared to normal individuals, including deficits in neurochemistry (see West & Grace, 2001 for a detailed review). Deficits in neural substrates linking the prefrontal regions of the brain with other areas (such as the amygdala and the limbic system) have been linked to deficits in executive functioning, reasoning, self-awareness, and decision-making (Tranel, Bechara, & Damasio, 2000). Such deficits can to some extent be addressed via targeted repetitive learning (i.e. strengthening neuro-pathways in the brain), improving cognitive control, and the teaching of mature thinking styles (Bell, Bryson, Fiszdon, Greig, & Wexler, 2004; Spaulding et al., 1998; Wykes, Reeder, Corner, Williams, & Everitt, 1999; Hogarty & Flesher, 1999).

**Treatment of Social Cognitive Deficits**

Psychopharmacological treatment may help with addressing some of the above named deficits. Findings have been mixed in determining the effects of medication, especially with regards to the remediation of negative symptoms and cognitive impairment. Studies have found that, in contrast to positive symptoms, negative symptoms and cognitive impairments tend to be more stable over time and less responsive to treatment with antipsychotic medications (Kane & Marder, 1993; Greden &

Tandon, 1991). However, more recent studies found some evidence that atypical antipsychotic medications (e.g. olanzapine, risperidone, and clozapine) may have a beneficial impact on negative symptoms and cognitive impairments (Meltzer & McGurk, 1999; Keffe, Silva, Perkins, & Lieberman, 1999; Wahlbeck, Cheine, Essali, & Adams, 1999). To date, studies specifically focused on the impact of pharmacological treatments on socio-cognitive deficits are limited and inconclusive. While some studies found treatment with atypical antipsychotic medications improved social perception as compared to treatment with conventional antipsychotic medications (Littrell, Petty, Hilligoss, Kirshner, & Johnson, 2004; Kee, Kern, Marshall, & Green, 1998), other studies did not find any significant effect of pharmacological treatment on emotion perception (Harvey, Patterson, Potter, Zhong, & Brecher, 2006; Herbener, Hill, Marvin, & Sweeney, 2005; Penn, Keefe, Davis, Meyer, Perkins, Losardo, et al., 2009; Sergie, Green, et al., 2007). Overall, symptom reduction and stabilization often has a positive, if moderate, effect on neurocognitive performance, with different medications affecting improvements in different areas of cognitive functioning (e.g. verbal fluency, attention) as symptom severity improves. Nonetheless, psychopharmacological intervention is just one part of a comprehensive as well as individualized treatment approach.

Studies have found evidence for a link between cognitive functioning and functional outcome in schizophrenia. The impact of change in cognitive functioning, however, appears to be mediated by cognitive interventions. Research has found that improvement in cognition is not sufficient to lead to functional change unless it is achieved via targeted treatments (Wykes & Reeder, 2005). Studies have also focused on identifying specific areas of socio-cognitive dysfunction in people with SMI.

Furthermore, research has focused on how social cognitive difficulties impact people's lives and how this functional deficit can best be addressed in treatment. As such, research has recognized aspects of social cognition as an important part to successful interpersonal functioning in persons with schizophrenia (Couture, Penn, & Roberts, 2006; Penn, Combs, & Mohmed, 2001). Difficulty with social functioning often adversely impacts a person's overall perceived quality of life (Grant, Addington, Addington, & Konnert, 2001, Penn, Corrigan, Bentall, Racenstein, & Newman, 1997). Intact social cognitive abilities, including adequate social skills, thus impact the quality of social interactions, which are an important factor in vocational functioning, establishing and maintaining interpersonal friendships and relationships, and achieving a level of functioning sufficient for independent community living (Dickinson, Bellack, & Gold, 2007). Impairment in social functioning is also associated with higher relapse rates (Perlick, Stastny, Mattis, & Teresi, 1992). These socio-cognitive deficits are best addressed in treatment via a social learning approach, including modeling of behaviors and repetitively practicing target behaviors in role-plays.

**Existing socio-cognitive treatment modalities.**

To date, several psychosocial treatment approaches have been developed and successfully implemented in the treatment of people with SMI. Treatment format and patient population are important characteristics to consider when choosing a specific treatment approach for people with SMI. Current treatments for people with schizophrenia-spectrum disorders utilize individual as well as group formats. Generally, the more "social" treatment approaches tend to utilize a group format, whereas

approaches that also target neurocognitive functioning utilize an individual or mixed, individual and group, format.

Another factor to consider when choosing a specific treatment modality to address socio-cognitive deficits is the symptom acuity of the patient. Some treatment modalities are formulated targeting either an inpatient or an outpatient patient population; others can be adjusted and administered with either group.

The following treatments are administered on an individual basis. Although they do not specifically target socio-cognitive dysfunction per se, they have been found useful in improving functioning in the social cognitive realm.

***Cognitive remediation therapy (CRT) (Wykes & Reeder, 2005).*** CRT operates on the premise that improvement in cognitive function will affect other functions, such as socio-cognitive abilities. Specifically, CRT aims to improve executive functions (e.g. planning skills), memory, attention, and the ability for cognitive shift (e.g. shift set). Wykes and Reeder (2005) emphasize the importance of explicit teaching of reflective processing coupled with practice of learned skills in order to improve metacognitive abilities. The authors suggest the use of CRT in people with no co-existing substance abuse problem or acquired traumatic brain injury as it would distract from the focus of the program and render is much less successful. Similarly, the authors discourage use of CRT in people who actively experience psychotic symptoms, as these as well would distract from the treatment. In addition to the above named suitability factors, CRT also assess participants' motivation to participate in treatment and, most importantly, motivation to change via the process. Sessions are conducted on an individual basis up to three times per week. Even though CRT does not specifically focus on either inpatients or

outpatients, studies have mostly been recruiting outpatients for treatment for reasons mentioned above (e.g. symptom acuity etc). Overall, studies have found that the most durable treatment effect was improvement in verbal memory performance. Wykes and colleagues (1999) found that CRT participants improved in cognitive flexibility as well as memory function. Further, Wykes and colleagues found some skills taught by CRT were sustained over the six months after therapy was terminated. Specifically, improved cognitive flexibility appeared to be related to changes in social functioning. However, no direct effect of therapy on social functioning was found 6-months post-treatment (Wykes et al., 2003). On a broader level of functioning, research has found both, CRT and IPT (for a discussion on IPT see below) effective for reducing symptoms of SMI (Medalia, Aluma, Tryon, & Meriam, 1998; Medalia, Dorn, & Watras-Gran, 2000; Spaulding et al., 1999).

***Cognitive-behavioral therapy (CBT) for psychotic disorders (Fowler, Garety, & Kuipers, 1995).*** Even though CBT has originally been developed as a treatment approach for depressive disorders (Beck, Rush, Shaw, & Emery, 1979), it has been modified to target a variety of other disorders, including psychotic disorders. As such, CBT for psychotic disorders is a structured treatment approach that has been successfully implemented with inpatients as well as outpatients (Garety, Fowler, & Kuipers, 2000; Gould, Mueser, Bolton, Mays, & Goff, 2001). A number of studies have used a CBT approach to aid in the treatment of positive symptoms (Tarrier, Beckett, et al., 1993; Tarrier, Sharpe, et al., 1993; Chadwick & Birchwood, 1994; Garety, Kuipers, Fowler, Chamberlain, & Dunn, 1994). Findings from these studies indicate that CBT techniques, such as challenging underlying beliefs, can help reduce delusions, general

symptomatology, and alleviate depressive symptoms. Although CBT primarily targets symptoms (i.e. psychosis), its central tenant is to reduce stress and symptom interference with functional outcome; it has been shown that CBT improves patient's ability to cope with stressors and increase adherence to treatment and symptom management (Turkington, Dudely, Warman, & Beck, 2006). In addition, Rector and colleagues found that CBT, in combination with enriched treatment-as-usual (i.e. including case management), lead to a reduction in negative symptoms at a six-month follow-up (Rector, Seeman, & Segal, 2003). As such, CBT differs from other treatment approaches reviewed here, as it does not directly aim to improve basic cognitive abilities related to social functioning. Rather, CBT focuses on identifying and challenging dysfunctional thought and belief systems, identifying cognitive biases, encouraging the patient to self-monitor thoughts and beliefs, and helping the client relate cognitions to mood and behavior. However, given the heterogeneity of schizophrenia-spectrum disorders, treatment approaches need to be tailored individually to address the specific combination of symptoms of the particular patient. The primary and underlying aim in CBT with an SMI population is thus the identification of the patient's vulnerabilities, stressors, and response style (Fowler, Garety, Kuipers, 1998). Given the individual variability of symptom presentation, CBT treatment ranges in duration of treatment and in frequency of individual treatment sessions. Garety and colleagues (2000) describe offering on average 20 sessions of weekly or biweekly meetings with the therapist. However, the reported range of sessions offered to individual clients is from 12 to 30 sessions conducted anywhere between six months and one year. Fowler and colleagues (1995) conceptualized CBT for psychotic disorders in six components that are intended to be

administered in any given order, depending on the patient's needs. The components are as follows:

(1) Engagement and assessment (e.g. building rapport and developing trust, utilizing interviewing strategies to obtain detailed and specific information pertaining to patient' s history, symptoms, etc.)

(2) Coping strategy work (e.g. identifying and modifying existing coping strategies; this may involve homework tasks such as keeping a record of symptoms)

(3) Developing an understanding of the experience of psychosis (e.g. evaluating existing delusional beliefs and constructing a new way of making sense of beliefs; this includes some psycho-education, which builds on patient's understanding of the disorder)

(4) Working on delusions and hallucinations (e.g. through explorations of misattributions and "jumping to conclusion" biases)

(5) Addressing mood and negative self-evaluations (e.g. using standard cognitive therapy approaches to address low self-esteem, etc.)

(6) Managing the risk of relapse and social disability (e.g. reviewing learned skills and strategies to prevent relapse).

Even though the authors state that these six components of CBT treatment can be administered flexibly, there appears to be some encouragement to move through the components (or stages) in a structured manner as many of the issues addressed during one stage build on work done during previous CBT components. However, the authors emphasize that, while moving through the treatment components, previous components

can be revisited as needed to aid understanding and preserve the therapist-patient relationship. Overall, several studies have found CBT to be effective in individuals with SMI, reporting that the treatment beneficially impacts positive symptoms, reduces relapse, and aids overall recovery during the acute phase of the illness (Gould et al., 2001; Pilling et al., 2002; Rector & Beck, 2001; Tarrier & Wykes, 2004).

***Personal therapy for schizophrenia (Hogarty, et al., 1995).*** Personal Therapy (PT) for Schizophrenia is similar in its treatment approach to CBT (described above). As with CBT, PT aims to identify and modify stressors while focusing on relapse prevention as well as the enhancement of personal and social adjustment for people with SMI. However, unlike CBT, PT does not focus directly on positive symptoms or symptom remission in general. To that end, PT's focus is more on preventing relapse in patients with chronic SMI who are stable, and less on patients with acute symptoms. Hogarty and colleagues found that for patients with social support (i.e. living with family), PT reduced relapse rates (but not for those patients living independently who have received PT); similarly, patients who continued to participate in PT over an extended period of time (i.e. over one year) showed more positive effects in social adjustment (Hogarty, Kornblith, et al., 1997; Hogarty, Greenwald, et al., 1997). The treatment is delivered in three phases:

1. The basic phase introduces the PT approach and is used to establish rapport with the client. An individual treatment plan is formulated and clients learn about their illness and treatment, including identifying their individual signs and symptoms, stressors, and ways of coping.

2. The intermediate phase focuses on maintaining and enhancing clinical stability, continued psychoeducation (including adjustment to living with the disorder), facilitating skill development to resume activities of daily living. This phase also introduces relaxation techniques and social skills training.
3. The advanced phase continues to build on previous phases of PT and also addresses conflict resolution skills as well as social and vocational issues important to recovery.

Overall, PT can be described as a modified approach to treatment of SMI clients, combining psychotherapy, psychoeducation and case management strategies.

***Functional cognitive-behavioral therapy (fCBT) (Cather, 2005).*** Functional CBT focuses on increased functioning and well-being in people with schizophrenia. Penn and colleagues introduce fCBT as "a brief individual treatment for schizophrenia-spectrum disorders that targets residual symptoms that interfere with functional goal attainment, including interpersonal goals" (Penn et al., 2004). Thus, fCBT differs from the above-described CBT and PT treatments in that it does not focus as much on relapse prevention. In addition, fCBT is intended to be a shorter treatment approach with 16 weekly sessions and 4 bi-weekly booster sessions. The sessions are broken down into steps with different treatment foci as follows:

(1) Session 1 introduces the fCBT treatment approach to the client and is used to build rapport with the client.

(2) Sessions 2 through 5 focus on identifying of functional treatment goals and barriers to the achievement of goals, as well as on identifying and pursuing pleasant activities in order to increase well-being and, overall, quality of life.

(3) Sessions 6 through 16 focus on specific treatment modules addressing specific deficits or symptoms the individual client is experiencing (e.g. negative symptoms, delusions, difficulty with social relationships, maladaptive coping strategies) via CBT approaches. However, unlike traditional CBT, the authors emphasize an active approach to functional improvement (e.g. scheduling activities and engaging in activities).

Although fCBT has been found to aid with the improvement of positive symptoms, particularly auditory hallucinations, no significant improvements were noted in the realm of social functioning (Cather et al., 2005). This is particularly interesting given the stated focus of the fCBT treatment approach as one that emphasizes functionality over symptom reduction. However, the authors noted that fCBT is a relatively recent treatment approach that needs to be further evaluated via empirical studies.

