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Social cognition and interaction training (SCIT) for outpatients with schizophrenia: A preliminary study

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Abstract

Social functioning deficits (e.g., social skill, community functioning) are a core feature of schizophrenia. These deficits are only minimally improved via the frontline treatments for schizophrenia (e.g. medication, social skills training, cognitive-behavioral therapy). Social cognition is a promising treatment target in this regard as it may be more strongly related to social functioning outcomes than traditional neurocognitive domains [Couture, S., Penn, D.L., Roberts, D.L., 2006. The functional significance of social cognition in schizophrenia: a review. Schizophrenia Bulletin (Suppl. 1), S-44–63]. Social cognition and interaction training (SCIT) is a 20-week, manualized, group treatment designed to improve social functioning in schizophrenia by way of improved social cognition. This article reports preliminary data from a quasi-experimental study comparing SCIT + treatment as usual (TAU; $n=20$) to TAU alone ($n=11$) among outpatients. Results using analysis of variance (ANOVA) suggest SCIT-related improvements in emotion perception and social skill.

Keywords: Psychosis; Emotion perception; Theory of Mind; Attributional style; Social functioning

1. Introduction

Social cognition is impaired in schizophrenia (Penn et al., 2006), is relatively independent of traditional neurocognitive domains (e.g. attention, memory, executive functioning), and may be the strongest predictor of functional outcome in this illness (Couture et al., 2006; Brüne et al., 2007). For these reasons, there has been recent interest in social cognitive treatment interventions. Most of these interventions can be conceptualized as either "targeted" (e.g. Silver et al., 2004) or "broad-based" (e.g. Hogarty et al., 2004) approaches. Targeted interventions focus on a single social cognitive ability (e.g. emotion perception), whereas broad-based interventions typically comprise a variety of psychosocial strategies, including techniques for improving social cognitive skills. Both of these approaches have shown promise, but both have important limitations. Notably, both conceptualize social cognitive dysfunction as a deficit state despite evidence that social cognitive biases play an important role in this population (Rosse et al., 1994; Bentall et al., 2001; Allen et al., 2004). Similarly, intervention

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techniques are adapted from information processing models that do not account for the qualitatively different characteristics of social cognitive stimuli (Penn et al., 1997) or brain functions (Frith and Wolpert, 2003).

We developed a treatment model and intervention package aimed at addressing these limitations. Social cognition and interaction training (SCIT; Roberts et al., 2006) is a 20-week, manualized group intervention that targets dysfunctional social cognitive processes which have been observed in schizophrenia, including problems with emotion perception and Theory of Mind (ToM), hasty judgment making, and biased social attributions. The treatment comprises the following three phases: (1) *Emotions*, which addresses emotion perception dysfunction; (2) *Figuring out situations*, which addresses attributional biases and ToM dysfunction; and (3) *Integration*, in which participants practice applying learned skills to interpersonal problems in their own lives.

Preliminary studies suggest that SCIT is feasable, and may improve social cognition and social functioning in inpatient populations (Penn et al., 2005; Combs et al., 2007a). The current study was a quasi-experimental trial comparing SCIT plus treatment-as-usual (TAU) to TAU among individuals with schizophrenia-spectrum disorders. Consistent with the inpatient findings, we predicted that SCIT would be associated with improved emotion perception, Theory of Mind, and social skill, as well as reduced attributional bias, relative to the TAU condition.

2. Methods

2.1. Participant recruitment and sample characteristics

Thirty-one adults with schizophrenia-spectrum diagnoses and without current substance use problems were recruited from an outpatient psychiatry clinic. All participants were receiving regular outpatient psychiatric treatment, including antipsychotic medication, throughout the study. Participants were assigned to the TAU group who either (1) declined to participate in the SCIT group ($n=4$), (2) were unable to attend SCIT due to a scheduling conflict ($n=1$), or (3) had participated in previous research with our laboratory, had agreed to be contacted for future research participation, and met study criteria ($n=6$). Three SCIT treatment groups were conducted, each with 4 to 11 participants and two co-facilitators.

2.2. Measures

Diagnosis was obtained from participants' medical charts, and confirmed with items from the psychotic disorders section of the Structured Clinical Interview for DSM-IV – Patient Edition (SCID-P; First et al., 2001). Symptomatology was assessed with the Positive and Negative Syndrome Scale (PANSS) (Kay et al., 1987).

