Psychiatric Rehabilitation Journal
2017, Vol. 40, No. 1, 12–20

1095-158X/17/$12.00 http://dx.doi.org/10.1037/prj0000190

Understanding Social Situations (USS): A Proof-of-Concept Social–Cognitive Intervention Targeting Theory of Mind and Attributional Bias in Individuals With Psychosis

Joanna M. Fiszdon
VA Connecticut Healthcare System, West Haven, Connecticut and Yale University

David L. Roberts
University of Texas Health Sciences Center at San Antonio

David L. Penn
University of North Carolina at Chapel Hill and Australian Catholic University

Kee-Hong Choi
Korea University

Cenk Tek
Yale University

Jimmy Choi
Institute of Living at Hartford Hospital, Hartford, Connecticut

Morris D. Bell
VA Connecticut Healthcare System, West Haven, Connecticut and Yale University

Objectives: In this proof-of-concept trial, we examined the feasibility and preliminary efficacy of Understanding Social Situations (USS), a new social–cognitive intervention that targets higher level social–cognitive skills using methods common to neurocognitive remediation, including drill and practice and hierarchically structured training, which may compensate for the negative effects of cognitive impairment on learning. ***Method:*** Thirty-eight individuals with schizophrenia spectrum disorders completed the same baseline assessment of cognitive and social–cognitive functioning twice over a 1-month period to minimize later practice effects, then received 7–10 sessions of USS training, and then completed the same assessment again at posttreatment. ***Results:*** USS training was well tolerated and received high treatment satisfaction ratings. Large improvements on the USS Skills Test, which contained items similar to but not identical to training stimuli, suggest that we were effective in teaching specific training content. Content gains generalized to improvements on some of the social–cognitive tasks, including select measures of attributional bias and theory of mind. Importantly, baseline neurocognition did not impact the amount of learning during USS (as indexed by the USS Skills Test) or the amount of improvement on social–cognitive measures. ***Conclusions and Implications for Practice:*** USS shows promise as a treatment for higher level social–cognitive skills. Given the lack of relationship between baseline cognition and treatment effects, it may be particularly appropriate for individuals with lower range cognitive function.

Keywords: cognition, social cognition, schizophrenia, treatment, cognitive remediation

Social cognition has been defined as "the domain of cognition that involves the perception, interpretation, and processing of social information" (Penn, Corrigan, Bentall, Racenstein, & Newman, 1997, p. 115). Although related to basic neurocognition, social cognition is a separable construct and has been shown to mediate the relationship between neurocognition and functioning (Schmidt, Mueller, & Roder, 2011). Broadly, social cognition can be divided into the following domains: (a) affect recognition, the processing and identification of emotional information; (b) social perception or social knowledge, or the ability to identify interrelationships and social cues in social situations as well as gauge social rules and expectations; (c) theory of mind (ToM), the ability to infer other people's intentions, beliefs, and mental states; and (d) attributional style (AS), or the types of attributions individuals make about the causes of events, with individuals

This article was published Online First June 9, 2016.
Joanna M. Fiszdon, VA Connecticut Healthcare System, West Haven, Connecticut and Department of Psychiatry, School of Medicine, Yale University; David L. Roberts, Department of Psychiatry, University of Texas Health Sciences Center at San Antonio; David L. Penn, Department of Psychology, University of North Carolina at Chapel Hill and Department of Psychology, Australian Catholic University; Kee-Hong Choi, Department of Psychology, Korea University; Cenk Tek, Department of Psychiatry, School of Medicine, Yale University; Jimmy Choi, Institute of Living at Hartford Hospital, Hartford, Connecticut; Morris D. Bell, VA Connecticut Healthcare System and Department of Psychiatry, School of Medicine, Yale University.
Correspondence concerning this article should be addressed to Joanna M. Fiszdon, Psychology Service (116B), VA Connecticut Healthcare System, 950 Campbell Avenue, West Haven, CT 06516. E-mail: joanna.fiszdon@yale.edu

who have psychosis being more likely to blame others for negative events. Although AS and ToM are separable domains (Mancuso, Horan, Kern, & Green, 2011), it has been suggested that these two domains may be closely related, with deficits in the ability to correctly infer other people's intentions and mental states related to the types of attributions individuals make about the causes of events (Penn, Sanna, & Roberts, 2008; Randall, Corcoran, Day, & Bentall, 2003; Taylor & Kinderman, 2002).

There is ample evidence of medium to large effect size impairments in social cognition in individuals with psychosis (Savla, Vella, Armstrong, Penn, & Twamley, 2013), and these impairments have in turn been linked to poor social functioning (Couture, Penn, & Roberts, 2006; Fett et al., 2011; Schmidt et al., 2011). Hence, it is no surprise that social cognition has been identified as a potential target for interventions aimed at improving functional outcomes in individuals with psychosis. To date, dozens of different social–cognitive interventions have been developed, ranging from very brief, narrowly focused experimental manipulations to quite long, intensive treatments that include training on multiple facets of social cognition, in some cases in the context of other rehabilitation (Fiszdon, 2013).

Several literature reviews have examined the efficacy of social–cognitive interventions (Fiszdon & Reddy, 2012; Kurtz & Richardson, 2012). From these, it appears that the most frequently and successfully targeted social–cognitive domain has been affect recognition, with moderate to large effect size improvements. There have been far fewer evaluations of interventions targeting more complex, higher level social–cognitive processes such as ToM and AS, and the results of these trials have been more mixed, with small to moderate effects on ToM and no discernible impact on AS (Kurtz & Richardson, 2012).

We have previously suggested that the more modest success of interventions focused on higher level social–cognitive processes may be due to the higher task demands of such interventions (Fiszdon & Reddy, 2012; Roberts & Velligan, 2012). Specifically, while interventions targeting lower level social–cognitive domains often rely on highly structured, repetitive behavioral approaches focused on learning simple associations between observations and deductions (e.g., wide-open eyes are most often associated with surprise or fear), many of the higher level interventions involve more complex, cognitively taxing processes, such as psychoeducation, open-ended questions, analysis of more complex and ambiguous stimuli, recall of large chunks of information, and group evaluation and discussion of multiple social scenarios. This latter approach may be less successful given that, among individuals with social–cognitive impairments, neurocognitive impairments may be particularly common (Bora, Yucel, & Pantelis, 2009; Fanning, Bell, & Fiszdon, 2012; Freeman et al., 2014; Garety et al., 2013; Ochoa et al., 2014), along with emerging evidence suggesting that baseline neurocognition may moderate the efficacy of most (Garety et al., 2015), though not all (Bechi et al., 2013), social–cognitive interventions.