***Training of affect recognition (TAR) (Wölwer et al., 2005).*** TAR is a socio-cognitive treatment approach aimed specifically at the remediation of deficits in facial affect recognition in a SMI population. The training is conducted in small groups (two participants and one therapist) and can be done with inpatients as well as outpatients. However, the authors note that TAR is geared specifically toward less symptomatic and more stable participants. TAR consists of a total of 12 sessions. Participants meet with their therapist twice a week for 45-minute sessions. The training consists of emotion perception exercises, ranging from the identification and discrimination of facial affect to

the integration of facial expressions into a social-behavioral context and situational context. This treatment approach has been found useful in producing significant improvement in affect recognition abilities.

***Cognitive-behavioral social skills training (CBSST) (McQuaid et al., 2000).*** CBSST was developed with a middle-aged and older adult SMI population in mind. The authors describe age-related patient characteristics such as increasing problems with physical health, potential loss of support, as well as particular belief systems (i.e. "an old dog can't learn new tricks") as factors influencing the development of CBSST (McQuaid et al., 2000). Further, the authors acknowledge that both CBT and social skills training (SST) have been found to include beneficial treatment strategies targeting the specific treatment needs of an SMI population. The underling rationale is that CBT techniques that have been found useful in the treatment of schizophrenia-spectrum disorder can be enhanced for older adults when combined with a social skills training approach, stressing repetition and practice of learned techniques and skills. In addition, the authors cite the potential stigma toward psychotherapy in an older cohort, reasoning that going to "class" may encourage more willingness to engage in treatment. The treatment approach consists of self-contained therapy modules that can be arranged and administered in any given order. CBSST is geared toward outpatients and usually administered in 12 weekly one-hour sessions. The two overarching targets of CBSST are improvement in social functioning as well as symptom reduction while keeping in mind the increased cognitive difficulties faced by an older population. To that end, CBSST focuses on the impact of beliefs or cognitions on mood and behavior as well as on the repetitive practice of

pragmatic living skills. The manualized treatment approach consists of the following three modules:

(1) Focus on cognitive-behavior skills (including training in basic cognition-challenging skills, using these skills to increase treatment adherence, gaining increased coping skills and applying them to prevent relapse, and reducing conviction regarding psychotic symptoms).

(2) Focus on symptom self-management (including improving skills in areas of problem-solving, identifying symptoms of relapse, and managing warning signs).

(3) Focus on symptom management and coping with persistent symptoms (including medication adherence strategies utilizing mnemonic aids and environmental structuring, and cognitive and behavioral strategies to identify and cope with ongoing symptoms).

Some of the above named approaches are taken from the UCLA Social and Independent Living Skills Series (Psychiatric Rehabilitation Consultants, 1991), especially from the Symptoms Management Module. Other approaches and techniques were taken from the traditional CBT approach and used in modified ways to address the specific needs of older individuals with SMI. A pilot study conducted by the authors showed that CBSST is beneficial for participants, especially with regards to treatment engagement and adherence.

As mentioned above, treatment interventions specifically targeting social cognitive dysfunction are mostly administered in a group format. Usually, group sizes average about six patients and one or more instructors. The following treatment

modalities have been successfully used with people with schizophrenia-spectrum disorders.

***Integrated psychological therapy (IPT) (Brenner et al., 1992).*** IPT is a well-validated, manualized treatment intervention developed to improve neurocognitive and socio-cognitive abilities as well as social skills in people with schizoprenia (Roder, Mueller, Mueser, & Brenner, 2006). The underlying premise that basic neurocognitive deficits have cascading effects on higher-level social and interpersonal functioning is addressed via different treatment modules that aim to improve necessary cognitive skills in order to effectively teach higher-level skills. With this sequential effect in mind, IPT modules are intended to be taught in order, starting with the more molecular neurocognitive functions and working up to a more molar level of social behavior. This group-based intervention is made up of five treatment modules that target these different levels of functioning. The domains are: (1) cognitive differentiation, (2) social perception, (3) verbal communication, (4) social skills, and (5) interpersonal problem solving. As such, IPT spans abilities and functions related to neurocognition and social cognition as well as social competence. Specifically, the domains focus on improving the following skills and abilities:

(1) The cognitive differentiation module addresses neurocognitive abilities such as attention, verbal memory, cognitive flexibility, and concept formation. Unlike other treatment programs, this IPT subprogram aims to improve functioning in these areas via group exercises focusing on strategy learning.

(2) The social perception module addresses social cognitive abilities such as social and emotional perception and emotional expression. This subprogram aims to

improve participants' apprehension and interpretation of social situations via group exercises utilizing slides depicting various social situations.

(3) The verbal communication module aims to bridge underlying functional abilities with overt behavioral skills. As such, it focuses on neurocognitive abilities that directly impact interpersonal communication skills such as verbal fluency and other skills related to executive functioning. The module revolves around the basic communication skills of *listening, understanding,* and *responding.*

(4) The social skills module focuses on fostering social competence in participants and uses in vivo role-plays as a focal strategy.

(5) The interpersonal problem-solving module adds group-based problem solving exercises and thus utilizes skills learned during prior subprograms.

As mentioned above, the IPT subprograms are designed to be administered sequentially, but, depending on symptom acuity of participants and targeted skills and abilities, only relevant subprograms may be administered. Studies up to date have found persistent positive global therapy effects independent from the specific number of subprograms administered (Roder et al., 2006).

IPT has been implemented in inpatient as well as outpatient settings. However, as Roder and colleagues address in their recent meta-analysis of studies that utilized the IPT treatment approach, studies done with outpatients were limited in number, but nonetheless showed positive effects regarding the amelioration of targeted dysfunctions (Roder et al., 2006).

***Cognitive Enhancement Therapy (CET) (Hogarty & Greenwald, 2006).***

Cognitive Enhancement Therapy combines individual computer-based training of

cognitive abilities with group-based social cognition training. Overall, the CET approach to treatment is based on the "mastery principle" with participants repetitively working on skills until the training goal is achieved. Given the approaches and goals inherent in CET, participants benefit most from this treatment approach once their symptoms are in remission and stable. Thus, CET targets a stable, non-substance abusing outpatient population and is recommended for use with participants with an IQ of 80 or higher (Hogarty, Greenwald, & Eack, 2006). CET uses specific components first used in the IPT approach and is heavily based on Ben-Yishay's *general stimulation holistic program* originally developed for use in people with traumatic brain injury (Ben-Yishay et al., 1985). Further, CET tailors treatment to individual needs based on cognitive style (i.e. cognitive impairment is understood via domain associated cognitive deficits that can be impoverished, disorganized, or rigid). CET seeks to identify participants' individual cognitive style and tailor training approaches with these specific symptom presentations in mind. For example, the training for individuals presenting with an impoverished cognitive style, treatment focuses heavily on learning skills related to elaboration and a more "gistful" construction of cognitive schemas. Similarly, for participants with a disorganized cognitive style, treatment will focus on improvement of attention and planning skills. Lastly, CET training with individuals identified as having a rigid cognitive style, treatment focuses on generating alternatives and becoming more flexible in behavior as well as in cognitions (Hogarty & Flesher, 1999a). Hogarty and Flesher (1999b) indicate that at the core of CET lies meta-cognition. The authors stress the importance of "gistful" appraisals and automatic processing. As such, the focus is on metacognitive abilites and training includes tasks targeting improvement of processing

speed, attention, memory, as well as problem solving skills. CET consists of approximately 56 social-cognitive group sessions lasting 90 minutes. In addition, neurocognitive deficits are approached via approximately 75 one-hour sessions using computer exercises. Specifically, the first part of CET is devoted to mastery of tasks pertaining to the above-mentioned domains of neurocognitive functioning. While the computer-based training occurs in individual session, the second part of CET focuses on fostering social cognitive function and social adjustment and occurs in a group setting. Throughout CET treatment, each participant also receives individual supportive therapy and medication management. Overall, studies have shown that CET results in improved neurocogntive functioning and psychosocial adjustment (Eack, Hogarty, Greenwald, Hogarty, & Keshavan, 2007; Hogarty et al., 2006; Hogarty et al., 2004).

***Social Cognition and Interaction Training (SCIT) (Penn et al., 2007).*** SCIT is a manual-based treatment approach that has been recently developed to address social cognitive dysfunctions in people with schizophrenia-spectrum disorders, especially individuals with paranoid symptoms. Specifically, SCIT addresses deficits in emotion perception, social perception and social cognitive biases, attributional style, cognitive flexibility, social relationships, and theory of mind related skills. SCIT, initially developed for use with an inpatient population, is structured as a group-based treatment approach consisting of 20 training hour-long sessions with sessions conducted up to three times per week. This treatment approach consists of three phases of training:

(1) Understanding emotions: This module incorporates a "personalized" understanding of social cognition (i.e. exploring the concept via personal

experiences of participants) and defining basic emotions and relating them to facial expressions.

(2) Exploring social cognitive biases: This module includes exploration of common biases held, especially by individuals with paranoid symptoms, and focuses on the "jumping to conclusions" phenomena as well as offers alternative strategies to avoid the pitfalls ambiguous situations can provide.

(3) Integrating materials from previous sessions: This final module aims to aid participants to apply learned materials and skills into their everyday lives.

A pilot study conducted by Penn and colleagues (2005) found that inpatients trained with SCIT showed moderate improvement in attributing hostile and aggressive intent in others, emotion perception, and showed significant improvement in ToM measures (Penn, Roberts, Munt, Silverstein, Jones, & Sheitman, 2005). Combs and colleagues have conducted another study of the efficacy of SCIT in a forensic inpatient population and found that individuals improved in all targeted social cognitive domains (Combs, Adams, Penn, Roberts, Tiegreen, & Stem, 2007).

***Social cognition enhancement training (SCET) (Choi & Kwon, 2006).*** SCET is a group-based treatment approach designed for stable, non-substance abusing outpatients with SMI. The central tenet of SCET is improvement in social cognitive functioning. The focus is on a subset of social cognition, specifically ToM-related skills such as social context appraisal and perspective-taking skills. The SCET treatment approach consists of a total of 36 90-minute sessions twice per week. The sessions are divided into three 12-session levels: elementary, middle, and advanced. SCET utilizes four-column cartoons to train individuals on social perception, emotion recognition, and social cue perception

skills. Tasks include arranging the cartoon in the right order based on contextual information. Participants are encouraged to discuss strategies as well as problem-solve social situations similar to the ones depicted in the cartoon. So far, results from SCET treatment trials have shown improved performance on a laboratory task assessing for abilities related to social context appraisal (Picture Arrangement, WISC-R). SCET is a rather recent addition to the social cognition treatment approaches.

**The Future of Social-Cognitive Treatments for SMI Populations**

Research in the field of social cognition has highlighted the importance of social cognitive abilities (e.g. social and emotional perception) in mediating cognitive functioning and broader social functioning in the SMI population. As such, functional outcome (i.e. social behavior in the treatment milieu and community functioning) has been tied not only to symptom reduction and stabilization (e.g. Medalia et al., 1998), but also to improved cognition and social cognition (e.g. Penades et al., 2003). For example, in a recent review of social cognition and functional outcome, Couture and colleagues emphasized evidence for a relationship between social perception and various domains of functional outcome (Couture et al., 2006). However, research has devoted less attention to the functional significance of other social cognitive domains (i.e. ToM and attributional style). Improving functional outcomes in individuals with SMI has been an essential tenant in the development for social cognitive treatment approaches, especially with regard to their potential to become acknowledged as evidence-based practice. To that extent, the above reviewed interventions can be viewed as interventions targeting specific domains of social cognition (e.g. SCET) and interventions that target a broader range of social cognitive abilities (e.g. IPT and SCIT).

As described above, there are several psychosocial interventions to date that explicitly target social cognitive dysfunction in individuals with SMI (e.g. Brenner, Hodel, Roder, & Corrigan, 1992; Hogarty & Greenwald, 2006; Penn, Roberts, Combs, & Sterne, 2007). The clinical outcome research is rapidly moving toward recognition of such interventions as evidence based practice. However, different interventions address different dimensions and domains of social cognition. Research on both intervention development and clinical outcome is increasingly focusing on which specific dimensions and domains are actually involved in treatment and recovery processes, which are most accessible to treatment, and which are most important with regard to personal and social functioning in the real world. Nevertheless, the scientific priority for outcome data on broad, multi-component treatment also remains high. Both types of research are needed now and in the near future.

The range and diversity of existing treatment modalities, however, make it difficult to determine the logical next steps in research. Different modalities focus on different social cognitive abilities and impairments. There are striking differences in the modalities' time courses (or "dosage," to use a pharmacological term). Although the overall research results suggest clinical effectiveness, the outcome expectations and measures are too diverse to allow any more specific conclusions. Ultimately, one should expect that specific modalities or packages of modalities will be identified as optimally effective for specific clinical presentations or constellations of impairments, but this will come only after years of clinical trials. Meanwhile, it seems that a reasonable research strategy is to study one modality that strikes a balance between focus and comprehensiveness, that is, a modality that addresses a moderate range of specific social

cognitive impairments whose ecological validity has a reasonable degree of face validity. Controlled or partially controlled trials of such a modality will gradually expand the database of social cognitive treatment toward future meta-analyses that will consolidate confidence that this approach has substantial promise. The values of such trials will be enhanced when they are done in a context that allows additional study of the factors that enhance or inhibit response to treatment. Similarly, the values of these trials will be enhanced when outcome can be measured in terms of specific cognitive changes, as well as functional recovery.