2.2.1. Social cognitive measures

Emotion perception was assessed with two measures: The Face Emotion Identification Task (FEIT; Kerr and Neale, 1993) and the Bell-Lysaker Emotion Recognition Task (BLERT; Bell et al., 1997). Performance on the FEIT is indexed as the total number of correctly identified emotions out of nineteen pictured faces. Reliability (Cronbach's alpha) for the FEIT was 0.51. Although low, this is consistent with previous research that has used this measure (Kerr and Neale, 1993; Mueser et al., 1996; Penn et al., 2000). The BLERT consists of 21 brief video scenes in which an actor utters phrases using emotionally salient facial expressions and vocal prosody. Performance is indexed as the total number of correctly identified emotions (0–21). Reliability (Cronbach's alpha) of the BLERT was 0.77.

Theory of Mind was also assessed with two measures. The Hinting task (Corcoran et al., 1995) consists of ten brief, written vignettes including social hints that the respondent must interpret. Total scores range from 0 to 20, with higher scores indicating better performance. Reliability (Cronbach's alpha) for the Hinting task was 0.65. The Awareness of Social Inference Test (TASIT; McDonald et al., 2003) was abbreviated due to time constraints (from 16 to 10 items). The abbreviated TASIT requires participants to view and answer four Yes/No questions about each of ten brief video-taped social vignettes depicting examples of sarcasm and "white lies." Performance is indexed as the total number of correct responses, ranging from 0 to 40. Reliability (Cronbach's alpha) for the abbreviated TASIT was 0.81.

Attributional style was measured with the Ambiguous Intentions Hostility Questionnaire-Ambiguous items (AIHQ-A; Combs et al., 2007b). The AIHQ-A comprises five short, written, second-person vignettes describing negative interpersonal events with ambiguous causality. Each of the five vignettes is followed by a Hostility question (e.g. "Why did the other person do what s/he did?"), an Aggression question (e.g. "How would you respond?"), and a Blame question (e.g. "How much would you blame the person?"). Scores on each range from 0 to 5; higher scores indicate greater bias.

Hostility and Aggression scores are derived from response ratings made by two independent, blinded coders, while Blame scores are derived from subject responses on Likert-type (0 to 5) scales. Agreement between raters (Intraclass Correlation Coefficient, ICC) was 0.85. The reliability (Cronbach's alpha) of the Likert-rated Blame scores was 0.92.

2.2.2. Social skill

The Social Skills Performance Assessment (SSPA; Patterson et al., 2001) consists of two 3-min role-play conversations with a confederate on pre-determined topics (e.g. "Your landlord has not fixed a leak that you told him about last week, and now you are calling him on the phone to follow-up."). SSPA performance was tape-recorded and scored by two coders, trained to reliability (ICC > 0.70), and blind to treatment condition and pre/post status. Ratings were made of the following domains: interest/disinterest, speech fluency, clarity, focus, affect, social appropriateness, submissiveness-versus-persistence, negotiation ability, and overall conversational effectiveness. Domains were summed to yield a total score. Ratings from two scenes were collapsed into an overall composite social skill scale (overall ICC = 0.79), with a range from 16 to 80, with higher scores signifying greater skill.

The BLERT, TASIT, and SSPA were added to the study protocol after completion of the first cohort, and therefore were considered secondary outcome variables. All assessments were conducted by trained assessors who were not blind to treatment condition or pre/post status.

2.3. Treatment conditions

Treatment as usual (TAU) comprised a suite of available services, including medication management, individual and group psychotherapy, case management, family education and support, and occupational therapy. Use of TAU services differed across participants based on collaborative planning between clients and their clinicians. This was not influenced by study procedures. No TAU participants received social-cognitively oriented treatment during the study period; several received individual, symptom-focused cognitive-behavioral treatment as part of TAU.

All SCIT sessions followed a similar format, beginning with structured check-ins in which participants made increasingly fine-grained observations about their current emotional state and its relationship to their behavior, thoughts, and social interactions. Next, homework was reviewed to bridge content from the previous week to the current session. Early sessions in Phases 1 and 2 focused on psychoeducation and discussion of social cognitive principles. The bulk of most core sessions was spent learning specific social cognitive strategies, and then utilizing these strategies to analyze social cognitive stimuli (photographs, specialized videos, or incidents from group members' lives). Strategy practice was structured in the form of games (including feedback about right and wrong answers) or as collaborative data-gathering exercises or problem-solving sessions. All sessions ended with assignment of homework.