With the aforementioned background in mind, we developed a new social–cognitive intervention that narrowly targets components of higher level social–cognitive domains (ToM and AS)—but that may limit cognitive load—and uses strategies that are commonly used in neurocognitive remediation, including hierarchically structured training, performance-based increases in task difficulty, and massed drill and practice, to name a few. In the current report, we provide data on the initial feasibility, tolerability, and efficacy of this proof-of-concept intervention.

Method

Participants

Individuals were recruited by word of mouth, team presentations, and flyers placed at hospitals and community mental health centers. In order to be eligible for participation, the following criteria had to be met: diagnosis of schizophrenia spectrum disorder; presence of AS or ToM deficit as indicated by performance greater than or equal to 0.5 standard deviations below norms; aged 18 or older; no evidence of developmental disability in chart or on baseline assessment; psychiatrically stable as evidenced by minimum of 90 days since discharge from last hospitalization and 60 days since last change in psychiatric medications; no current (30 days) diagnosis of substance use disorder; English as primary language; and no severe, uncorrected auditory or visual impairment or known neurological disorder judged likely to affect response to intervention. This study was approved by all relevant local Institutional Review Boards. Written informed consent was obtained from all participants or their legally authorized representatives, as appropriate.

Procedure

This was a within-subject, double-baseline design, with the two baselines (Time 1 [T1] and Time 2 [T2]) administered 1 month apart. Because there was limited information about the psychometric properties of the social–cognitive measures at the beginning of the study, the double-baseline design was used in order to control for any potential practice effects. The first baseline was preceded by a screening session to determine whether participants met diagnostic criteria and exhibited impairments in ToM or AS. Impaired performance was quantified as performance greater than or equal to .5 standard deviations below published healthy control norms on one of the primary AS measures or one of the primary ToM measures (see the Measures section for details).

After the second baseline, participants were administered the social–cognitive training sessions at a rate of two per week over the course of about a month. At the end of each session, participants were asked to fill out treatment satisfaction ratings. Once finished with the training, participants were administered the final posttraining assessment (Time 3 [T3]). Participants were paid for their participation.

Measures

The Structured Clinical Interview for the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM–IV*; First, Spitzer, Gibbon, & Williams, 1996) administered by the first author was used to confirm psychiatric diagnosis. The Wide Range Achievement Test 3, Reading (WRAT–3 Reading; Jastak & Wilkenson, 1993) was used to assess premorbid intelligence. Current cognitive function was assessed using the MATRICS Consensus Cognitive Battery (MCCB; Nuechterlein et al., 2004). Psychiatric symptoms and overall functioning were assessed using the Positive and Negative Syndrome Scale (PANSS; Kay, Fiszbein, & Opler, 1987) and the Quality of Life Scale (Heinrichs, Hanlon, & Carpenter, 1984). Motivation for the social–cognitive training was assessed using the Intrinsic Motivation Inventory for Schizophrenia Research (IMI–SR; Choi, Mogami, & Medalia, 2010). Treatment satisfaction was assessed using a five-item Likert-type scale developed for the current study.

We (the first and second authors) also developed a 22-item measure of intervention content (the Understanding Social Situations [USS] Skills Test), assessing knowledge of principles and skills taught during the social–cognitive intervention. The format and focus of these items were based on (though were not the same as) the content of the training modules. For example, trainees were presented with photographs and asked to determine whether statements about those photographs were facts (e.g., the woman has dark hair) or guesses (e.g., the woman is happy). For other test items, trainees had to evaluate social photographs and determine whether specific statements about them were good or bad guesses or look at a sequence of photographs and determine which of several choices would be the most appropriate to complete the sequence.

Primary social–cognitive measures included two measures of AS and two measures of ToM. These measures were selected because of their frequency of use and/or their demonstrated sensitivity to social–cognitive training effects.

The primary AS measures were the Internal Personal and Situational Attributions Questionnaire (IPSAQ; Kinderman & Bentall, 1996) and the Ambiguous Intentions Hostility Questionnaire (AIHQ; Combs, Penn, Wicher, & Waldheter, 2007). The IPSAQ consists of 16 positive and 16 negative social scenarios (e.g., a friend betrayed the trust you had in her), where the examinee is asked to imagine herself in the situation; hypothesize about why the situation may have occurred; and indicate whether the cause of the situation had something to do with the participant herself (internal attribution), whether it was something about the other person (external personal attribution), or whether it was something about the situation (situational attribution). A personalizing bias (PB) score is computed, which reflects the likelihood that the examinee will attribute the cause of negative events to other people as opposed to situational factors, with higher scores indicating a greater tendency to do so. The AIHQ consists of 15 vignettes describing social scenarios with negative outcomes that vary in intentionality, with a third of the vignettes describing what are most likely purposeful actions (e.g., someone cancels a date with you), a third describing what are most likely incidental actions (e.g., someone in a dance club bumps into you), and a third describing situations that are ambiguous (e.g., you walk by a group of teens who begin to laugh). Each vignette is followed by a series of questions assessing the amount of hostility, blame, and aggression that the examinee states she would experience if in the situation. For the current analyses, we focused on ambiguous vignettes.

The two primary ToM measures were the Hinting Task (Corcoran, Mercer, & Frith, 1995; Greig, Bryson, & Bell, 2004) and the revised Reading the Mind in the Eyes Task (Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001). The Hinting Task consists of 10 vignettes, where the examinee is presented with a dyad social interaction and asked to make inferences about the intent behind a hint dropped by one of the characters. Responses are rated 0–2 points, with higher scores reflecting better ToM (range of 0–20). The Eyes Task consists of 36 black-and-white photographs of the eye regions of faces. For each photo, examinees are presented with four word choices and asked to select the adjective they believe best describes what the person may be thinking or feeling. Higher scores indicate better ToM (range of 0–36).