**Present Study**

The purpose of this dissertation project is to further scientific understanding of treatment for social cognitive impairment in SMI. The project includes an empirical study of such treatment in the form of a controlled outcome trial. The choice of treatment is based on a comprehensive review and analysis of previous findings on social cognitive impairment, its role in personal and social functioning, and its amenability to treatment. Specifically, this study aims to demonstrate that deficits in social cognition can be ameliorated via a targeted treatment approach such as SCIT. As such, this study is a clinical trial of a social cognitive treatment modality in a context that allows for systematic evaluation of different outcome domains and possible moderators of the treatment effect. The modality chosen for this project is the Social Cognition and Interaction Training (SCIT). Developed by Penn and colleagues, SCIT addresses a range of social cognitive domains within an average time frame (a total of 20 training sessions). It can be used independently, i.e. is not reliant on additional interventions such as social skills training. SCIT has been developed and tested primarily in inpatient settings, with

only one preliminary study in community settings published so far (Roberts, Penn, and Labate, 2010). We designed the present study to evaluate a targeted treatment for social cognition deficits (SCIT) in a severely mentally ill population in real-world settings. As such, the heterogeneity of schizophrenia spectrum disorders in community participants as well as constraints imposed by the real-world setting calls for a hybrid design rather than a conventional controlled trial. In this project, a series of SCIT groups were conducted in outpatient settings that serve people with SMI. Clinical and neurocognitive assessment data were included to explore the possible role of clinical and neurocognitive factors as moderators of the treatment effect. The offered social cognitive treatment approach aims to be inclusive of important socio-cognitive domains identified by research thus far. Specific social cognitive impairments addressed by SCIT include emotion and social perception (including social cues, facial affect recognition), social cognitive biases and attributional style (e.g. "jumping to conclusions"), cognitive flexibility, and ToM skills. It is hypothesized that individuals participating in SCIT treatment groups will improve in the above named domains over the course of SCIT treatment as compared to individuals receiving the standard outpatient care regimen. This hypothesized treatment effect was measured via the social cognition outcome measures described below. Specifically, it is hypothesized that each group will show improved performance on the social cognition measures after receiving SCIT treatment. Thus, Group 1 (SCIT then TAU) is expected to show improvement on assessment 2, while Group 2 (TAU then SCIT) is expected to show improvement on assessment 3 (see Figure 2.1).

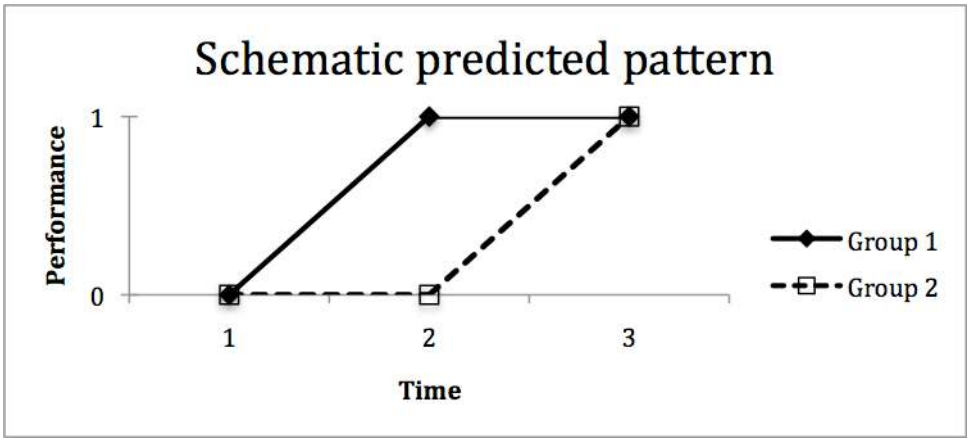


*Figure 2.1* Central hypothesis of the present study.

# Chapter 3 - Method

## Participants

Forty participants with a primary diagnosis of an Axis I psychiatric disorder in the schizophrenia spectrum participated in this study. Individuals in outpatient treatment settings were enrolled in the study if the met the following inclusion criteria: between 19 and 64-years of age, current DSM-IV diagnosis of schizophrenia or schizoaffective disorder, stable antipsychotic medication regimen, no concurrent substance abuse or dependence, no mental retardation, and no organic brain injury or pathology.

Overall, 42 individuals agreed to participate in the study. Two individuals withdrew consent before the study commenced and where excluded from the final study sample. The remaining 40 participants were selected into two groups: 1) SCIT – TAU, receiving SCIT therapy first and then TAU; and 2) TAU – SCIT, receiving TAU first and then participated in SCIT therapy. Randomness in participant selection and group assignment was constrained by individual schedules as well as schedules and availability of space at treatment sites. Although this prevented truly random sampling and assignment, the circumstances allowing participation and driving group assignment were themselves sufficiently random to allow the expectation of a reasonably unbiased process.

Assessments were conducted at three time-points: at baseline (pre-intervention), after the first set of SCIT groups were completed (when participants switched from SCIT to TAU or TAU to SCIT), and after the second set of SCIT groups was completed (post-intervention). All 40 participants completed baseline assessments. Of these 40, 36 (10% attrition) completed the interventions (18 in the SCIT – TAU group; 18 in the TAU –

SCIT group). Of these, 31 participants agreed to complete the second assessment phase; and 26 completed the third and last assessment phase. Thus, all participants took part in baseline testing, with an attrition rate of 22.5% and 35% for the following assessment phases respectively.

**Treatment Settings and Population Sample**

Participants for this treatment approach were recruited from community-based care settings in Lincoln, NE. The settings served as hosts and performance sites for the assessment and therapy activities of the study. They were chosen as representative for serving people with especially severe and disabling mental illness but functioning outside an institutional setting. The settings also generally operate within a biopsychosocial understanding of mental illness guided by principles of rehabilitation and recovery. This creates a climate in which introductions of new skill training and therapy modalities are normal and routine occurrences. A close working relationship between the UNL psychology department, the Community Mental Health Center of Lancaster County, and OUR Homes, Inc. made it possible to conduct the study with minimal disruption to ongoing services. The assessment activities and therapy sessions were integrated into the normal operations of the host programs in an effort to make the study activities a natural part of the setting. In collaboration with the study PI, the SCIT therapists composed progress notes for each participant, according to agency conventions for group therapy. These were entered into the respective participants' clinical records.

The recruiting pool created by the performance sites is expected to be highly heterogeneous with respect to any demographic and clinical measures commonly used in psychiatric research, except for diagnosis and occupational functioning. Diagnoses are

overwhelmingly in the schizophrenia spectrum. Almost by definition, people in psychiatric day programs have significant difficulties in occupational functioning. The interaction of diagnostic and functional factors can be presumed to create a recruiting pool reasonably representative of people in the lower middle third of the distribution of global functioning, e.g. as measured by Axis V of the DSM. This is compatible with expectations of who stands to benefit from SCIT.

**Midtown Center**

The Midtown Center is an adult day rehabilitation program for individuals with SMI. Approximately 50 individuals attend the program daily (Monday-Friday) and are encouraged to take an active role in their rehabilitation through participation in the day-to-day program operation (e.g. lunch preparation, answering phones, publishing daily and monthly newsletters, etc.). Midtown Center is administered by the Community Mental Health Center of Lancaster County.

**Southville Center**

The Southville Center is a day rehabilitation program for adults with SMI. The program encourages "healthy living" and, to that extent, offers individuals exercise classes and well-balanced food-choices. Further, Southville Center offers tutors and classes, helping individuals work on achieving personal goals (e.g. obtaining a GED). A maximum of 120 individuals attend Southville Center on a daily (Monday-Friday) basis. The Southville Center is administered by OUR HOMES assisted living facilities.

**Treatment Conditions**

This research project examines the efficacy of a social cognitive treatment intervention, Social Cognition and Interaction Training (SCIT) developed by Penn and

colleagues at the University of North Carolina-Chapel Hill (UNC). The SMI research lab at UNL has had close ties with the UNC research group lead by David Penn over several years. Of the existing social cognitively oriented treatment approaches, SCIT was chosen as it was recently developed and appears to target an essential range of social cognitive domains and promises to ameliorate functional impairment in an SMI population. As such, this research will compare a manual-based treatment approach (SCIT) to treatment-as-usual (TAU) as offered in targeted treatment settings. TAU in identified treatment settings usually consists of case management (including medication management), plus various occupational, rehabilitative and supportive services, especially for the population segment sampled in this study.

## Measures

**Demographic information.** Demographic information will be collected form participants regarding age, gender, race, psychiatric diagnosis, highest education level completed, current living situation, and currently received treatments and/or services and treatment and/or service providers. In addition, all participants will be assessed using the following clinical, neurocogntive, and social cogntive measures.

### Clinical measures and neurocognitive measures.

***Brief Psychiatric Rating Scale (BPRS; Ventura et al., 1993).*** This semi-structured interview provides an efficient and quick way to assess symptom change in persons with severe mental illness. It consists of 24-items of which 14 are interview-based and 10 are based on observed behavior and/or speech during the interview. The administration manual for the BPRS provides interview questions, symptom definitions and specific anchor points for rating symptoms. Ratings are based on severity as well as

frequency of experienced symptoms and range from 1 (not present) to 7 (extremely severe). Thus, the total score on the BPRS can range from 24 to 168, with higher scores indicating more severe and frequent psychopathology. The BPRS is one of the most widely used measures in psychiatric outcome studies as well as clinical psychopharmacology research. Studies supported the BPRS as a well-validated and reliable assessment measure and found it to consist of four core factors, which underlie the structure of the BRPS. The factors are anxiety/depression (including BPRS items somatic concern, anxiety, depression, suicidality, and guilt), thinking disorder (including BPRS items of grandiosity, hallucinations, unusual thought content, bizarre behavior, and conceptual disorganization), withdrawal (including BPRS items disorientation, blunted affect, emotional withdrawal, elevated mood, self-neglect, and motor retardation), and activity (including BPRS items tension, excitement, motor hyperactivity, distractability, and mannerisms and posturing) (Burger, Calsyn, Morse, Klinkenberg, & Trusty, 1997; Thomas, Donnell, & Young, 2004; Velligan et al., 2005).

***Neuropsychological Assessment Battery – Screening Module (NAB-Scr; Stern & White, 2003).*** The NAB-Screener is a recently developed neuropsychological assessment to evaluate cognitive functioning in adults aged 18 to 97. The modular assessment battery consists of subtests that target critical domains of cognitive functioning, including *attention, language, memory, spatial,* and *executive functions.* The evaluation also provides an overall or *total screening index* indicating the level of overall cognitive functioning. Given the recent development of the NAB, studies evaluating its psychometric properties are very limited at this time. However, two reviews published in

the Mental Measurements Yearbook indicate that the NAB is based on extensive normative and validation data (Makatura, 2005; Van Gorp & Hassenstab, 2005).

***Trail Making Test - Trails A and B (Reitan & Davidson, 1974).*** The original Trail Making Test was developed in 1944 as part of the Army Individual Test Battery and now is a standard component of the Halstead-Reitan Neuropsychological Test Battery (Reitan & Wolfson, 1995). The Trail Making Test is a paper-and-pencil measure of visual processing and visuo-motor tracking (Lezak, 1995) and is used to measure capacity for organization and sequencing. Trails A requires the participant to connect 25 numbered dots that are randomly spread across a sheet of paper in sequence during a timed administration (i.e. number 1 through number 25). Trails B is more demanding, as it requires the participant to connect a series of 25 randomly distributed dots on a sheet of paper containing numbers and letter in an alternating sequence (1-A-2-B-3-C etc.) during a timed administration. Participants are stopped and alerted to errors in sequencing, requiring them to go back to the last correct stop and redirect their sequencing to correct their performance. Scores for both Trails A and B are based on the time an individual needs to correctly complete each task. Efficient performance on the Trail Making Test, especially Trails B, depends in part of facets of working memory and sufficient cognitive flexibility.

***Controlled verbal fluency task (FAS; Borkowski, Benton, & Spreen, 1967).*** A test of verbal fluency; participants are given a total of three letters, one letter at a time (F, A, and S) and have 60 seconds to responds with as many words as possible that start with the given letter. Proper nouns were scored as incorrect; total number of correct words

generated within the allotted 60 seconds for each of the three trials is added up and used as the final score.

***Letter-Number Sequencing (LNS; WAIS-III; Wechsler, 1997).*** The LNS subtest of the WAIS tests participants' attention and working memory by reading a sequence of intermixed letters and numbers (e.g. Q-1-B-3-J-2) to them at a rate of 1 per second, which they have to repeat back to the examiner after manipulating the order and place the numbers in ascending numerical order and then the letters in alphabetical order. The letter-number sequences become increasingly longer and range from 2 stimuli (e.g. A-3) to a maximum of 8 stimuli. A total of three trials are presented at each length with the test being discontinued after the participant fails three consecutive trials of the same length. Each correctly manipulated sequence receives a score of 1, for a maximum score of 21.