3. Results

3.1. Data sample

All 31 study participants completed baseline and post-test assessments. Study hypotheses were evaluated using two experimental samples: the full intent-to-treat (ITT) sample and a "Completer" sample ($n = 14$ or 70% of the full SCIT group sample); completion was defined as attendance to at least 50% of the therapy sessions with at least two sessions in each of SCIT's three phases. We required attendance at sessions in all three phases because the skills taught in SCIT are cumulative, with higher-level skills and real-world application not being addressed until the second half of the intervention. Of the six non-completers, three dropped out during phase 1, and three attended inconsistently throughout the treatment. The attendance rates for the ITT and Completer samples were 64% and 82%, respectively. Chi-square and *t*-tests revealed that the full and completer samples did not differ significantly on any demographic or baseline clinical measures.

3.2. Demographic and baseline clinical analyses

Table 1 summarizes the characteristics of the SCIT and TAU groups. SCIT participants were significantly more symptomatic and were more likely to be diagnosed with schizoaffective disorder. However these differences were unrelated to social cognitive outcome variables, and therefore were not entered in the primary analyses. Comparisons revealed no baseline differences on any of the social cognitive or social skill measures. At baseline, the PANSS total symptoms score was significantly correlated with social skill performance ($r = 0.678$, $P = 0.003$). Therefore, symptom change was entered as a covariate in analyses of the social skill data only.

Table 1
Demographic and clinical information.

	SCIT + TAU (n=20)		TAU (n=11)	
	Mean/%	S.D.	Mean/%	S.D.
Age	36.8	12.3	41.4	12.3
Female (%)	45.0		36.0	
Ethnicity (%)				
African Am.	25.0		18.2	
Caucasian	75.0		72.7	
Other	0.0		9.1	
Diagnosis (%) *				
Schizophrenia	35.0		81.8	
Schizoaffective	65.0		18.2	
Yrs education	13.9	3.6	14.0	1.8
WRAT – Reading	44.4	8.3	47.7	6.0
Living status (%)				
Independent	35.0		54.5	
Family home	15.0		9.1	
MH supported	30.0		18.2	
Group home	20.0		18.2	
PANSS symptoms **	67.9	11.7	51.3	10.0
Positive	16.3	4.5	13.1	3.1
Negative	17.7	5.9	11.6	4.7
General	34.0	7.2	26.5	5.6

MH supported = Apartment with functional supports from a mental health provider.
* Diagnosis: χ^2=6.23; P=0.013.
** Symptoms: t=3.97; P<0.001; NB: All PANSS subscales also P<0.05.

3.3. Treatment findings[1]

In the Completer sample, the effect of SCIT on social cognition was examined with an omnibus 2 (time: pre-test versus post-test)×2 (group: TAU versus SCIT + TAU) mixed model multivariate analysis of variance (MANOVA) conducted on the primary social cognitive measures (FEIT, AIHQ hostility bias, and Hinting task). The time × group interaction was statistically significant (Wilk's λ=0.592, F=4.82, P=0.010). To probe this interaction, follow-up 2 (time)×2 (group) ANOVAs were conducted on each of the three dependent variables, and the two additional AIHQ variables (summarized in Table 2). For the FEIT (emotion perception task), neither of the main effects for time nor treatment group was statistically significant. However, there was a significant time × group interaction (F=13.27, P=0.001); SCIT + TAU completers improved significantly from pre- to post-test (F=9.52, P=0.009), whereas TAU participants' performance declined at a trend level of statistical significance (F=4.57, P=0.06). The improved performance in the SCIT + TAU group corresponded to a medium within-group effect size.[2]

Neither the main effects nor the interactions for the Hinting (ToM) or AIHQ (attributional) tasks were statistically significant.

Results from a series of 2×2 ANOVAs on the secondary outcome variables are summarized in the lower portion of Table 2. On the BLERT (emotion perception task), neither of the main effects for time nor group was statistically significant. However, the time × group interaction approached a trend level of statistical significance (F=3.27, P=0.092). Probing revealed that participants who received SCIT + TAU had a trend toward higher performance on the BLERT at post-test relative to participants in the TAU group (t=1.69, P=0.11).