Several additional social–cognitive measures were also included in order to obtain preliminary information about their reliability and sensitivity and to evaluate the potential generalizability of training effects. The exploratory social–cognitive measures included The Awareness of Social Inference Test (TASIT; McDonald, Flanagan, & Rollins, 2002), a series of video vignettes where examinees are asked to distinguish sincerity from sarcasm and lies; the Picture Stories Task (Brune, 2005), a picture sequencing task with social content; the Comic Strip Task (Brunet, Sarfati, & Hardy-Bayle, 2003; Sarfati, Brunet, & Hardy-Bayle, 2003; Sarfati, Passerieux, & Hardy-Bayle, 2000), where examinees are asked to select a picture that reflects the comic character's future intentions; the Davos Assessment of Cognitive Biases Scale (DACOBS; van der Gaag et al., 2013), a comprehensive self-report measure assessing multiple social–cognitive domains; and the Bell–Lysaker Emotion Recognition Task (BLERT; Bell, Bryson, & Lysaker, 1997), an affect recognition task. The standard administration of the BLERT was amended to also include a confidence judgment metacognitive measure (Koren, Seidman, Goldsmith, & Harvey, 2006; Moritz, Woznica, Andreou, & Kother, 2012) by asking the examinee, at the end of each emotion recognition trial, to indicate how confident she was that her answer was correct using Likert-type anchors ranging from *100% sure* (4) to *guessed* (1). We then calculated average confidence ratings for trials where the examinee correctly identified an emotion and confidence ratings for trials where the examinee was incorrect.

Understanding Social Situations (USS) Training

USS was designed as a proof-of-concept training to evaluate whether techniques and principles common to neurocognitive remediation can be effectively used to train higher level social–cognitive skills in individuals with schizophrenia spectrum disorders with poor neurocognition. USS is individually administered and trainer led and consists of four modules targeting different aspects of ToM and AS. Each module contains multiple difficulty levels, with numerous exercise trials at each level. Module content was largely adapted from successful brief lab-based experimental interventions for ToM and AS, as cited in the following. USS is administered over the course of seven to 10 sessions, each session about an hour long. Verbal vignettes, cartoon series, video clips, and audio clips are presented on a computer throughout the training, and the trainee is guided through the stimuli, with the trainer adjusting task difficulty and providing corrective feedback as appropriate. At the end of each session, a short homework assignment related to that day's training content is given and reviewed at the beginning of the next session.

The training relies on methods common to neurocognitive remediation, with participants learning complex skills by first practicing their individual components. Once participants demonstrate a mastery of "building block" skills and concepts, the training exercises move on to more refined, complex variations of the skills that build on what was mastered at an earlier level. Techniques used throughout include massed drill and practice, performance-based increases in task difficulty, use of visual cues to reduce memory load (e.g., auditory and written presentation of vignettes), modeling, scaffolding (trainer-provided instructional support), and verbal mediation (trainees are asked to describe the exercise stimuli out loud and/or are asked to "talk through" what information they used to reach various inferences). USS training progresses from more clear-cut forced-choice or multiple-choice social scenarios to more nuanced, multidimensional scenarios where individuals are encouraged to assess all relevant aspects of a situation and generate their own responses. The difficulty of tasks is further manipulated throughout the training by varying social scenario ambiguity level, valence, and self-relevance. Progress through the training is tailored to individual performance in order to provide an optimal level of challenge while minimizing frustration. Hence, individuals who are performing well on a particular training component are advanced to the next difficulty level, while others are provided with additional exercise opportunities to master a skill before advancing. The training components are listed in the following sections.

Psychoeducation and motivation enhancement. The first one to two sessions focus on providing a rationale for and engaging the trainee in the ensuing training. The trainee is asked to provide examples of difficulties he or she has experienced in social situations, and treatment-related and social functioning goals are collaboratively set. A rationale for and overview of the training content is presented, along with video-clip examples of social situations with negative outcomes and brief discussion of consequences of making and acting on hasty social judgments.

Module 1: Separating social facts from guesses. Content for this module was adapted from Social Cognition Interaction Training (Penn, Roberts, Combs, & Sterne, 2007; Penn et al., 2005; Roberts et al., 2014). The goals of this module are to (a) reinforce the idea that many of the assumptions we make about social situations are only guesses and (b) practice the skill of making more accurate guesses by carefully evaluating the information used to support them. As the exercises begin, the focus is on distinguishing judgments of fact (e.g., the direct perception that a pictured individual is smiling) versus judgments that are guesses (e.g., the inference that a smiling person is experiencing an internal state of happiness). Trainees are shown pictures and asked whether specific statements are factual (e.g., "Is it a fact that the man in the picture has a hat on his head?" or "Is it a fact that the man is thinking about an upcoming meeting?") and asked to justify why the statements are or are not factual (e.g., "I can see the hat" or "I cannot see what he's thinking"). The focus of the training then shifts to examining different types of guesses and whether other facts of the situation make them good or bad guesses. Toward the end of the module, trainees are asked to comprehensively evaluate social scenarios by first generating facts about them and then making good (i.e., supported by facts) guesses about them.

Module 2: Making probability or confidence judgments and not jumping to conclusions about social situations. Some of the content for this module was based on closure or disambiguation tasks used by Moritz and colleagues (Moritz & Woodward, 2007) to assess and treat a bias against disconfirmatory evidence. The goal of this module is to develop skills in evaluating the quality of social guesses based on the type, quality, and facts that do or do not support them. As the exercises begin, trainees practice identifying facts that either do or do not support specific guesses about a social scenario and then assign confidence judgments to different guesses (e.g., when evaluating a photograph of a woman and a policeman standing on a corner and looking at a map, it's a good guess that the woman may be asking for directions). As the module progresses, trainees are asked to evaluate the likely accuracy of guesses made about partially obscured photos and then are asked to rerate the likelihood of these guesses as more information is revealed. Finally, trainees are simply shown social scenarios and asked to make their own high-likelihood guesses.

Module 3: Determining others' mental states and intentions. The exercises in this module were based on the work of Sarfati and colleagues (Kayser, Sarfati, Besche, & Hardy-Bayle, 2006; Sarfati, Hardy-Bayle, Besche, & Widlocher, 1997; Sarfati, Hardy-Bayle, Brunet, & Widlocher, 1999; Sarfati et al., 2000), who showed that verbal elaboration of information presented about social situations increases the accuracy of guesses made about those situations. The goal of this module is to develop skills in using verbal elaboration of facts to more accurately predict future events and to make good guesses about others' thoughts, feelings, and intentions. Trainees are shown a sequence of events and then asked to guess what is most likely to happen next (e.g., shown a photo series of a woman in a sleeveless shirt holding her arms together, close to her torso, it's more likely that she'll next put on a sweater than that she'll take a drink of cold water). Throughout the training, emphasis is on evaluating the scenario and guess options by talking through each component in order to more fully process and integrate relevant information. As the training progresses, stimuli sets become longer and more complex, and trainees are asked to generate their own guesses about the thoughts, feelings, and intentions of characters presented in the social scenarios. In the final level of this module, trainees are presented with social sequences with a negative outcome and are asked to describe what happens in these scenarios, whether they think the negative outcomes were accidental or intentional, and to justify their guesses.