**Social cognition measures.**

***Hinting Task (Corcoran, Mercer, & Frith, 1995).*** The Hinting Task is a theory of mind (ToM) measure administered as part of a social cognition assessment battery. ToM is of particular interest in understanding the relationship between cognition and social interactions and refers to the ability to infer the intentions and beliefs of others. It has been found that persons with schizophrenia have difficulty utilizing inductive reasoning to infer the attitudes and intentions of others (Frith, 1992). Additionally, ToM deficits appear to be unique to persons diagnosed with schizophrenia (Janssen, Krabbendam, Jolles, & van Os, 2003). In fact, Corcoran (2003) found that persons with schizophrenia rely on a different strategy to understand the meaning behind pragmatic language compared to a non-clinical population. The Hinting Task consists of ten short vignettes involving two people and asks the participant to infer the intention behind

veiled speech acts. Each vignette ends with one of the characters saying something to the other. After each vignette is presented, participants are asked a question regarding the characters intention (e.g. "What does George really mean when he says this?" or "What does Paul want Jane to do?"). Each vignette is read out to participants and available for participants to read through as many times as necessary. If participants cannot make an inference or arrive at an inappropriate solution, more detail is added to the interaction giving a more obvious hint regarding the underlying meaning to the participants. Scores range from 0 to 2 per vignette (for a total score range of 0 to 20) with lower scores indicative of a more concrete understanding of the vignette and higher score indicative of a better understanding of underlying intentions of the characters in the depicted interaction. Although there is limited psychometric data available, the Hinting Task is sensitive to deficits in schizophrenia, correlates with other ToM measures and has good face validity in studies with seriously mentally ill participants (Corcoran et al., 1995; Corcoran & Frith, 2003; Yager & Ehmann, 2006).

***Social Perception Scale (Garcia, Fuentes, Ruiz, Gallach, & Roder, 2003).***

Garcia and colleagues (2003) developed the Social Perception Scale in order to assess the following criteria: stimuli identification, interpretation of images, and title assignment. This measure consists of four photographs that are presented to participants. Two of the pictures were chosen because of their cognitive complexity and the other two because of their emotional content. Participants are presented with one photograph at a time and asked to carefully look at the picture. Participants are told that the same set of questions will be asked for all four pictures and are asked to limit their answers to what appears in the picture and to not make any assumptions. Questions asked are: 1) Could you tell me

what details/elements/things you can actually see in this photo? 2) Could you tell me what is happening in this photo, keeping in what you told me before? 3) What title would you give to this photo? In a few words, mention the key elements of the picture. Participants are evaluated on the basis of whether they were able to address the three key concepts of the photograph: situational context, actor/s and action or interaction amongst them. One point is given for each aspect mentioned, points are added up to comprise a total score indicating the number of correctly identified details. It should be noted that the Social Perception Scale does not measure social functioning or social skills, rather it aims to measure cognitive abilities necessary in social perception. Given the relative recent development of this measure, studies to determine psychometric features have yet to be undertaken. Although its use so far has been limited, studies using the Social Perception Scale found effective in measuring cognitive abilities necessary for intact social perception (Combs, Adams, et al., 2007; Fuentes, Garcia, Ruiz, Soler, & Roder, 2007; Ruiz, Garcia, Fuentes, Garcia-Merita, 2005). Even though the Social Perception Scale has very limited psychometic data available, it was chosen as an outcome measure because social perception is a social cognitive construct specifically addressed by the SCIT treatment module.

***Ambiguous Intentions Hostility Questionnaire (AIHQ; Combs, Penn, Wicher, & Waldheter, 2007).*** The AIHQ is a new measure specifically targeting social cognitive bias (hostility) in schizophrenia-spectrum disorders. It consists of 15 short vignettes reflecting negative outcomes that vary in intentionality (i.e. intentional, accidental, and ambiguous intentions). In a preliminary study to evaluate the psychometric properties of the AIHQ, the authors reported supportive findings regarding the validity and reliability

of the measure. However, this study was conducted with a non-clinical sample and did not address test-retest reliability. Other preliminary findings indicate that the AIHQ is predictive of violence and aggression in an inpatient sample of people with schizophrenia (Waldheter, Jones, Johnson, & Penn, 2005). Most importantly, the AIHQ has been found to be a sensitive outcome measure in a SCIT treatment trial in inpatients with schizophrenia (Penn et al., 2005).

***Need for Closure Scale (NFCS; Webster & Kruglanski, 1994).*** The NFCS is used to assess the extent to which a person, faced with a decision or judgment, desires any answer (as compared with confusion and ambiguity). The authors derive the need for cognitive closure from two general tendencies: urgency and permanence. The urgency tendency refers to the inclination to attain closure immediately and to seize any early information that can potentially lead to closure. The permanence tendency refers to the inclination to maintain closure for as long as possible and to stick with information leading to the achieved closure. The NFCS is a 16-item Likert-type scale designed to assess attitudes, beliefs, and experiences related to the tolerance of ambiguity with higher scores indicating a greater need for closure.

***Emotional Context Perception Task (ECPT; Choi, Liu, Kleinlein, Wynne, Spaulding, 2006).*** The ECPT is a computerized task assessing the perception and recognition of emotional cues. It consists of 40 cartoon portrayals depicting a cartoon character expressing one of nine emotions (fear, disgust, contempt, shame, anger, surprise, sadness, happiness, and neutral). This character is depicted either in a group of people who also express an emotion or alone (blank background). The 40 stimuli include 8 portrayals without contextual emotions (blank background) and 32 portrayals with

contextual emotions ("main character" in a group of people). Participants are asked to identify the emotion by answering a multiple-choice question and to rate the intensity of the identified emotion on a 7-point Likert scale.

***Social Functioning Scale (SFS; Birchwood, Smith, Cochrane, Wetton, & Copestacke, 1990).*** The SFS is a 79-item scale designed to assess functioning in individuals with schizophrenia-spectrum disorders. It targets the level of ability in seven areas: 1) social engagement (e.g. "how much time do you spend alone?"), 2) interpersonal communication (e.g. "how many friends do you have?"), 3) activities of daily living (e.g. "how often do you prepare and cook a meal?"), 4) recreation (e.g. "how often do you play a sport?"), 5) social activities (e.g. "how often do you visit friends?"), 6) competence at daily living (e.g. "how able are you to handle your own money?"), and 7) occupation/employment (e.g. "are you in regular employment?"). Although the questionnaire can be filled out by the participant, typically the examiner will ask the questions and fill out the form. This scale has been shown to be a reliable, valid, and sensitive measure of social functioning (Birchwood et al., 1990).

***Attributional Style Questionnaire (ASQ; Peterson, Semmel, von Baeyer, Abramson, Metalsky, & Seligman, 1982).*** The ASQ is a questionnaire consisting of 48 Likert style items designed to measure the causal attributions offered by patients regarding good or bad events in their lives. The attributional dimensions assessed with this instrument include internal-external, stable-unstable, and global-specific. Each item is measured on these dimensions via separate 7-point Likert scales. This measure has been found to be a valid and realible assessment of people's attributional style (Seligman, 1991; Sweeney, Anderson, & Bailey, 1986).

***Multnomah Community Ability Scale (MCAS; Barker et al., 1994).*** The MCAS is a 17-item Likert-type scale specifically designed to assess level of functioning in individuals with SMI. The scale is completed by the individual's community support worker or case manager and includes four subscales (interference with functioning, adjustment to living, social competence, and behavioral problems) and an overall (total) score of functioning. Good test-retest reliability and internal consistency haven been reported (Barker et al., 1994).

***Emotional Context Perception Task (ECPT; Choi, Liu, Kleinlein, Wynne, Spaulding, 2006).*** The ECPT is a computerized task assessing the perception and recognition of emotional cues. It consists of 40 cartoon portrayals depicting a cartoon character expressing one of nine emotions (fear, disgust, contempt, shame, anger, surprise, sadness, happiness, and neutral). This character is depicted either in a group of people who also express an emotion or alone (blank background). The 40 stimuli include 8 portrayals without contextual emotions (blank background) and 32 portrayals with contextual emotions ("main character" in a group of people). Participants are asked to identify the emotion by answering a multiple-choice question and rate the intensity of the identified emotion on a 7-point Likert scale.

***Face Emotion Identification Task (FEIT; Kerr and Neale, 1993).*** The FEIT utilizes black and white still photographs of facial emotions developed by Ekman and Friesen (1976) and Izard (1971). It was administered in the computerized version consisting of 19 black and white still photographs presented for approximately 15 seconds each, with an interval of 10 seconds between photographs. During the interval, the participants were asked to pick one of six basic emotions (i.e. happy, sad, angry,

surprised, afraid, and ashamed) that best describes the face in the previous photograph, Each emotion corresponded to a number (1-6) on the screen and participants pressed the corresponding key on the keyboard to finalize their answer and move on the next photograph. The total number of correct answers was used as the final score for this task.

***Voice Emotion Identification Task (VEIT; Kerr and Neale, 1993).*** The VEIT was administered in the computerized version consisting of 21 audio recordings of verbally presented statements with neutral content (e.g. "He tossed the bread to the pigons", "Fish can jump out of the water"). Participants were asked to rate the voice tone that best describes each statement and chose their answer from a list of six basic emotions (i.e. happy, sad, angry, surprised, afraid, and ashamed). As with the FEIT, each emotion was listed with a corresponding number (1-6) that participants used to record their answer via the corresponding keyboard key. The total number of correctly identified items was used for the final score of this task.

***Benton Facial Recognition Test (BTFR; Benton, Hamsher, Varney, & Spreen, 1983).*** The BFRT consists of a series of sheets containing photographs of physically similar faces (i.e. not showing hair or glasses). Participants are presented with a sheet containing a single "target" face and are asked to match the target to a set of six face photographs for a total of 22 trials. The first six trials consist of participants selecting one matching face photograph; the remaining trials ask participants to identify three correct matches from a total of six face photographs presented in different angles (i.e. the face changed in orientation or lighting conditions compared to the target photograph).

***Bell Lysaker Emotion Recognition Task (BLERT; Bell, Bryson, & Lysaker, 1997).*** The BLERT is an affect perception task and was administered in its computerized

version consisting of 21 short video clips. In each clip, an actor reads one of three neutral scripts, while displaying one of seven basic emotions (i.e. happy, sad, angry, afraid, surprised, ashamed, and neutral). After each clip, participants are asked to pick the emotion that best describes the actor in the video from a list of seven emotion. As with the FEIT and VEIT, each answer choice on the computer screen corresponds with a number on the keyboard that is used by participants to make their answer choice. The total number of correctly identified emotions is used as the final score on this task.

**Design and Procedure**

**Power analysis.** Using the standard power level of .80, the expected n for this study is 20 subjects per group (overall N=40). Effect sizes from previous studies by Penn and colleagues (2005; 2007) and Combs, Adams, and colleagues (2007) on the AIHQ ranged from $r = .50$ to $r = .82$ and specific sample sizes ranged from N=6 to N=28. A reasonable attrition rate, considering all the subjects are in long-term rehabilitation programs before this study even begins, is 10%. The remaining 36-subject sample is well within the sample size*s* used by Penn and colleagues as well as Combs and colleagues in initial demonstrations of effectiveness of this modality (Penn, et al., 2005*;* Penn, et al., 2007; Combs, Adams, et al., 2007).

**Participant recruitment.** Staff in treatment settings as well as the primary investigator checked available medical records to determine if participants meet the inclusion criteria. Once the participants were identified, they were approached by staff (incl. the primary investigator) and given information about the study and the opportunity to enroll. After informed consent was obtained and HIPPA rules explained, the participants were selected into either one of two treatment groups: 1) first receiving SCIT

and then TAU, or 2) first receiving TAU and then SCIT. Participants were selected rather than randomly assigned into treatment groups in order to maximize comparability between SCIT and TAU groups in terms of participant characteristics (e.g. age, gender). All participants, regardless of treatment group, completed both phases of the study and as such participate in SCIT treatment groups as well as the control (TAU) group, differing only in the sequence in which the phases were completed. This study enrolled a total 20 participants in each treatment condition for a combined total of 40 participants. Previous pilot studies conducted by Penn and colleagues and an inpatient trial conducted by Combs and colleagues obtained significant study results with smaller samples (N=17 and N=18) (Penn, et al., 2007; Combs, Adams, et al., 2007).

**Experimental design and treatment conditions.** This study is based on a hybrid, quasi-exprimental, rather than a conventional experimental design due to restrictions imposed by the real-world setting of this study, including the heterogeneity of schizophrenia spectrum disorders in community participants and working with individual schedules as well as accommodating time and space restrictions at each treatment site. The present study consist of two treatment phases. Thus, Phase I (with post-treatment assessment) would in itself be a complete controlled trial under conventional research conditions. We hope that, given the inherent limitations of this study, Phase II will compensate for the small sample and other limitations that would otherwise compromise a purely Phase I design. The treatment conditions included in this empirical analysis include a social cognitive treatment modality (SCIT) and treatment-as-usual (TAU). Hence, the design of the study is a 2 (Treatment: SCIT vs. TAU) X 3 (Time of assessment: pre-treatment vs. between treatment vs. post-treatment) mixed group

factorial design. Thirty-six participants (out of the 40 enrolled participants) completed both treatment conditions (phases), SCIT and TAU, differing only in the order in which SCIT and TAU are received. Group 1 received SCIT, followed by TAU; Group 2 received TAU, followed by SCIT. SCIT treatment groups and control (TAU) groups each consisted of six to eight participants. The primary investigator as well as a co-leader led all groups. A total of 20 bi-weekly one-hour treatment sessions were conducted in community-based psychiatric care settings. The SCIT was provided according to the treatment manual developed by Penn and colleagues (Roberts, Penn, and Combs, 2007). Three treatment groups were conducted in each of two study phases, yielding 18 subjects in the first group (SCIT first) and 18 subjects in the second group (TAU first):

| | **Phase 1 ⟶ Phase 2** | |
|---|---|---|
| **Group 1** **(N=18)** | SCIT n=6<br>SCIT n=6<br>SCIT n=6 | TAU |
| **Group 2** **(N=18)** | TAU | SCIT n=6<br>SCIT n=6<br>SCIT n=6 |

*Figure 3.1* Study design: Treatment groups.

