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Assessment of Social Judgments and Complex Mental States in the Early Phases of Psychosis

Shannon M. Couture^{a,1*}, David L. Penn^a, Jean Addington^b, Scott W. Woods^c, and Diana O. Perkins^d

^aUniversity of North Carolina at Chapel Hill, Department of Psychology, CB#3270, Davie hall, Chapel Hill, NC 27599-3270 USA

^bUniversity of Toronto and the Centre for Addiction and Mental Health, 250 College Street, Toronto, Ontario, M5T 1R8, Canada. Email: jean_addington@camh.net

^cYale University, Department of Psychiatry, CMHC B38, 34 Park Street, New Haven, CT 06511 USA. Email: scott.woods@yale.edu

^dUniversity of North Carolina at Chapel Hill, Department of Psychiatry, 252 Medical School Wing D, CB#7160, Chapel Hill, NC 27599-7160 USA. Email: Diana_perkins@med.unc.edu

Abstract

Objectives—Social cognition plays an important role in the functioning of individuals with psychosis. In this study, we explored two areas of social cognition not previously investigated early in the course of psychosis.

Method—Eighty-eight clinical high risk participants, 26 participants diagnosed with schizophrenia for less than 5 years, and 41 non-clinical control participants completed two measures of social cognition.

Results—Clinical high risk participants demonstrated biased responses to untrustworthy faces compared to both of the other groups. Early schizophrenia participants performed more poorly on an advanced theory of mind task compared to the clinical high risk and control groups.

Conclusions— There are different patterns of performance on social cognitive tasks in these groups, which require further examination in longitudinal studies.

Keywords

schizophrenia; social cognition; prodrome; social judgment; theory of mind

1. Introduction

Social cognition has been identified as an important contributing factor to social dysfunction in psychosis, particularly in chronic schizophrenia (Couture et al., 2006). There is also clear evidence of social difficulties in individuals recently diagnosed with psychosis and in those who are identified as clinically “high risk” (i.e., those who meet Criteria of Prodromal States,

*Corresponding author. Email: Shannon.Couture@manchester.ac.uk, Tel: 44(0)1613060421, Fax: 44(0)1613060406.

¹Present and permanent address: University of Manchester, Division of Clinical Psychology, Second Floor, Zochonis Building, Brunswick Street, Manchester M13 9PL United Kingdom. Email: Shannon.Couture@manchester.ac.uk

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see Yung et al., 1998; Miller et al., 1999) for developing psychosis (e.g., Ballon et al., 2007; Pinkham et al., 2007). However, despite these social problems, less is known about the nature of social cognitive deficits in the early phases of psychosis.

The few studies that have examined social cognition in first-episode psychosis support the notion of a deficit in facial affect perception and vocal affect perception relative to controls (Addington et al., in press; Addington et al., 2006a; Edwards et al., 2001; Herbener et al., 2005; Kucharska-Pietura et al., 2005; Pinkham et al., 2007). The evidence is currently mixed on comparisons between first-episode and chronic participants, with some studies finding evidence for a comparable deficit (Addington et al., in press; Addington et al., 2006a; Pinkham et al., 2007), and others suggesting that participants with chronic schizophrenia perform most poorly (Kucharska-Pietura et al., 2005). One study also found evidence for impaired social perception (Addington et al., 2006b), and others for theory of mind deficits (Bertrand et al., 2007; Inoue et al., 2006) in individuals with a first episode of psychosis compared to non-clinical controls (NCC).

In studies examining individuals at clinical high risk (CHR) for psychosis, findings typically support a subtle deficit in CHR participants, with their performance on affect perception and theory of mind tasks falling in between first episode and NCC participants, without differing from either group (Addington et al., in press; Pinkham et al., 2007).

The purpose of the current study was to expand upon previous research by examining new areas of social cognition (i.e., advanced theory of mind and complex social judgments) in those at CHR and in individuals early in the time course of psychosis (i.e., ill less than 5 years).

2. Methods

2.1 Participants

The sample consisted of 88 CHR individuals, 26 individuals early in schizophrenia-spectrum illness (ES), and 41 NCC. Participants provided informed consent and the protocol was approved by the Institutional Review Boards at each university.

2.1.1 CHR Participants—All CHR participants were recruited from the three sites in the PREDICT study: the University of Toronto (n=36), the University of North Carolina at Chapel Hill (UNC) (n=33), and Yale University (n=19). CHR participants met the Criteria of Prodromal States (COPS) based on the Structured Interview for Prodromal Symptoms (SIPS; Miller et al., 2003). All participants met Attenuated Positive Symptom State Criteria, which included the emergence or worsening of non-psychotic disturbance of thought content, thought process, or perceptual abnormality over the past year. All relevant study staff completed a rater training program developed at Yale University. On the SIPS, the kappa was greater than 0.80 at all sites and the overall kappa was 0.90. In addition, all sites participated in weekly conference calls chaired by JA to achieve consensus diagnosis for every CHR case admitted to the study.

2.1.2 ES Participants—ES participants were recruited from a broader study examining neurocognition and social cognition in schizophrenia and autism at UNC. The Structured Clinical Interview for DSM-IV Axis I Diagnosis – Patient Version (SCID-P; First et al., 1995) was used to confirm diagnosis. Research assistants were trained on the SCID-P to high reliability by one of the authors (DLP; ICC>0.80). Diagnosis was also verified from documented medical records. Participants were excluded if they met current criteria for substance abuse or dependence, had a prior head injury, or an IQ<70 as assessed by the Wechsler Abbreviated Scale for Intelligence (Wechsler, 1999).