Module 4: Inducing a positive interpretive bias in ambiguous social situations. The exercises in this module were based on the work of Constans, Mathews, Yiend, and colleagues (Constans, Penn, Ihen, & Hope, 1999; Mathews & Barch, 2006; Mathews & Mackintosh, 2000; Yiend, Mackintosh, & Mathews, 2005), who demonstrated that a positive interpretive bias can be induced by presenting what are initially ambiguous social situations and then presenting additional information that disambiguates these scenarios in a positive direction. The goal of the module was for trainees to develop an automatic bias toward interpreting ambiguous social events in a positive manner. Similarly to Constans and colleagues, we presented brief stories wherein the trainees had to complete a word fragment that disambiguated the story to a positive interpretation (e.g., you exit a building behind somebody and they let the door swing shut in your face. They probably didn't [see you]). This was followed by a comprehension question that further reinforced the positive interpretive bias (e.g., Were they trying to be rude to you?).

Data Analysis

Measures of dispersion and distribution were calculated and inspected to assess normality and identify potential outliers. Descriptive statistics were calculated for participant demographic variables. To assess treatment feasibility, summary values were calculated for the number of potential participants who called to inquire about the study, were found eligible based on a brief telephone screen, were found eligible following an in-person intake screening assessment, completed each of the assessments, and completed all treatment sessions. Individuals who dropped out of treatment (those who completed T1 testing but either did not participate in the training intervention or did not participate in the posttraining assessment) were compared to those who remained in the treatment on demographic, neurocognitive, and social–cognitive variables. A *t* test was used to examine potential differences on training task motivation and participant satisfaction ratings between those who completed all training sessions versus those who did not complete all sessions. Tolerability of the intervention was assessed by averaging the participant satisfaction ratings of each of the rated components.

Correlations between the two primary measures of AS were computed to establish if they measure sufficiently similar constructs that they could be combined into a single AS composite score. This process was repeated for the two primary measures of ToM. Pearson correlation was computed between the pretraining MCCB composite score and the USS Skills Test to examine the relationship between baseline cognitive function and pretraining performance on skills taught during the USS intervention. These correlations were repeated for the primary and exploratory social–cognitive measures. Preliminary efficacy was evaluated using three separate indices: paired sample *t* tests comparing the second baseline with posttraining assessments (T2 and T3), Cohen's effect size for within-subject designs (D_{av}), and the Reliable Change Index (RCI; Jacobson & Truax, 1991), with inputted test–retest values based on T1 and T2 test–retest reliability. Due to the preliminary, exploratory nature of these analyses, *p* values were not corrected for multiple comparisons. For the USS Skills Test, because double-baseline data were not obtained and we could not calculate test–retest reliability, the number of improvers was calculated using the Standard Deviation Index (Duff, 2012). In order to examine whether baseline cognition impacted the degree of improvement during USS training, we computed correlations between the T2 MCCB total score (obtained prior to beginning USS training) and the pre-post training changes on the USS Skills Test, primary and exploratory social–cognitive measures. Finally, we tallied the number of individuals who, based on the RCI or Standard Deviation Index, improved on at least one of the outcome measures.

Results

Of 81 individuals who called about the study and were screened by phone, 58 were found eligible and consented. From among these, six screened out during a more comprehensive in-person assessment. Fifty-one and 49 participants, respectively, completed T1 and T2 assessments. Forty-five individuals attended at least one training session, with 39 of them completing all training and the posttraining assessment. One individual repeatedly fell asleep during testing and every training session, and his testing performance was questionable (e.g., impairment greater than 4 standard deviations relative to the current sample on the Hinting Task). This participant was hence excluded from analyses, bringing the final sample size of individuals with posttraining data to 38. Demographic information for these individuals is presented in Table 1.

There were no significant differences on demographic, neurocognitive, or social–cognitive characteristics between individuals who completed the study ($n = 38$) versus those who completed social–cognitive measures at T1 but did not complete the full study ($n = 13$). Comparing those who began USS training sessions but did not complete ($n = 6$) versus those who completed all sessions, there were no significant differences on participant satisfaction ratings or motivation for the training. For individuals who completed the study, average satisfaction ratings are presented in Table 2. Some of the write-in participant comments were "I liked that it made me think things through," "The training opens your eyes to judgments," and "I didn't like realizing most of the facts were actually guesses."

Table 1
Demographics for Study Participants (n = 38)

Measure	*M* (*SD*)
Age	51.74 (8.66)
Education	12.42 (1.94)
WRAT *t* score	41.26 (9.88)
Age at onset	20.68 (10.68)
Number of hospitalizations	6.40 (4.94)
Gender (% male)	61%
Marital status (% never married)	66%
Diagnosis	
Schizophrenia	74%
Schizoaffective disorder	13%
Other disorder with psychotic features	13%
Race	
African American	53%
Caucasian	45%
Hispanic	3%
MCCB total score	29.50 (12.34)
PANSS total score	47.34 (8.18)
Quality of Life Scale total score	72.76 (12.58)
GAF score	40.78 (9.35)

Note. WRAT = Wide Range Achievement Test; MCCB = MATRICS Consensus Cognitive Battery; PANSS = Positive and Negative Syndrome Scale; GAF = Global Assessment of Functioning.

There was a significant relationship between baseline cognitive function (MCCB composite) and pretraining performance on the USS Skills Test ($r = .459$, $p = .007$). The MCCB also significantly correlated with pretraining performance on two of the four primary measures (Hinting: $r = .42$, $p < .05$; Eyes: $r = .46$, $p < .005$; IPSAQ PB: $r = .13$, $p = .45$; AIHQ Ambiguous items: *r*s = −.12 to .10, *ns*) and on the majority of exploratory measures (with the exception of the DACOBS). As the correlations between the two primary ToM measures and the two primary AS measures were low (*r*s = −.05 to .34), performance on all four tasks was evaluated separately. Table 3 presents performance on the primary and exploratory measures at T1 and T2 along with test–retest reliability. Table 4 presents the pre- and postperformance for USS training, along with paired *t* tests, effect sizes for within-subject designs, and information on the number of individuals who improved based on RCI cutoff scores.