Participants in the control group (TAU) continued to receive their individual standard care regimen typically consisting of medication management, case management and a range of occupational, rehabilitational and supportive services. No alternative, added treatment was offered. Participants in both groups participated in pre-, between- and post-treatment assessments:

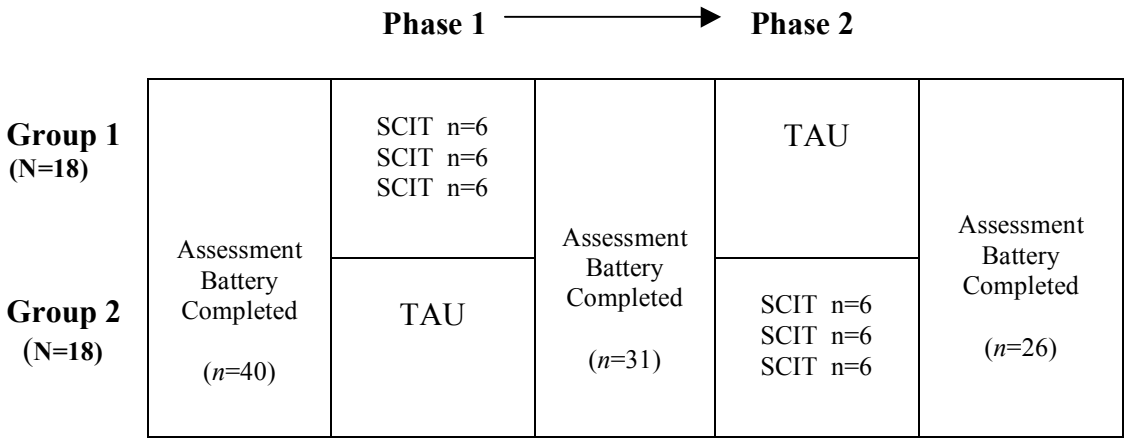


*Figure 3.2* Study design: Treatment groups and testing phases.

Participants received $5 for their participation after completion of each assessment phase for a total of $15 at the end of the study.

**Treatment fidelity.** Two group leaders who are involved in this project as graduate level research assistants were assigned per treatment group. Dennis Combs, Ph.D., who has worked with SCIT and participated during various stages of the development of SCIT, has provided an all-day training workshop for the application of SCIT on June 3, 2008. All group leaders involved in this project participated in all parts of this workshop and were trained by Dennis Combs, Ph.D. on the application of SCIT and running treatment groups using the SCIT manual. In addition, mock treatment groups were used to train group leaders in the application of SCIT and the adherence to the SCIT treatment manual. All research assistants were either graduate students in the Clinical Psychology Training Program and members of the Serious Mental Illness research laboratory at UNL (E. Cook, B.A., C. Davidson, B.A., M. Tarasenko, B.A., A. Collins, M.A., L.F. Reddy, B.A., A Wynne, B.A., K.H. Choi, M.A.) or have been involved as research assistants with the SMI research group at the Lincoln Regional Center. Graduate students were involved in the assessment as well as function as SCIT

group leaders in this study; other research assistants were only involved in the assessment phases of this study. All research assistants involved in the data collection part of this study had prior experience with administration of the measures used in this study.

**Data analysis.**

***Data preparation.*** Confidentiality of participants was protected and all identifying information removed from data materials. All participants were assigned a subject ID number (in lieu of name, date of birth, chart numbers, etc.) to represent them in the database. Once all the data was coded this way, it was entered into SPSS (SPSS, Inc., 2006) by the primary investigator. Univariate analyses were used to investigate any data entry errors, values beyond the defined range of data coding options, missing values, skewness, and kurtosis. Both univariate and bivariate analyses were used to examine outliers. Data entry errors, out-of-range values, and missing values were rechecked in the original participant files. These values were then corrected or left blank in the instance of missing information. Outliers were either be trimmed or transformed, depending on the individual case and the outlier's effects.

***Statistical analysis.*** Preliminary data analysis uses analysis of variance (ANOVA) and $\chi^2$ tests to compare demographic background and clinical presentation pre-treatment to ascertain that the two groups are initially equivalent and to obtain descriptive sample information. Gender was used as a covariate in all subsequent analyses of social cognitive outcome variables (see Figure 4 for group composition by gender). The central hypothesis (SCIT treatment improves performance on social cognitive outcome measures) was explored via 21 ANCOVAs conducted on the social cognitive outcome measures (dependent variables) to compare Group 1 (SCIT then TAU) to Group 2 (TAU

then SCIT) (independent variables) in order to establish a treatment effect of SCIT on social cognitive functioning. Specifically, ANCOVAs are used to determine differential change over time between the two groups. Mean differences are used to qualitatively interpret quantitative interaction terms.

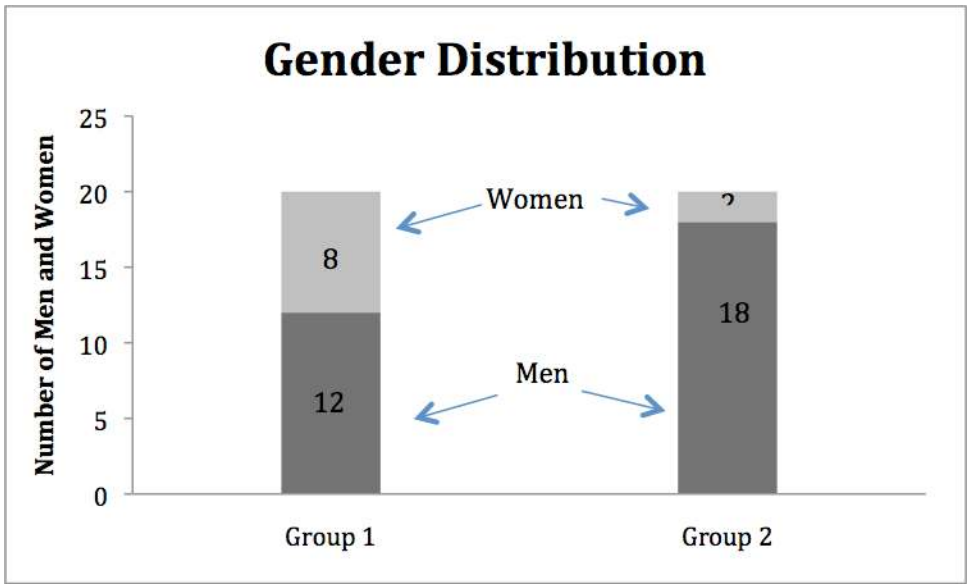


*Figure 3.3.* Gender distribution: Number of women and men per group.

# Chapter 4 - Results

## Demographic and Clinical Characteristics

Table 4.1 summarizes the demographic and baseline clinical characteristics of the treatment groups (Group 1 = SCIT then TAU; Group 2 = TAU then SCIT). ANOVA and $\chi^2$ tests revealed no significant differences between groups with regards to participants' education (years of completed education), age, diagnosis, treatment site and current symptomatology at baseline. However, the groups differed significantly in gender makeup ($\chi^2 = 4.8$, $p = .028$). The potential impact of this difference on study hypotheses was probed. Within the full sample, bivariate correlations between gender and baseline social cognitive performance was significant for the BTFR ($r = -.336$, $p = .034$) and AIHQ Aggression ($r = -.363$, $p = .021$), indicating that men scored significantly higher on these measures (BTFR between group $t(38) = 2.20$, $p = .03$; AIHQ Aggression between group $t(38) – 2.40$, $p = .02$). Higher scores on the BTFR indicate more correctly identified facial expressions; a higher score on the AIHQ Aggression scale indicates a more aggressive response to ambiguous situations. Gender was used as a covariate in order to address these baseline differences in subsequent analyses of the social cognitive data.

Table 4.1

*Demographic and Clinical Characteristics*

| | SCIT-TAU ($n$ = 20) | TAU-SCIT ($n$ = 20) | Total ($n$ = 40) |
|---|---|---|---|
| | *M* (SD) or *M* (%) | *M* (SD) or *M* (%) | *M* (SD) or *M* (%) |
| Age (range: 21 – 61 years) | 37.10 (10.60) | 44.25 (14.04) | 40.68 (12.80) |
| Gender (%) * | | | |
| Female | 8 (20%) | 2 (5%) | 10 (25%) |
| Male | 12 (30%) | 18 (45%) | 30 (75%) |
| Years of Education | 11.85 (2.13) | 12.68 (2.32) | 12.26 (2.24) |
| Ethnicity (%) | | | |
| Caucasian | 19 (47.5%) | 20 (50%) | 39 (97.5%) |
| Hispanic | 1 (2.5%) | 0 (0%) | 1 (2.5%) |
| Diagnosis – Axis I (%) | | | |
| Schizophrenia, Paranoid Type | 5 (12.5%) | 5 (12.5%) | 10 (25%) |
| Schizophrenia, Undiff Type | 5 (12.5%) | 8 (20%) | 13 (32.5%) |
| Schizoaffective Disorder | 10 (25%) | 7 (17.5%) | 17 (42.5%) |
| Diagnosis – Axis II (%) | | | |
| None | 17 (42.5%) | 18 (45%) | 35 (87.5%) |
| BPD | 1 (2.5%) | 0 (0%) | 1 (2.5%) |
| Paranoid PD | 1 (2.5%) | 0 (0%) | 1 (2.5%) |
| Avoidant PD | 0 (0%) | 1 (2.5%) | 1 (2.5%) |
| Other | 1 (2.5%) | 1 (2.5%) | 2 (5.0%) |
| Treatment Site | | | |
| Midtown Center | 12 (30%) | 8 (20%) | 20 (50%) |
| Southville Center | 8 (20%) | 12 (30%) | 20 (50%) |

* Gender: $\chi^2 = 4.8$, $p = .028$

Table 4.2 summarizes symptomatology and neurocognitive characteristics for all study participants at baseline (time 1 testing). ANCOVAs indicated that the two groups did not differ on measures of symptoms and neurocognition at baseline; neither did performance on these measures differ between treatment sites.

Table 4.2

*Baseline (Testing Time 1) Symtomatology and Neurocognitive Characteristics*

| | SCIT-TAU ($n$ = 20) | TAU-SCIT ($n$ = 20) | Total ($n$ = 40) |
|---|---|---|---|
| | *M* (SD) | *M* (SD) | *M* (SD) |
| BPRS Total | 38.20 (9.89) | 41.45 (7.67) | 39.83 (8.89) |
| Factors: | | | |
| Thought Disorder | 3.77 (2.05) | 4.21 (2.27) | 3.99 (2.15) |
| Anergia | 2.54 (1.05) | 3.05 (1.49) | 2.80 (1.30) |
| Affect | 5.84 (2.50) | 6.60 (2.51) | 6.22 (2.50) |
| Disorganization | 3.11 (1.37) | 3.26 (1.12) | 3.19 (1.24) |
| Trails A | 44.65 (29.82) | 48.40 (36.29) | 46.53 (32.95) |
| Trails B | 144.45 (127.41) | 134.75 (89.78) | 139.60 (108.90) |
| FAS | 27.80 (11.12) | 30.20 (14.13) | 29.00 (12.61) |
| Letter-Number Sequencing | 8.10 (3.45) | 7.65 (3.98) | 7.88 (3.68) |
| NAB Screening Total | 437.85 (76.51) | 442.55 (78.27) | 440.20 (76.43) |

**Treatment Findings**

The effects of SCIT on social cognition were analyzed in a series of 2 (group: Group 1 SCIT then TAU versus Group 2 TAU then SCIT) X 3 (time: pretest versus posttest 1 versus posttest2) mixed model analyses of covariance (ANCOVAs) (Table 4.3 shows the means for each condition of the design). Gender was used as a covariate in all analyses of outcome measures. Of the 21 conducted ANCOVAs, two yielded a significant time x group interaction effect (FEIT and MCAS Health), three yielded trend-level significant time x group interaction effects (BTFR, SPS Identified Stimuli, and SPS Title);