On the TASIT (ToM task), the time × group interaction approached statistical significance (F=2.58, P=0.128). Probing of this interaction revealed trend-level improvement in the SCIT + TAU group (F=4.24, P=0.070), and no improvement in the TAU group. The SCIT + TAU group's improvement corresponded to a moderate effect size.

A 2 (time)×2 (group) analysis of covariance (ANCOVA) was conducted on the SSPA (social skill test) with PANSS symptom change score ([pre-test PANSS total − post-test PANSS total]/pre-test PANSS total) entered as a covariate. This yielded a statistically significant time × group interaction (F=6.49, P=0.024). Follow-up analyses revealed that participants who received SCIT + TAU improved significantly in social skill from pre- to post-test (F=30.13, P=0.001) whereas individuals who received TAU did not. The SCIT + TAU group's improvement corresponded to a large effect size.

Results from the ITT sample were similar to Completer results, although slightly attenuated. Among primary variables, the FEIT yielded a significant time × group interaction (F=7.04, P=0.013), driven by improvement from pre- to post-test in the SCIT group

[1] The FEIT and Hinting task variable distributions were found to violate parametric statistics' assumptions of normality. Therefore, the statistical tests in this section were replicated using non-parametric Mann–Whitney and Wilcoxon change-score tests. Non-parametric findings mirrored parametric results to an acceptable degree for both the FEIT (Mann–Whitney U=24.00; Wilcoxon W=90.00; P=0.003) and the Hinting task (Mann–Whitney U=74.50; Wilcoxon W=140.50; P=0.887). Thus, it was determined that assumption violations did not distort findings on these measures.

[2] Within-group effect sizes were calculated to estimate the magnitude of change from pre- to post-test within the treatment condition. Cohen's d (Cohen, 1988) was calculated using Dunlap et al.'s (1996) conservative calculation, which corrects for effect size inflation due to within-variable correlation in paired samples.

Table 2
Completer sample outcomes.

	SCIT + TAU		N	Within SCIT effect size (*d*)	TAU		N	Within TAU effect size (*d*)
	Pre-test M (S.D.)	Post-test M (S.D.)			Pre-test M (S.D.)	Post-test M (S.D.)		
FEIT *	12.21 (2.39)	13.57 (2.82)	14	0.50	13.73 (2.05)	12.54 (2.21)	11	−0.55
Hinting task	16.14 (2.66)	15.92 (2.59)	14	−0.08	15.45 (2.94)	15.27 (3.38)	11	−0.06
AIHQ Hostility	1.97 (0.61)	2.11 (0.70)	14	0.22	1.70 (0.48)	1.51 (0.60)	11	−0.35
AIHQ Aggression	1.79 (0.33)	1.89 (0.27)	14	0.31	1.95 (0.33)	1.98 (0.52)	11	0.05
AIHQ Blame	2.90 (1.04)	2.93 (0.95)	14	0.03	2.50 (1.01)	2.26 (0.73)	11	−0.22
BLERT	15.57 (3.26)	16.50 (2.22)	10	0.29	14.12 (5.52)	13.00 (5.93)	7	−0.19
TASIT	26.30 (6.90)	29.50 (5.72)	10	0.50	27.38 (5.42)	27.50 (5.73)	8	0.02
SSPA **	55.33 (5.17)	62.61 (6.56)	9	1.17	58.64 (4.10)	59.00 (6.46)	7	0.06

SCIT = Social Cognition and Interaction Training; TAU = Treatment as usual; FEIT = Face Emotion Identification Task; AIHQ = Ambiguous Intentions Hostility Questionnaire; BLERT = Bell & Lysaker Emotion Recognition Task; TASIT = The Awareness of Social Inference Test; SSPA = Social Skill Performance Assessment.

* Significant time × group interaction ($P=0.001$).

** Significant time × group interaction ($P=0.024$).

that reached a trend level of statistical significance ($F=3.00$, $P=0.10$). No other main effects or interactions were found. Among secondary variables, the BLERT yielded a time-by-group interaction that reached a trend level of statistical significance ($F=3.91$, $P=0.067$), also driven by pre- to post-test improvement in the SCIT group ($F=3.37$, $P=0.096$). The SSPA yielded a time × group interaction that approached statistical significance ($F=2.71$, $P=0.121$). This was driven by significant improvement in the SCIT group ($F=11.86$, $P=0.006$) which approached a large effect size ($d=0.79$). TASIT results were not statistically significant.