There was a significant, large effect size improvement on the USS Skills Test, with significant moderate effect size (ES) improvements on one of the primary AS measures (the AIHQ). Neither of the two primary ToM measures improved significantly, though baseline performance on one of them (the Hinting Task) was near ceiling. On exploratory measures, there was a significant though small effect size improvement on the Comic Strip Task, the Picture Story Task, and the DACOBS. There was no significant

Table 2
USS Training Participant Treatment Satisfaction Ratings

Questions	*M* (*SD*)
Training materials were easy to understand.	3.38 (.46)
I found this training helpful.	3.52 (.43)
I found this training useful.	3.47 (.45)
This training will help me to better understand social situations.	3.57 (.42)
This training will help me to better understand other people.	3.51 (.43)

Note. 1 = *strongly disagree*; 2 = *disagree*; 3 = *agree*; 4 = *strongly agree*.

relationship between baseline cognitive performance, as assessed by the MCCB, and the amount of change on the USS Skills Test or any of the social–cognitive measures. Similarly, none of the specific MCCB neurocognitive domains correlated significantly with the amount of change on the USS Skills Test. Nine of 38 participants (24%) improved on at least one of the four primary outcomes. None improved on all four primary outcomes. Twenty-eight of 38 participants (74%) improved on at least one of the primary and secondary outcomes combined, though none improved on all 16 outcomes.

Discussion

Our findings indicate that the USS training is well tolerated by individuals with schizophrenia spectrum disorders, with little drop-out from the beginning to end of training and high treatment satisfaction ratings. Our participants thought the training was useful and helped them evaluate the complexities that go into making social judgments. There were large improvements on the USS Skills Test, suggesting that we were effective in teaching specific training content. Moreover, the training was associated with medium-sized improvements on one of the primary measures of AS, along with significant, albeit small, treatment signals on three of the exploratory measures. Notably, two of those measures (the Comic Strip Task and the Picture Story Task) tested content and skills very similar to those emphasized by the USS training. Importantly, while pretraining neurocognition was associated with pretraining performance on a majority of our social–cognitive measures, along with the USS Skills Test, baseline cognitive function did not impact the amount of learning, indicating that the training was not less effective for individuals with greater cognitive impairments.

Contrary to initial expectations, we did not find an effect on either of the two primary measures of ToM. Lack of effects on the Hinting Task may have been due to the already relatively high initial performance, with little room for improvement, while for the Eyes Task, lack of improvement may have been due to the high vocabulary demands of the task, which were not targeted during USS training. An alternative explanation (and one that can also be applied to several of the exploratory measures) is that some of our measures were simply too different from the content of the training. While USS narrowly targets foundational ToM skills like fully processing social situations and using concrete evidence to make and evaluate different social judgments, some of our exploratory assessments targeted very different skills, like drawing inferences from indirect verbal cues and subtle facial expressions. The limited overlap between our training and some of these measures highlights the heterogeneity of social cognition and the importance of choosing the right outcome measures—not only ones that purport-

Table 3
Test–Retest Reliability of Social Cognitive Measures at Time 1 and Time 2 (n = 38)

Social cognitive measures	T1 *M* (*SD*)	T2 *M* (*SD*)	Test–retest reliability (T1, T2)
Primary			
USS Skills Test	—	16.25 (1.66)	—
IPSAQ personalizing bias	.57 (.30)	60 (.27)	.66
AIHQ Ambiguous items			
Hostility	1.87 (.50)	1.72 (.44)	.46
Blame	2.96 (1.05)	2.98 (.96)	.52
Aggression	1.57 (.40)	1.51 (.32)	.41
Hinting Task	17.76 (2.35)	18.16 (1.91)	.62
Eyes Task	19.79 (4.91)	21 (5.60)	.71
Exploratory			
TASIT total	46.08 (6.66)	42.55 (6.59)	.70
TASIT Lies	25 (3.47)	25.66 (4.31)	.60
TASIT Sarcasm	21.08 (5.50)	16.89 (5.56)	.50
BLERT total	13.34 (3.84)	13.76 (3.93)	.74
Confidence in correct answers	2.49 (.33)	2.5 (.46)	.55
Confidence in incorrect answers	1.78 (.37)	1.77 (.53)	.49
Comic Strip Task total	19.47 (4.83)	21.16 (5.04)	.78
Brune Picture Story Task	42.61 (9.30)	47.66 (10.09)	.48
DACOBS total[a]	168.92 (38.41)	161.5 (36.73)	.87

Note. USS = Understanding Social Situations; IPSAQ = Internal Personal and Situational Attributions Questionnaire; AIHQ = Ambiguous Intentions Hostility Questionnaire; TASIT = The Awareness of Social Inference Test; BLERT = Bell–Lysaker Emotion Recognition Task; DACOBS = Davos Assessment of Cognitive Biases Scale.
[a] On the DACOBS, lower scores indicate better social cognition.

Table 4
Training Pre- and Postperformance on Social Cognitive Measures (n = 38)

Social cognitive measures	T2 *M* (*SD*)	T3 Posttraining *M* (*SD*)	Paired *t* test (T2, T3)[a]	Cohen's D_{av}	Number and percentage of improvers based on RCI
Primary					
USS Skills Test	16.25 (1.66)	18.78 (2.07)	**−7.56, *p* < .001**	1.35	13/34, 38%[b]
IPSAQ personalizing bias	60 (.27)	.55 (.29)	1.42, *p* = .164	.18	3/38, 8%
AIHQ Ambiguous items					
Hostility	1.72 (.44)	1.46 (.41)	**3.54, *p* = .001**	.60	3/38, 8%
Blame	2.98 (.96)	2.46 (.80)	**3.61, *p* = .001**	.59	12/38, 32%
Aggression	1.51 (.32)	1.44 (.36)	1.23, *p* = .226	.21	2/38, 5%
Hinting Task	18.16 (1.91)	18.16 (2.06)	0, *p* = 1.00	0	0/38, 0%
Eyes Task	21 (5.60)	20.68 (5.45)	.61, *p* = .55	.06	0/38, 0%
Exploratory					
TASIT total	42.55 (6.59)	41.26 (6.78)	1.65, *p* = .107	.19	0/38, 0%
TASIT Lies	25.66 (4.31)	25.61 (3.85)	.09, *p* = .933	.01	2/38, 5%
TASIT Sarcasm	16.89 (5.56)	15.92 (5.41)	1.44, *p* = .159	.18	2/38, 5%
BLERT total	13.76 (3.93)	14.42 (3.78)	−1.62, *p* = .114	.17	4/38, 11%
Confidence in correct answers	2.5 (.46)	2.37 (.49)	−1.88, *p* = .068	.27	9/38, 24%
Confidence in incorrect answers	1.77 (.53)	1.92 (.58)	−1.58, *p* = .122	.27	6/37, 16%
Comic Strip Task total	21.16 (5.04)	22.21 (4.77)	**−2.04, *p* = .048**	.21	3/38, 8%
Brune Picture Story Task	47.66 (10.09)	50.90 (8.79)	**−2.43, *p* = .020**	.34	2/38, 5%
DACOBS total	161.5 (36.73)	152.71 (37.95)	**2.17, *p* = .037**	.24	5/38, 13%