Table 3

*Performance on Social Cognition and Social Functioning Measures (adjusted with gender as covariate)*

| | Testing Time 1 | | Testing Time 2 | | Testing Time 3 | |
|---|---|---|---|---|---|---|
| | SCIT-TAU | TAU-SCIT | SCIT-TAU | TAU-SCIT | SCIT-TAU | TAU-SCIT |
| | *M* (SD) | *M* (SD) | *M* (SD) | *M* (SD) | *M* (SD) | *M* (SD) |
| FEIT Total* | 11.17 (1.64) | 11.36 (4.22) | 11.92 (3.15) | 10.36 (3.34) | 10.92 (1.78) | 12.57 (3.84) |
| VEIT Total | 10.58 (2.68) | 9.00 (3.26) | 11.17 (3.21) | 8.79 (3.04) | 10.08 (3.45) | 9.14 (3.28) |
| BLERT Total | 11.75 (3.57) | 11.29 (5.29) | 12.42 (3.50) | 11.50 (4.62) | 12.67 (5.07) | 11.93 (4.86) |
| BTFR Total ** | 39.33 (4.64) | 41.71 (6.33) | 40.00 (5.03) | 40.93 (6.37) | 41.08 (6.37) | 41.21 (6.58) |
| ECPT Total*** | 8.42 (2.43) | 6.93 (3.15) | 8.17 (2.12) | 5.43 (2.28) | 8.08 (3.99) | 5.29 (2.81) |

| | | | | | | |
|---|---|---|---|---|---|---|
| SPS | | | | | | |
| Identified Stimuli+ | 38.75 (12.07) | 32.93 (10.28) | 28.83 (7.99) | 33.57 (12.77) | 35.17 (10.50) | 37.36 (12.06) |
| Interpretations | 7.75 (2.01) | 8.08 (2.09) | 8.17 (1.47) | 8.86 (1.46) | 8.33 (.98) | 7.86 (2.14) |
| Title ++ | 3.67 (1.92) | 3.93 (1.82) | 4.17 (3.07) | 3.21 (2.69) | 3.92 (1.98) | 4.79 (1.53) |
| Hinting Task Total | 15.25 (4.77) | 15.71 (3.63) | 14.75 (4.50) | 15.79 (3.68) | 16.83 (3.69) | 17.36 (2.59) |
| NFCS Total | 50.50 (9.35) | 54.93 (11.25) | 47.08 (8.33) | 52.07 (12.06) | 50.33 (7.64) | 52.00 (8.16) |
| ASQ Total | 2.67 (2.90) | 1.71 (2.76) | 2.58 (2.91) | 1.50 (1.91) | 2.42 (1.93) | 1.57 (2.10) |
| AIHQ | | | | | | |
| Blame | 3.20 (1.00) | 3.04 (.62) | 2.81 (.77) | 3.13 (.60) | 2.94 (.76) | 3.07 (.69) |
| Hostility | 2.18 (.78) | 2.10 (.73) | 2.22 (.73) | 2.19 (.64) | 1.83 (.52) | 1.97 (.58) |
| Aggression ~ | 1.95 (.34) | 2.07 (.39) | 2.02 (.32) | 2.00 (.25) | 1.98 (.29) | 1.84 (.26) |
| MCAS | | | | | | |
| Total± | 65.08 (11.85) | 65.07 (10.56) | 114.33 (18.83) | 118.33(16.48) | 118.92 (16.25) | 121.86 (21.03) |
| Health±± | 20.00 (3.81) | 19.07 (3.29) | 20.17 (3.16) | 21.14 (2.68) | 20.58 (3.03) | 21.00 (3.19) |
| Adaptation | 10.50 (3.23) | 10.00 (2.39) | 10.67 (2.57) | 10.36 (2.21) | 10.92 (2.23) | 11.07 (2.92) |
| Social Skills±±± | 17.25 (4.18) | 18.50 (4.27) | 17.50 (3.78) | 18.29 (3.63) | 19.17 (3.33) | 19.93 (3.67) |
| Behavior | 17.33 (2.19) | 17.57 (1.50) | 17.67 (1.83) | 18.57 (1.22) | 17.58 (2.31) | 17.16 (2.98) |
| SFS | | | | | | |
| Social Engagement | 11.67 (1.72) | 11.14 (2.91) | 11.83 (1.59) | 11.29 (2.84) | 11.83 (1.75) | 11.07 (2.50) |
| Interpersonal Communication | 7.83 (1.47) | 7.21 (1.85) | 7.83 (.94) | 7.14 (1.61) | 7.83 (1.53) | 7.07 (1.86) |

*n* (SCIT) = 12; *n* (TAU) = 14

*FEIT: $F(2\ 22) = 6.018$, $p = .008$ (time x group interaction)
**BTFR: $F(1\ 23) = 2.909$, $p = .102$ (time x group interaction)
***ECPT: $F(1\ 23) = 8.366$, $p = .008$ (group main effect)
+SPS Identified Stimuli: $F(2\ 22) = 4.247$, $p = .028$ (time main effect); $F(2\ 22) = 2.891$, $p = .077$ (time x group interaction)
++SPS Title: $F(2\ 22) = 2.682$, $p = .091$ (time x group interaction)
±MCAS Total: $F(2\ 22) = 65.402$, $p < .01$ (time main effect)
±±MCAS Health: $F(2\ 22) = 4.737$, $p = .019$ (time x group interaction)
±±±MCAS Social Skills: $F(2\ 22) = 2.411$, $p = .113$ (time main effect)
~AIHQ Aggression: $F(2\ 22) = 2.61$, $p = .096$ (time main effect)

Of the 21 ANCOVAs, two yielded a significant time x group interaction effect: FEIT ($F(2\ 22) = 6.02$, $p = .008$) (see Figure 5) and the MCAS (Health, $F(2\ 22) = 4.74$, $p = .019$) (see Figure 6); neither the main effects for time nor treatment group were statistically significant for these measures. Within and between group t-tests for the FEIT scores did not identify the source of the significant time x group interaction effect, but visual inspection of the mean changes within and between groups suggests that Group 1 improved immediately after receiving SCIT treatment (Time 1-2 within group $t(12) = -.92$, $p = .38$), but did not sustain that improvement over time as performance declined at the final assessment (Time 2-3 within group $t(11) = 1.51$, $p = .16$); for Group 2, performance declined after receiving TAU (Time 1-2 within group $t(17) = 1.14$, $p = .27$ ), but improved on the final assessment after receiving SCIT treatment (Time 2-3 within group $t(13) = -3.56$, $p = .003$).

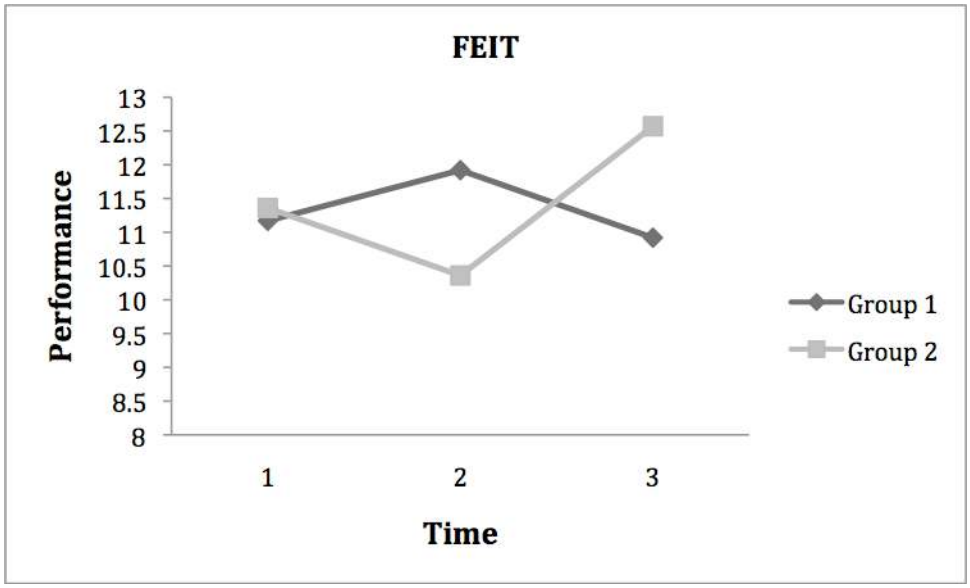


*Figure 4.1.* Group means for FEIT (adjusted with gender as covariate).

The significant time x group interaction for the MCAS Health (see Figure 4.2) indicates that while Group 1 showed neither statistically significant decline nor improvement on this measure over time (Time 1-2 within group $t(12) = -.46$, $p = .66$; Time 2-3 within group $t$(, Group 2 significantly improved performance after receiving TAU (Time 1-2 within group $t(17) = -3.22$, $p = .005$) and sustained this improvement after completing SCIT treatment (Time 2 -3 within group $t(13) = .22$, $p = .83$). Thus, the below depicted MCAS Health graph shows the significant interaction was due to a change not attributable to SCIT.

The time x group interactions for two of the Social Perception Scale measures (see Figures 4.3 and 4.4 below) indicate trend level statistical significance. The interaction effect for SPS Title ($F(2\ 22) = 2.68$, $p = .091$) indicates that Group 1 improved immediately after receiving SCIT treatment (Time 1-2 within group $t(12) = -$

.66, $p$ = .52), but did not sustain that improvement (Time 2-3 within group $t(11)$ = .464, $p$ = .65), Group 2's performance declined after receiving TAU (Time 1-2 within group $t(17)$ = .33, $p$ = .75) but improved significantly after receiving SCIT treatment (Time 2-3 $t(1)$ = -2.75, $p$ = .02) (see Figure 4.3).

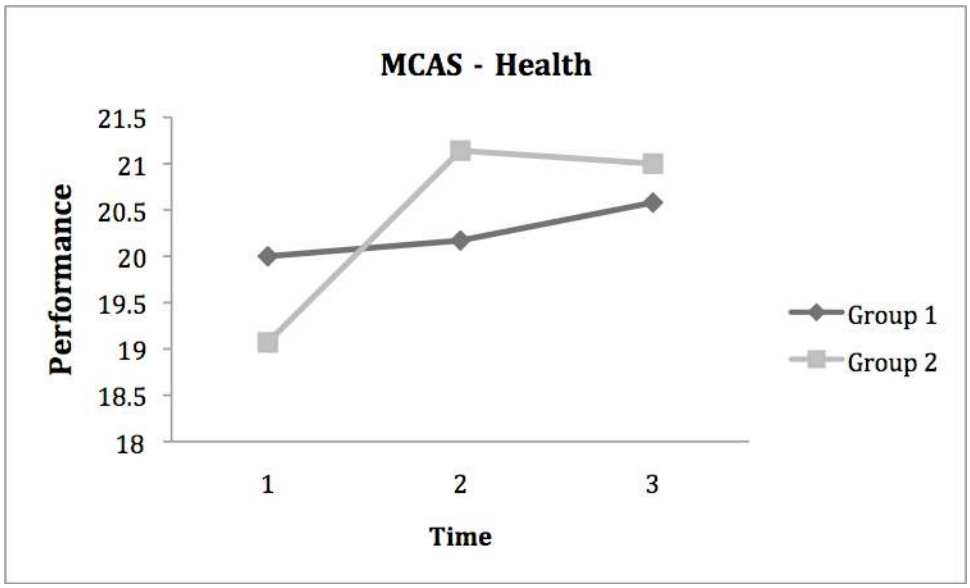


*Figure 4.2.* Group means for MCAS – Health (adjusted with gender as covariate).

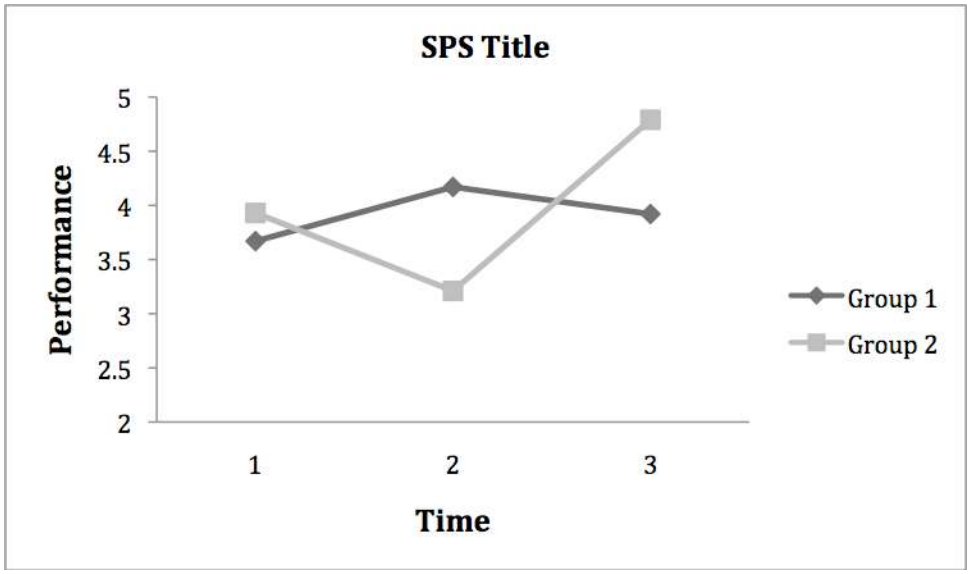


*Figure 4.3.* Group means for SPS title (adjusted with gender as covariate).

The trend-level interaction effect for SPS Identified Stimuli ($F(2\ 22) = 2.89$, $p = .077$) and indicates that Group 1 performed significantly poorer after receiving SCIT treatment (Time 1-2 within group $t(12) = 3.61$, $p = .004$) but improved significantly by the third assessment (Time 2-3 within group $t(11) = -2.38$, p = .04), whereas Group 2 showed steady improvement over time (Time 1-2 within group $t(17) = -.46$, $p = .65$; Time 2-3 within group $t(13) = -1.11$, $p = .29$; Time 1-3 within group $t(13) = -1.42$, $p = .18$). In addition, the main effect for time was significant for SPS Identified Stimuli ($F(2\ 22) = 4.25$, $p = .028$) (see Figure 4.4).

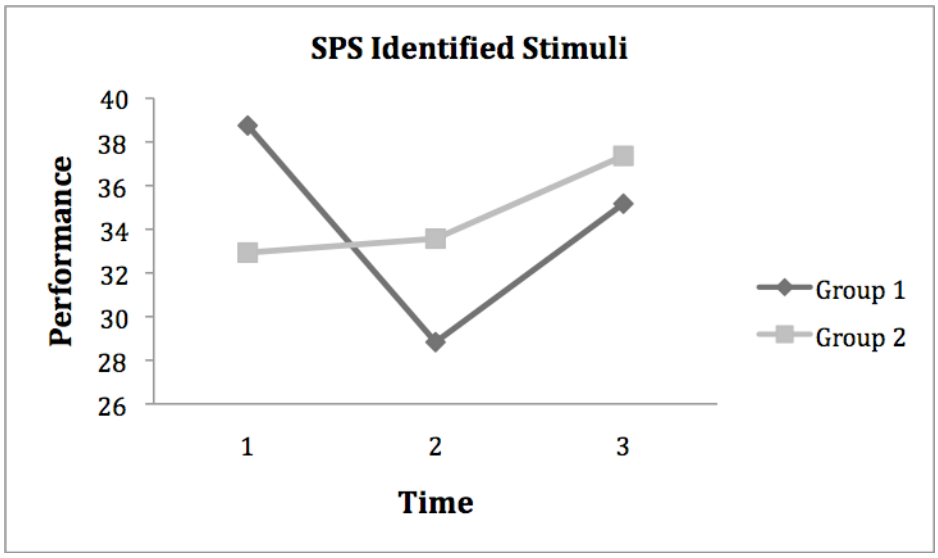


*Figure 4.4.* Group means for SPS Identified Stimuli (adjusted with gender as covariate).