4. Discussion

This study provides preliminary evidence that SCIT is feasible among outpatients, and may yield improvements in social cognition and social skill. Specific findings are discussed below.

Individuals who received SCIT + TAU showed significant improvement in emotion perception relative to TAU. This finding generally replicates the recent inpatient study of SCIT (Combs et al., 2007a) and is consistent with previous research demonstrating that it is possible to modify performance in this domain among outpatients (reviewed in Couture et al., 2006). SCIT differs from previous, "targeted" interventions, however, in that it addresses emotion perception as the first of three treatment phases (instead of as a stand-alone treatment). Therefore, post-treatment assessment does not occur until approximately four months after completion of targeted emotion perception training. Thus, the positive results in the current study suggest that emotion training effects in SCIT may be fairly durable. Alternatively, participants may have utilized the second and third phases of SCIT to rehearse and consolidate emotion perception gains, as these skills remain applicable in the exercises conducted during these latter phases.

The impact of SCIT on ToM varied across outcome measures. SCIT was not associated with improvement on the primary ToM measure, the Hinting task. This is a notable deviation from previous research with inpatient samples, which showed large improvement on this measure following SCIT (Penn et al., 2005; Combs et al., 2007a). Examination of frequency distributions on this measure revealed that most (57%) SCIT treatment completers performed in the normative range at pre-test (i.e. 17 or above, out of 20; Corcoran et al., 1995; Pinkham and Penn, 2006). Thus, the limited impact of SCIT on Hinting task performance may be due to a ceiling effect. In contrast, SCIT was associated with improvements in ToM that approached a trend level on the TASIT. These results are consistent with previous research showing that social cognitive training programs can improve ToM among individuals with schizophrenia (Roncone et al., 2004). It is also encouraging in that SCIT does not specifically target the ability to identify white lies and sarcasm, abilities assessed by the TASIT. Thus, SCIT may have promise in improving "real-world" ToM, although this conclusion is tempered by the small sample in this analysis.

SCIT did not reduce hostile and aggressive attributional biases, a finding which differs from our previous work with inpatients (Combs et al., 2007a). Examination of descriptive data revealed that means at both pre-

and post-test for all participants on all three attribution scales were lower than means produced by a normative sample of college students (Combs et al., 2007b). In the face of negative interpersonal events, participants reported inferring very low hostile intent, feeling very low aggressive response tendency, and having a very low tendency to blame others. This suggests a floor effect such that SCIT participants had little room for treatment-related improvement. Several factors may explain this floor effect. Participants may have "faked good", which is possible because the AIHQ is face valid. Alternatively, participants may actually have low bias, which is consistent with the low observed levels of paranoia in this sample.

The results showed that SCIT was associated with improvements in social skill. This finding is quite encouraging given that the primary goal of SCIT is to improve social functioning by way of improved social cognition. This provides preliminary support both for the theoretical model underlying SCIT and for SCIT's ability to generalize from cognition to social behavior.

Not surprisingly, SCIT-related effects were attenuated in the ITT sample relative to the Completer sample, suggesting a dose–response effect. To probe this effect, post-hoc bivariate correlations were computed between attendance and change scores on outcome variables in the full ITT sample. All correlations were non-significant, suggesting that more research is needed to elucidate the relationship between the dose of SCIT treatment components and social cognitive change.

The current project had several methodological limitations. First, although the raters of social cognitive bias and social skill measures were blind to treatment condition and pre/post status, the assessors were not. This is an important limitation, as Tarrier and Wykes (2004) have identified non-blinded assessment as a key source of treatment-effect inflation among studies of CBT for psychosis. Second, the use of a quasi-experimental design prevents full confidence in attributing the observed effects solely to SCIT. Third, small sample size limited power to detect all but moderate and large effect sizes, especially in the secondary variables. And last, floor and ceiling effects on two assessment measures may have prevented sensitive evaluation of change. These limitations are being addressed in a randomized, controlled trial that is currently underway.

In closing, this study provides preliminary evidence that SCIT is a feasible and promising method for improving social cognition and social skill among outpatients, although more controlled research is needed before the efficacy of SCIT is established.

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