Note. RCI = Reliable Change Index; USS = Understanding Social Situations; IPSAQ = Internal Personal and Situational Attributions Questionnaire; AIHQ = Ambiguous Intentions Hostility Questionnaire; TASIT = The Awareness of Social Inference Test; BLERT = Bell–Lysaker Emotion Recognition Task; DACOBS = Davos Assessment of Cognitive Biases Scale. Bolded significance values indicate those significant at $p < .05$.
[a] For paired *t* tests, data were missing for one BLERT confidence rating and three USS Skills Tests. [b] Because test–retest reliability was not available for the USS Skills Test, the Standard Deviation Index was used to determine whether change reached the significance threshold.

edly assess the same molar social–cognitive construct as that being trained but also that actually capture the specific facets of the domain that are being trained. While we need to be mindful of not just "training to the test," at the same time we need to consider to what extent a measure assesses the specific types of skills taught during the intervention. This problem is also highlighted by the fact that neither our primary measures of ToM nor of AS were significantly correlated with one another.

Another methodological consideration for treatment trial design is the quality of the measures used. Our double-baseline design allowed us to assess the test–retest reliability of multiple social–cognitive measures. Unfortunately, only a few reached the commonly accepted threshold of $r \geq .70$. Any conclusions we could draw about the preliminary efficacy of USS are severely limited by this. The problem of inadequate or limited psychometric information about social–cognitive measures has been recognized by the scientific community (Green et al., 2008), and efforts are under way to remedy this hurdle to ongoing development and validation of social–cognitive interventions (Pinkham et al., 2014; Pinkham, Penn, Green, & Harvey, 2016).

As this was an open, uncontrolled, proof-of concept trial, typical limitations of such trials should be kept in mind (e.g., potential practice effects, cohort or historical effects, impact of adjunctive treatments, random noise). Moreover, we are not able to determine whether the promising effects of USS are due to the specific treatment delivery methods, the training content itself, or a combination of the two.

In summary, the USS intervention was well tolerated, and the large and significant improvement in knowledge of training content, along with the lack of impact of baseline cognition on improvement in content knowledge, suggest that USS shows promise as a treatment for higher level skills in individuals with lower cognitive function. Of course, while our preliminary efficacy data are encouraging, the key to subsequent trials will be the development of psychometrically sound, sensitive measures that adequately capture targeted skills. Further development of this treatment, keeping in mind the end goal of improving social function, will quite likely require more intense training incorporating bridging work, including homework assignments and practice of skills in everyday settings. Finally, while the current USS intervention narrowly targets specific components of ToM and AS, further modules could be developed to target additional facets of these domains, including, though not limited to, detection of lies, sarcasm, faux pas, and second- and third-order ToM skills.

References

Baron-Cohen, S., Wheelwright, S., Hill, J., Raste, Y., & Plumb, I. (2001). The "Reading the Mind in the Eyes" Test revised version: A study with normal adults, and adults with Asperger syndrome or high-functioning autism. *Journal of Child Psychology and Psychiatry, 42,* 241–251. http://dx.doi.org/10.1111/1469-7610.00715

Bechi, M., Spangaro, M., Bosia, M., Zanoletti, A., Fresi, F., Buonocore, M., . . . Cavallaro, R. (2013). Theory of Mind intervention for outpatients with schizophrenia. *Neuropsychological Rehabilitation, 23,* 383–400. http://dx.doi.org/10.1080/09602011.2012.762751

Bell, M., Bryson, G., & Lysaker, P. (1997). Positive and negative affect recognition in schizophrenia: A comparison with substance abuse and normal control subjects. *Psychiatry Research, 73*(1–2), 73–82. http://dx.doi.org/10.1016/S0165-1781(97)00111-X

Bora, E., Yucel, M., & Pantelis, C. (2009). Theory of mind impairment in schizophrenia: Meta-analysis. *Schizophrenia Research, 109,* 1–9. http://dx.doi.org/10.1016/j.schres.2008.12.020

Brüne, M. (2005). Emotion recognition, 'theory of mind,' and social behavior in schizophrenia. *Psychiatry Research, 133*(2–3), 135–147. http://dx.doi.org/10.1016/j.psychres.2004.10.007

Brunet, E., Sarfati, Y., & Hardy-Baylé, M. C. (2003). Reasoning about physical causality and other's intentions in schizophrenia. *Cognitive Neuropsychiatry, 8,* 129–139. http://dx.doi.org/10.1080/13546800244000256

Choi, J., Mogami, T., & Medalia, A. (2010). Intrinsic Motivation Inventory: An adapted measure for schizophrenia research. *Schizophrenia Bulletin, 36,* 966–976. http://dx.doi.org/10.1093/schbul/sbp030

Combs, D. R., Penn, D. L., Wicher, M., & Waldheter, E. (2007). The Ambiguous Intentions Hostility Questionnaire (AIHQ): A new measure for evaluating hostile social-cognitive biases in paranoia. *Cognitive Neuropsychiatry, 12,* 128–143. http://dx.doi.org/10.1080/13546800600787854

Constans, J. I., Penn, D. L., Ihen, G. H., & Hope, D. A. (1999). Interpretive biases for ambiguous stimuli in social anxiety. *Behaviour Research and Therapy, 37,* 643–651. http://dx.doi.org/10.1016/S0005-7967(98)00180-6

Corcoran, R., Mercer, G., & Frith, C. D. (1995). Schizophrenia, symptomatology and social inference: Investigating "theory of mind" in people with schizophrenia. *Schizophrenia Research, 17,* 5–13. http://dx.doi.org/10.1016/0920-9964(95)00024-G

Couture, S. M., Penn, D. L., & Roberts, D. L. (2006). The functional significance of social cognition in schizophrenia: A review. *Schizophrenia Bulletin, 32*(Suppl. 1), S44–S63. http://dx.doi.org/10.1093/schbul/sbl029