The main effect for group was statistically significant for ECPT ($F(1\ 23) = 8.366$, $p = .008$), with better overall performance of Group 1 versus Group 2 (see Figure 4.5).

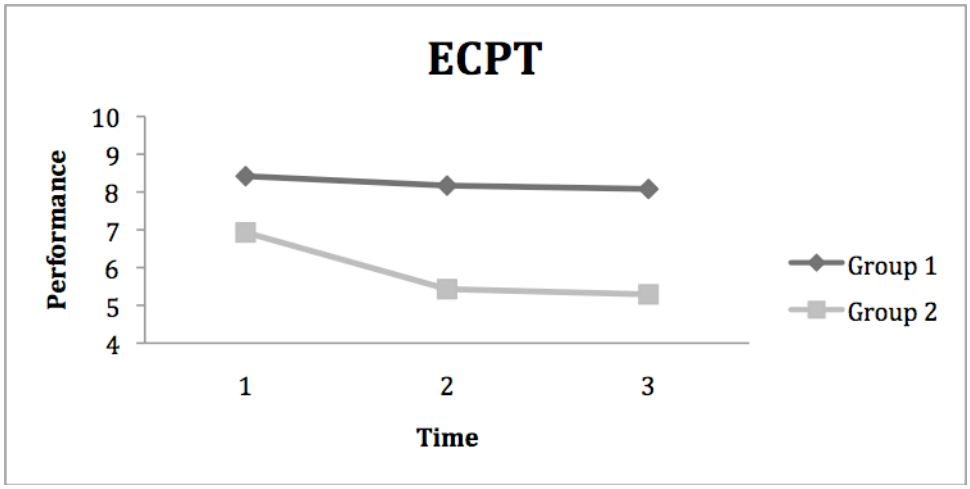


*Figure 4.5.* Group means for ECPT (adjusted with gender as covariate).

Other significant or trend-level significant main effects for time were found for the following measures: MCAS (Total Score: $F(2\ 22) = 65.40$, $p < .01$), with both groups improving significantly after Time 1 (see Figure 4.6).

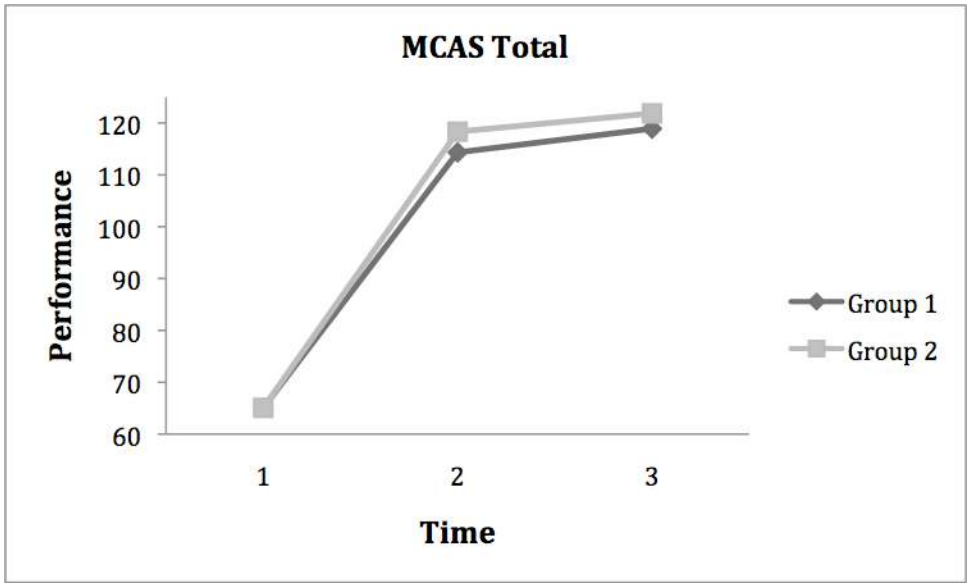


*Figure 4.6.* Group means for MCAS Total score (adjusted with gender as covariate).

The main effect of time reached a trend level of statistical significance for the following measures: AHIQ (Aggression: $F(2\ 22) = 2.61$, $p = .096$), with Group 1's performance initially declining but improving during the last assessment, while Group 2 improved performance over time (see Figure 4.7);

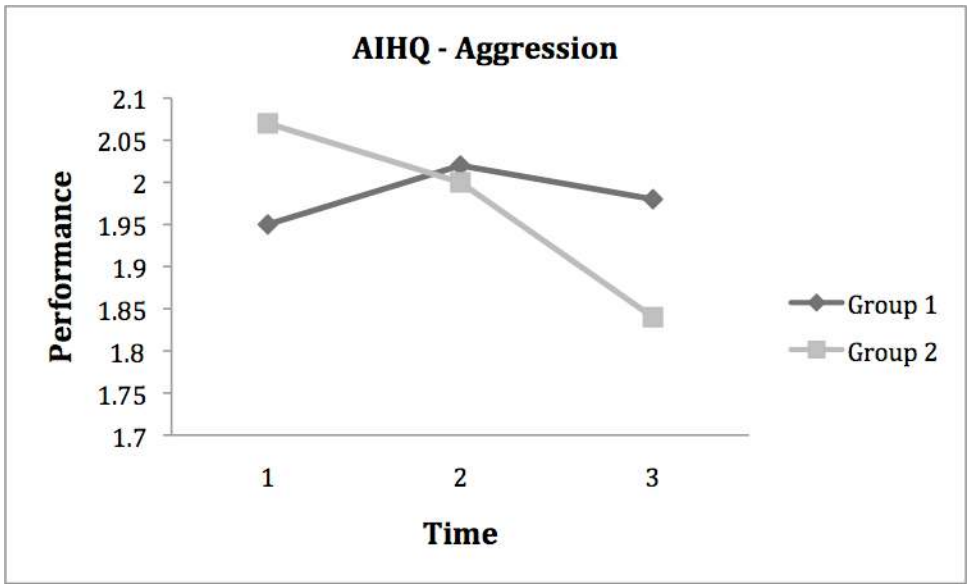


*Figure 4.7.* Group means for AIHQ Aggression (adjusted with gender as covariate).

Hinting Task ($F(2\ 22) = 3.02$, $p = .096$), with both groups showing improved performance by the third assessment (see Figure 4.8).

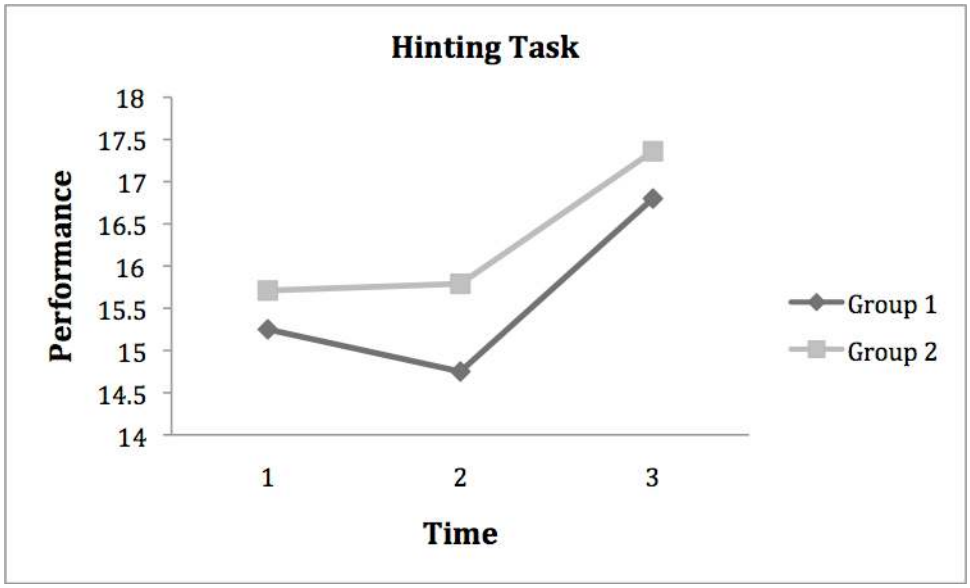


*Figure 4.8.* Group means for Hinting Task (adjusted with gender as covariate).

To further explore the data, these results were further probed with 2x2 ANCOVAs as well as univariate ANCOVAs. As expected, no mean difference was found for Time 1 testing on performance of social cognitive and social functioning outcome measures between the two groups (Group 1 = SCIT then TAU; Group 2 = TAU then SCIT). For Time 2 testing, Group 1 is expected to have improved performance after receiving SCIT treatment. Results indicate that Group 1 (SCIT first) performed better on the following outcome measures as compared to Group 2 (TAU first): BTFR ($F(2\ 28) = 3.45$, $p = .046$) (see Figure 4.9), SFS Interpersonal Communication ($F(2\ 28) = 3.88$, $p = .033$) (see Figure 4.10), and ASQ ($F(2\ 28) = 2.91$, $p = .071$) (see Figure 4.11). No other significant mean differences between groups were found. Finally, Group 2 was expected to improve performance on outcome measures at Time 3 testing (after also receiving SCIT treatment), while Group 1 was expected to sustain level of performance. A significant time x group interaction indicating decrease in performance on the FEIT ($F$(1

23) = 12.040, $p$ = .002) for Group 1 while performance for Group 2 improved. A time x group interaction for the SPS (Title; $F$(1 23) = 4.793, $p$ = .039) indicates that Group 2 demonstrated significant improvement while performance for Group 1 stayed that same. Further, a trend-level significant main effect for time for the MCAS (Adaptation; $F$(1 23) = 2.965, $p$ = .099) indicates the groups' performance improved between the second and third assessment (see Figure 4.12).

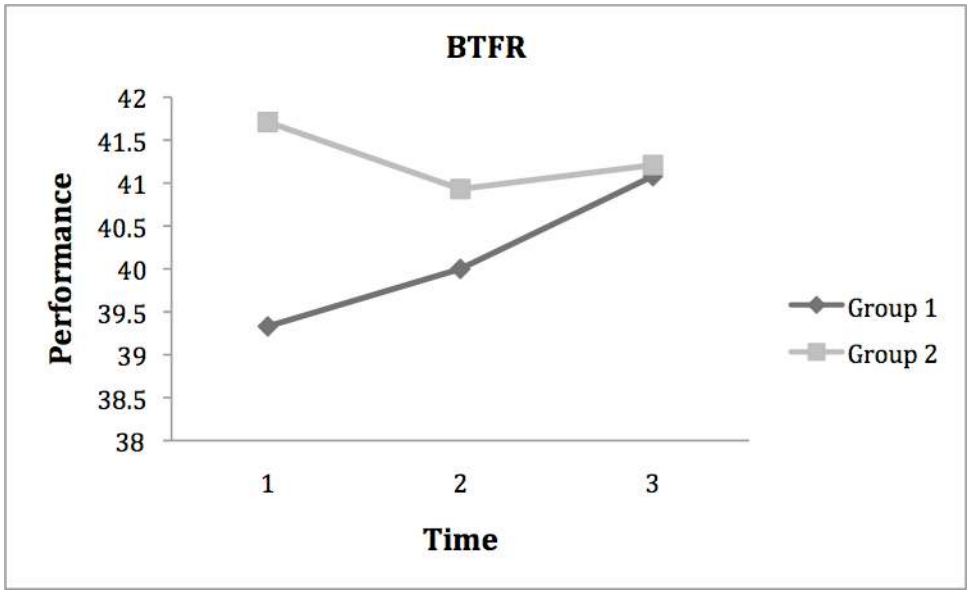


*Figure 4.9.* Group means for BTFR (adjusted with gender as covariate).

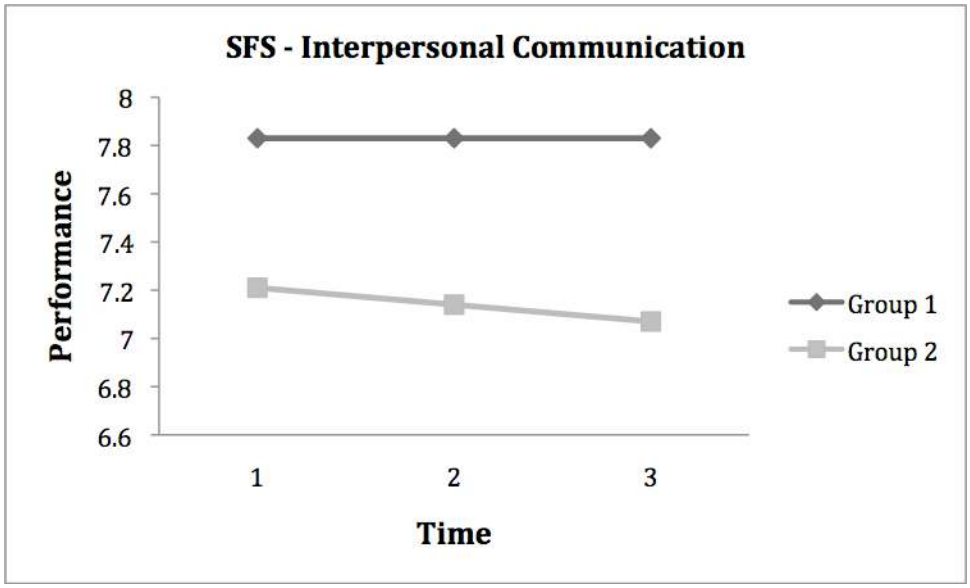

*Figure 4.10* .Group means for SFS Interpersonal Communication (adjusted with gender as
covariate).