Duff, K. (2012). Evidence-based indicators of neuropsychological change in the individual patient: Relevant concepts and methods. *Archives of Clinical Neuropsychology, 27,* 248–261. http://dx.doi.org/10.1093/arclin/acr120

Fanning, J. R., Bell, M. D., & Fiszdon, J. M. (2012). Is it possible to have impaired neurocognition but good social cognition in schizophrenia? *Schizophrenia Research, 135,* 68–71. http://dx.doi.org/10.1016/j.schres.2011.12.009

Fett, A.-K. J., Viechtbauer, W., Dominguez, M. D., Penn, D. L., van Os, J., & Krabbendam, L. (2011). The relationship between neurocognition and social cognition with functional outcomes in schizophrenia: A meta-analysis. *Neuroscience and Biobehavioral Reviews, 35,* 573–588. http://dx.doi.org/10.1016/j.neubiorev.2010.07.001

First, M. B., Spitzer, R. L., Gibbon, M., & Williams, J. B. (1996). *Structured Clinical Interview for DSM–IV Axis I Disorders—Patient Edition (SCID–I/P, Version 2.0)*. New York, NY: Biometrics Research Department, New York State Psychiatric Institute.

Fiszdon, J. M. (2013). Introduction to social cognitive treatment approaches for schizophrenia. In D. L. Roberts & D. L. Penn (Eds.), *Social cognition in schizophrenia: From evidence to treatment* (pp. 285–310). New York, NY: Oxford University Press. http://dx.doi.org/10.1093/med:psych/9780199777587.003.0012

Fiszdon, J. M., & Reddy, L. F. (2012). Review of social cognitive treatments for psychosis. *Clinical Psychology Review, 32,* 724–740. http://dx.doi.org/10.1016/j.cpr.2012.09.003

Freeman, D., Startup, H., Dunn, G., Černis, E., Wingham, G., Pugh, K., . . . Kingdon, D. (2014). Understanding jumping to conclusions in patients with persecutory delusions: Working memory and intolerance of uncertainty. *Psychological Medicine, 44,* 3017–3024. http://dx.doi.org/10.1017/S0033291714000592

Garety, P., Joyce, E., Jolley, S., Emsley, R., Waller, H., Kuipers, E., . . . Freeman, D. (2013). Neuropsychological functioning and jumping to conclusions in delusions. *Schizophrenia Research, 150,* 570–574.

Garety, P., Waller, H., Emsley, R., Jolley, S., Kuipers, E., Bebbington, P., . . . Freeman, D. (2015). Cognitive mechanisms of change in delusions: An experimental investigation targeting reasoning to effect change in paranoia. *Schizophrenia Bulletin, 41,* 400–410. http://dx.doi.org/10.1093/schbul/sbu103

Green, M. F., Penn, D. L., Bentall, R., Carpenter, W. T., Gaebel, W., Gur, R. C., . . . Heinssen, R. (2008). Social cognition in schizophrenia: An NIMH workshop on definitions, assessment, and research opportunities. *Schizophrenia Bulletin, 34,* 1211–1220. http://dx.doi.org/10.1093/schbul/sbm145

Greig, T. C., Bryson, G. J., & Bell, M. D. (2004). Theory of Mind performance in schizophrenia: Diagnostic, symptom, and neuropsychological correlates. *Journal of Nervous and Mental Disease, 192,* 12–18. http://dx.doi.org/10.1097/01.nmd.0000105995.67947.fc

Heinrichs, D. W., Hanlon, T. E., & Carpenter, W. T., Jr. (1984). The Quality of Life Scale: An instrument for rating the schizophrenic deficit syndrome. *Schizophrenia Bulletin, 10,* 388–398. http://dx.doi.org/10.1093/schbul/10.3.388

Jacobson, N. S., & Truax, P. (1991). Clinical significance: A statistical approach to defining meaningful change in psychotherapy research. *Journal of Consulting and Clinical Psychology, 59,* 12–19. http://dx.doi.org/10.1037/0022-006X.59.1.12

Jastak, J., & Wilkenson, G. (1993). *Wide Range Achievement Test 3*. Lutz, FL: Psychological Assessment Resources.

Kay, S. R., Fiszbein, A., & Opler, L. A. (1987). The Positive and Negative Syndrome Scale (PANSS) for schizophrenia. *Schizophrenia Bulletin, 13,* 261–276. http://dx.doi.org/10.1093/schbul/13.2.261

Kayser, N., Sarfati, Y., Besche, C., & Hardy-Baylé, M. C. (2006). Elaboration of a rehabilitation method based on a pathogenetic hypothesis of "theory of mind" impairment in schizophrenia. *Neuropsychological Rehabilitation, 16,* 83–95. http://dx.doi.org/10.1080/09602010443000236

Kinderman, P., & Bentall, R. (1996). A new measure of causal locus: The Internal, Personal and Situational Attributions Questionnaire. *Personality and Individual Differences, 20,* 261–264. http://dx.doi.org/10.1016/0191-8869(95)00186-7

Koren, D., Seidman, L. J., Goldsmith, M., & Harvey, P. D. (2006). Real-world cognitive—and metacognitive—dysfunction in schizophrenia: A new approach for measuring (and remediating) more "right stuff." *Schizophrenia Bulletin, 32,* 310–326. http://dx.doi.org/10.1093/schbul/sbj035

Kurtz, M. M., & Richardson, C. L. (2012). Social cognitive training for schizophrenia: A meta-analytic investigation of controlled research. *Schizophrenia Bulletin, 38,* 1092–1104. http://dx.doi.org/10.1093/schbul/sbr036

Mancuso, F., Horan, W. P., Kern, R. S., & Green, M. F. (2011). Social cognition in psychosis: Multidimensional structure, clinical correlates, and relationship with functional outcome. *Schizophrenia Research, 125*(2–3), 143–151. http://dx.doi.org/10.1016/j.schres.2010.11.007

Mathews, A., & Mackintosh, B. (2000). Induced emotional interpretation bias and anxiety. *Journal of Abnormal Psychology, 109,* 602–615. http://dx.doi.org/10.1037/0021-843X.109.4.602

Mathews, J. R., & Barch, D. M. (2006). Episodic memory for emotional and non-emotional words in individuals with anhedonia. *Psychiatry Research, 143*(2–3), 121–133. http://dx.doi.org/10.1016/j.psychres.2005.07.030

McDonald, S., Flanagan, S., & Rollins, J. (2002). *The Awareness of Social Inference Test*. Suffolk, England: Thames Valley Test.

Moritz, S., & Woodward, T. S. (2007). Metacognitive training for schizophrenia patients (MCT): A pilot study on feasibility, treatment adherence, and subjective efficacy. *German Journal of Psychiatry, 10,* 69–78.

Moritz, S., Woznica, A., Andreou, C., & Köther, U. (2012). Response confidence for emotion perception in schizophrenia using a Continuous Facial Sequence Task. *Psychiatry Research, 200,* 202–207. http://dx.doi.org/10.1016/j.psychres.2012.07.007

Nuechterlein, K. H., Barch, D. M., Gold, J. M., Goldberg, T. E., Green, M. F., & Heaton, R. K. (2004). Identification of separable cognitive factors in schizophrenia. *Schizophrenia Research, 72,* 29–39. http://dx.doi.org/10.1016/j.schres.2004.09.007

Ochoa, S., Haro, J. M., Huerta-Ramos, E., Cuevas-Esteban, J., Stephan-Otto, C., Usall, J., . . . Brebion, G. (2014). Relation between jumping to conclusions and cognitive functioning in people with schizophrenia in contrast with healthy participants. *Schizophrenia Research, 159,* 211–217. http://dx.doi.org/10.1016/j.schres.2014.07.026

Penn, D. L., Corrigan, P. W., Bentall, R. P., Racenstein, J. M., & Newman, L. (1997). Social cognition in schizophrenia. *Psychological Bulletin, 121,* 114–132. http://dx.doi.org/10.1037/0033-2909.121.1.114

Penn, D. L., Roberts, D. L., Combs, D., & Sterne, A. (2007). Best practices: The development of the Social Cognition and Interaction Training program for schizophrenia spectrum disorders. *Psychiatric Services, 58,* 449–451. http://dx.doi.org/10.1176/ps.2007.58.4.449

Penn, D., Roberts, D. L., Munt, E. D., Silverstein, E., Jones, N., & Sheitman, B. (2005). A pilot study of Social Cognition and Interaction Training (SCIT) for schizophrenia. *Schizophrenia Research, 80*(2–3), 357–359. http://dx.doi.org/10.1016/j.schres.2005.07.011

Penn, D. L., Sanna, L. J., & Roberts, D. L. (2008). Social cognition in schizophrenia: An overview. *Schizophrenia Bulletin, 34,* 408–411. http://dx.doi.org/10.1093/schbul/sbn014

Pinkham, A. E., Penn, D. L., Green, M. F., Buck, B., Healey, K., & Harvey, P. D. (2014). The Social Cognition Psychometric Evaluation study: Results of the expert survey and RAND panel. *Schizophrenia Bulletin, 40,* 813–823. http://dx.doi.org/10.1093/schbul/sbt081

Pinkham, A. E., Penn, D. L., Green, M. F., & Harvey, P. D. (2016). Social Cognition Psychometric Evaluation: Results of the initial psychometric study. *Schizophrenia Bulletin, 42,* 494–504. http://dx.doi.org/10.1093/schbul/sbv056

Randall, F., Corcoran, R., Day, J. C., & Bentall, R. P. (2003). Attention, theory of mind, and causal attributions in people with persecutory delusions: A preliminary investigation. *Cognitive Neuropsychiatry, 8,* 287–294. http://dx.doi.org/10.1080/135468000057

Roberts, D. L., Combs, D. R., Willoughby, M., Mintz, J., Gibson, C., Rupp, B., & Penn, D. L. (2014). A randomized, controlled trial of Social Cognition and Interaction Training (SCIT) for outpatients with schizophrenia spectrum disorders. *British Journal of Clinical Psychology, 53,* 281–298. http://dx.doi.org/10.1111/bjc.12044

Roberts, D. L., & Velligan, D. I. (2012). Can social functioning in schizophrenia be improved through targeted social cognitive intervention? *Rehabilitation Research and Practice, 2012,* 1–8. http://dx.doi.org/10.1155/2012/742106

Sarfati, Y., Brunet, E., & Hardy-Bayle, M. C. (2003). *Comic-Strip Task: Attribution of intentions to others*. Le Chesnay, France: Hospital Versailles.

Sarfati, Y., Hardy-Baylé, M. C., Besche, C., & Widlöcher, D. (1997). Attribution of intentions to others in people with schizophrenia: A non-verbal exploration with comic strips. *Schizophrenia Research, 25,* 199–209. http://dx.doi.org/10.1016/S0920-9964(97)00025-X

Sarfati, Y., Hardy-Baylé, M. C., Brunet, E., & Widlöcher, D. (1999). Investigating theory of mind in schizophrenia: Influence of verbalization in disorganized and non-disorganized patients. *Schizophrenia Research, 37,* 183–190. http://dx.doi.org/10.1016/S0920-9964(98)00154-6

Sarfati, Y., Passerieux, C., & Hardy-Baylé, M. (2000). Can verbalization remedy the theory of mind deficit in schizophrenia? *Psychopathology, 33,* 246–251. http://dx.doi.org/10.1159/000029153

Savla, G. N., Vella, L., Armstrong, C. C., Penn, D. L., & Twamley, E. W. (2013). Deficits in domains of social cognition in schizophrenia: A meta-analysis of the empirical evidence. *Schizophrenia Bulletin, 39,* 979–992. http://dx.doi.org/10.1093/schbul/sbs080

Schmidt, S. J., Mueller, D. R., & Roder, V. (2011). Social cognition as a mediator variable between neurocognition and functional outcome in schizophrenia: Empirical review and new results by structural equation modeling. *Schizophrenia Bulletin, 37*(Suppl. 2), S41–S54. http://dx.doi.org/10.1093/schbul/sbr079

Taylor, J. L., & Kinderman, P. (2002). An analogue study of attributional complexity, theory of mind deficits and paranoia. *British Journal of Psychology, 93,* 137–140. http://dx.doi.org/10.1348/000712602162481

van der Gaag, M., Schütz, C., Ten Napel, A., Landa, Y., Delespaul, P., Bak, M., . . . de Hert, M. (2013). Development of the Davos Assessment of Cognitive Biases Scale (DACOBS). *Schizophrenia Research, 144,* 63–71. http://dx.doi.org/10.1016/j.schres.2012.12.010

Yiend, J., Mackintosh, B., & Mathews, A. (2005). Enduring consequences of experimentally induced biases in interpretation. *Behaviour Research and Therapy, 43,* 779–797. http://dx.doi.org/10.1016/j.brat.2004.06.007

Received September 8, 2015
Revision received March 9, 2016
Accepted April 1, 2016 ■