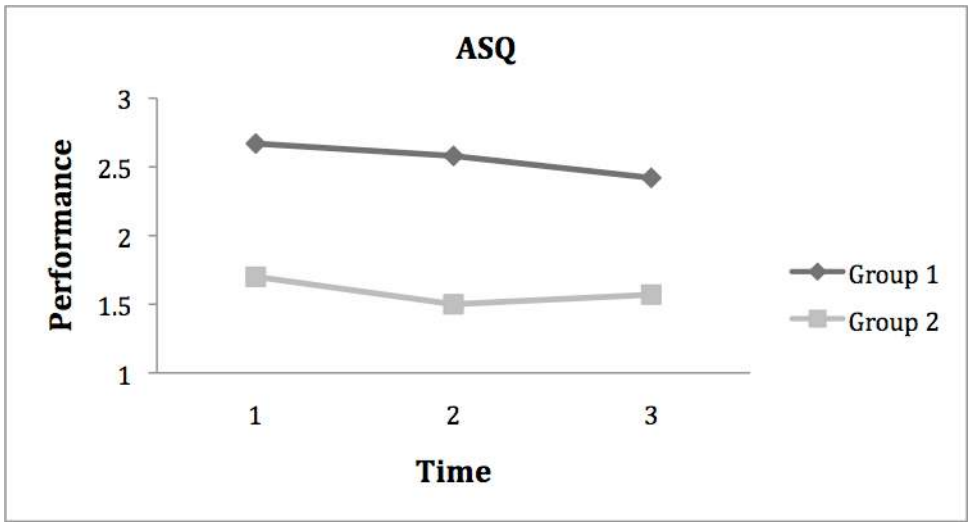


*Figure 4.11.* Group means for ASQ (adjusted with gender as covariate).

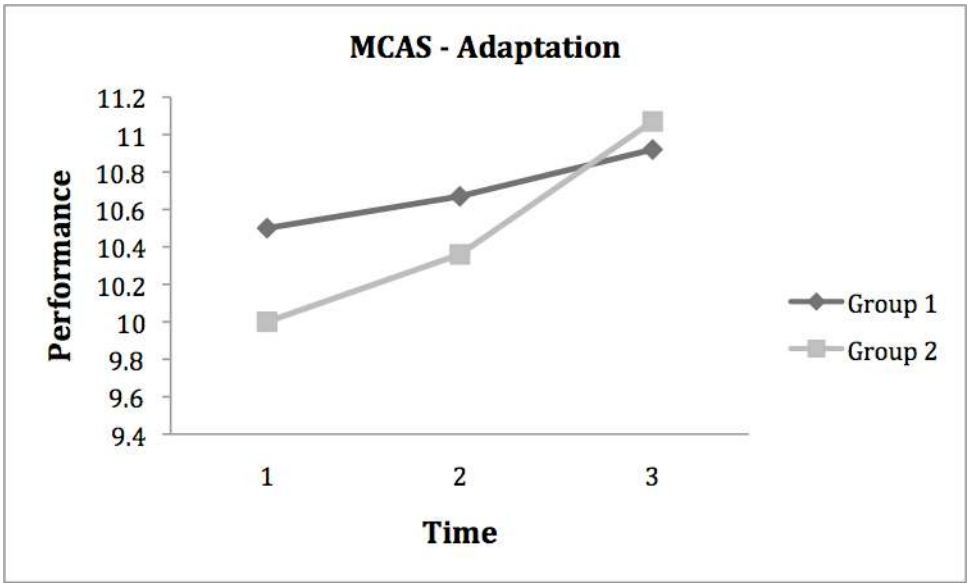


*Figure 4.12.* Group means for MCAS Adaptation (adjusted with gender as covariate).

Time 3 testing signified post-treatment testing for both groups. As expected, no mean difference was found in performance on all social cognition measures between the groups during Time 3 testing.

# Chapter 5 - Discussion

## General Discussion

This study contributes to the small but growing number of studies testing the impact of SCIT and comparable treatment modalities on social cognitive functioning. Although a range of treatments exist targeting deficits in cognitive, neurocognitive, and/or social cognitive deficits in individuals with severe mental illness, the heterogeneity of schizophrenia-spectrum disorders makes it difficult to treat individual areas of deficit in a comprehensive yet viable way. SCIT is a promising new approach to ameliorate deficits in social cognitive functioning by balancing necessary treatment components (i.e. identified deficit domains) with a viable way of administration during a typical time frame (20 sessions) via personally relevant and real-world exercises. Thus, by targeting "hot cognition," cognition with personally relevant content, SCIT promises to be ecologically valid, increasing the translatability of learned materials between the class room and other areas of participants' lives.

## Findings of the Present Study

Of the 40 participants in the final study sample, 65% completed all testing and 90% completed the SCIT intervention. The rate of attrition (35%) for assessments is high, and exceeds the forecast 10% attrition rate. Several factors contributed to this particular rate of attrition, including some individuals being discharged to other programs and/or moving out of the catchment area, others asked to drop-out as the time commitment was too much and/or they lost interest in continued participation.

**Emotion measures.** Three of the five emotion measures used in this study showed evidence of a SCIT treatment effect in the domain of emotion perception. This is

in line with previous studies where SCIT was administered (Roberts, et al., 2009; Combs, et al. 2009). Other studies targeting social cognitive deficits also found improvement of facial affect perception (Wolwer, et al, 2005; Horan, et al. 2009). However, the current study did not find sustained improvement in emotion perception. There was a decrease in scores for participants in Group 1 between the second assessment (immediately after receiving SCIT treatment) and the third assessment (after receiving TAU, without SCIT for 3 months). Results showed this pattern of improvement for the FEIT, BTFR, and the SPS. Previous studies have found a similar pattern in results; Combs and colleagues (2009) found that participants improved on the FEIT immediately after receiving SCIT treatment, but did not sustain these improvements at a 6-month follow-up assessment. However, the authors did note that, while performance declined significantly, it did not decline to baseline and was found to be on par with the non-psychiatrically ill control group. The present study generated no evidence for a SCIT treatment effect on the BLERT or the VEIT.

**ToM measures.** The results yield only weak support for a SCIT treatment effect on Theory of Mind as measured by the hinting task. Both groups improved somewhat on this task by the last (third) assessment, with Group 2 improving performance after receiving SCIT treatment. However, Group 1 showed a delayed improvement effect as performance initially decreased after receiving SCIT treatment, but subsequently increased after receiving TAU. The lack of a statistically significant difference may be due to the general high scores achieved on the Hinting Task, which may indicate a ceiling effect. This could indicate that this task may be useful for more acutely symptomatic inpatients, or more severely disabled institutional patients, but may not measure more

nuanced ToM deficits in a stable outpatient population. Other studies testing the effectiveness of SCIT on social cognitive deficits, however, did find improved performance on ToM measures after participants received the SCIT intervention (Roberts, et al., 2009; Combs, et al., 2007; Penn, et al., 2005). It should be considered, however, that these studies were conducted in inpatient settings where participants may have exhibited greater ToM deficits as measured by the Hinting Task at baseline, allowing measurement of possible improvement due to SCIT treatment.

**Attributional style measures.** Results of this study indicate that both groups improved in performance on the AIHQ (Aggression subscale) by the third assessment; only Group 1 showed improvement on the AHIQ (Blame subscale) immediately after receiving SCIT and sustained this improvement at the third assessment. However, a trend level decline in performance on the ASQ was found for both groups on the second and third assessment. The groups did not show a significant mean difference in performance, indicating no difference in attributional style after receiving SCIT treatment. No significant effect was found for either group on the NFCS.

**Social functioning measures.** The current study found participants increased their performance on the SFS (interpersonal communication subscale) after receiving SCIT treatment; this finding is consistent with previous findings by Combs and colleagues (2009). Participants achieved higher ratings on the MCAS (total score) after the first assessment; both groups sustained this improvement at the third assessment. Further, both groups showed improvement on the Adaptation subscale of the MCAS between the second and the third assessment. Finally, only Group 2 improved their ratings on the MCAS (Health subscale) over time.

**Limitations of the Present Study and Future Directions**

We designed this study to evaluate a targeted treatment for social cognition deficits in a severely mentally ill population in real-world settings. As such, the heterogeneity of schizophrenia spectrum disorders in community participants resulted in limitations for this study that would not be present in a sample of matched research participants. Thus, the quasi-experimental nature of this study may prevent a more confident assignment of treatment effects specifically to SCIT, which may be achieved via a more rigorously controlled study. The current study serves as a preliminary analysis for the implementation of SCIT in outpatient treatment settings.

As indicated in previous discussions, results may be impacted from lower than expected statistical power; a bigger study sample may allow for more statistically significant findings with regards to social cognitive outcome measures. It should be considered that the predicted attrition rate was based on previous studies conducted in inpatient settings as compared to the outpatient treatment settings in this study where ambient expectorations of treatment participation may differ. In addition, the higher than expected rate of attrition was limited to assessment completion (35%), while the expected rate of attrition (10%) was found for treatment completion. Although this smaller size during the assessment phase may impact statistically significant findings, it does not necessarily reflect a less strong treatment effect of SCIT. In light of this discrepancy of attrition rate between treatment completion and assessment completion, current findings indicate that SCIT should be considered a viable and feasible treatment for social cognitive deficits in an outpatient population. Participants appeared to enjoy the treatment and the 10% attrition was due to either a change of schedule or a move/discharge of the

participant from the treatment site. On the other hand, the higher rate of assessment attrition was heavily influenced by the time consuming process of testing (approximately 4 hours at each testing phase) and the small remuneration ($5 per completed assessment phase). As the demanding testing schedule is not typically not part of the treatment process to the extent is was here, the treatment effects documented by this study may be more solid for a purely clinical application of the treatment. Overall, a bigger sample size and advanced statistical modeling may allow for more nuanced results. As such, the present study functions as a precursor allowing and encouraging continued study of targeted treatment approaches for social cognitive deficits in an SMI population.

Even though the effect sizes for results for social cognitive outcomes measures were in the small to medium range, findings from the current study do indicate a treatment effect for SCIT. Improvement in some domains (e.g. emotion perception, social functioning) replicated findings from previous SCIT studies (Roberts, et al., 2009; Combs, et al. 2009) and contribute to the study of treatment effects on specific social cognitive domains. However, while finding some indication of a treatment effect, current as well as previous outcomes did not necessarily indicate persisting treatment effects (Combs, et al., 2009). This lack of persistent outcome effects may not entirely reflect a weak or non-existent treatment effect as it could also be due to longitudinal fluctuations in test performance that reflects actual fluctuations in functioning independent of treatment effects. Overall, the longitudinal stability of functioning in these domains is not well understood and could be interfering with our ability to measures treatment effects. More research is needed to further validate and delineate separate social cognitive domains. The heterogeneity of schizophrenia-spectrum disorders makes a clear separation

of domains rather difficult. However, a steadily growing number of studies in this area show promise in establishing a more precise theoretical groundwork.

Further, outcomes from the current study indicate that it is in the realm of feasibility to administer SCIT in outpatient treatment settings and achieve some clinically significant change. If participant enthusiasm for the treatment and the overall level of engagement in treatment sessions is any indication for the promise of this targeted social cognitive treatment, at least with regards to the feasibility and acceptability, then this study established just that. Although these indicators have not been explicitly measured, informal feedback from study participants was most uniformly very positive. Participants stated that they very much enjoyed the group sessions and many reported that that they felt more confident in interpersonal situations and felt that attending SCIT groups helped them better connect with others in the treatment setting. In addition, staff observed that clients who participated in SCIT treatment groups appeared to enjoy group sessions and observed frequent discussions relating to participants' experiences in group. Positive feedback regarding SCIT treatment replicates findings from previous SCIT studies (Penn, Roberts, Combs, and Sterne, 2007; Roberts, Penn, and Labate, 2009) and serves as an indicator of overall client engagement in treatment. This is especially important with regards to the overall higher level of difficulty of keeping SMI clients engaged in outpatient treatment (Kreyenbuhl, Nossel, and Dixon, 2009.).

This study contributes to the growing body of literature and existing studies needed for the establishing the feasibility of this new social cognitive treatment intervention. Our findings are encouraging as they reflect a replication of prior studies, including the informally assessed level of client engagement and enthusiasm for this

treatment modality. The presence of some treatment effects in this study makes a strong case for the effectiveness of this treatment, especially in light of the low statistical power and the potential of underestimating treatment effects that are present but remain statistically undetected. These improvements, especially in functional domains (e.g. as measured by the MCAS), are very compelling and make a strong case for going ahead with large scale treatment trials. In that sense, additional studies will be necessary not only to replicate findings, but also to determine generalizability of SCIT as well as the degree to which beneficial treatment effects are sustained by SCIT participants after treatment has concluded.

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