2.1.3 NCC Participants—NCC participants took part in the same study as ES participants. They were recruited from the community via mailings, mass emails, and postings. Participants in this group could not meet criteria for any current Axis I disorder, nor have relatives with autism, schizophrenia, Down’s syndrome, or Fragile X Syndrome.

2.1.4 Demographic Characteristics—Demographic characteristics for the 3 groups are displayed in Table 1. CHR participants were younger, and had a lower percentage of men and high school completers than the other two groups. The low percentage of women in the ES and NCC groups is reflective of recruiting these participants for matched comparison to an autism (i.e., high percentage of males) sample. The two clinical groups differed only on negative symptoms, with the ES group having more negative symptoms.

2.2 Measures and Procedures

2.2.1 Social Judgments—The Abbreviated Trustworthiness Task assesses complex social judgments (Adolphs et al., 1998). Participants were shown 42 faces of unfamiliar people and were asked to imagine they had to trust the pictured person with their money or with their life. They rated how much they would trust the person on a 7-point scale, ranging from -3 (very untrustworthy) to $+3$ (very trustworthy). The most trustworthy (top third/a score greater than $+1$) and least trustworthy faces (bottom third/a score less than -1) according to Adolphs’ normative scores were used to form 2 scales: the average rating on “trustworthy” faces and the average rating on “untrustworthy” faces. Adolphs and colleagues have scored the measure in this manner and found different biases between the two ends of the continuum in individuals with bilateral amygdala damage and in those with high-functioning autism (both groups provide more positive ratings to untrustworthy faces; Adolphs et al., 1998; Adolphs et al., 2001).

2.2.2. Complex Mental States—The Eyes Task was designed to assess adult theory of mind abilities (Baron-Cohen et al., 2001). Participants were shown a pair of eyes and asked to choose among 4 words the one that best describes what the person is thinking or feeling. The percentage of correct responses was used as a summary score for this measure, consistent with previous research.

2.2.3. Symptoms—The Positive and Negative Syndrome Scale (PANSS; Kay et al., 1987) was used with CHR and ES participants to assess the severity of symptoms.

2.2.4. Statistical Analysis—Given differences in age, education, and a marginal difference in ethnic composition of the 3 groups, they were included as covariates in the main analyses. Analysis of Covariance (ANCOVA) was performed for each social cognitive task, and, if significant, followed-up by Bonferroni comparisons. These analyses were then repeated controlling for the effect of gender, and then again with only males, given the gender differences across samples. Finally, Pearson’s correlations were computed for the symptom and social cognitive measures to assess any potential relationships. All variables met assumptions required for parametric tests.

3. Results

All results are presented in Table 1. For the Trustworthy Faces, there were no significant differences among the groups on trustworthy ratings. In contrast, there was a statistically significant group effect on Untrustworthy Faces. Post-hoc Bonferroni comparisons indicated the CHR group rated untrustworthy faces significantly more positively than the control group ($p < .05$), with the ES group falling in between the CHR and control groups but not significantly different from either one. Finally, for the Eyes Test, the effect of group was also significant.

Post-hoc comparisons revealed the CHR and NCC groups did not differ from each other ($p=.634$), but the ES group performed worse on the Eyes Test than both groups ($p<.05$ for both contrasts). These results were unchanged when the analyses were repeated controlling for gender or with males only.

The correlations among the 3 symptom subscales of the PANSS and the social cognition tasks were examined both within group (ES and CHR separately) and aggregating across group; none of the correlations were statistically significant.

4. Discussion

The aim of this study was to extend previous research investigating social cognition in early psychosis and CHR groups. Neither theory of mind nor social judgments have received much attention in these groups. It is important to investigate these constructs as improving understanding of social cognitive abilities early in illness course can highlight potential treatment targets and illness vulnerability markers. On a test of advanced ToM (the Eyes Test), only ES participants demonstrated impaired performance. These results suggest that perception of complex mental states is not a vulnerability marker for schizophrenia. However, it is important to note that not all individuals at CHR will develop a psychotic disorder. Thus, these results need to be supplemented with longitudinal analyses.

On a task requiring participants to make social judgments about unfamiliar faces, those at CHR showed a bias whereby they rated untrustworthy faces as more trustworthy relative to NCC participants, but neither group differed from the ES participants. This finding is consistent with limited evidence suggesting subtle social cognitive deficits in those at CHR (Addington et al., in press). Although it may seem counterintuitive that those at CHR provide more biased ratings of trustworthiness compared to ES participants, it should be noted that it is not necessary for vulnerability or risk for psychosis (or any condition) to be stable and immutable. Indeed, Just and colleagues (2001) note in regard to cognitive vulnerability for depression, one might expect some variability to occur across illness course due to a variety of factors such as stress, previous experiences being ill, and life experience which occur both dependently and independently of illness. Judgments of trustworthiness in particular involve analysis of multiple sources of information, including facial expression and comparison of the presented face with those in prior experiences with similar-looking individuals. Thus, these complexities may result in ratings of trustworthiness to be vulnerable to change. Longitudinal studies of this construct aimed at predicting illness course and severity would shed further light on this issue.

In contrast, neither clinical group was biased in their ratings of trustworthy faces. This is consistent with previous findings showing that positive affect, particularly happiness, is easier to detect than negative emotions (e.g., Gosselin et al., 1995).

There was also a notable lack of a relationship between symptoms and social cognitive performance. There has been mixed evidence whether social cognition and symptoms are related, with some studies finding support for a relationship with negative or disorganized symptoms (Edwards et al., 2001; Greig et al., 2004; Herbener et al., 2005; Sprong et al., 2007) whereas others fail to find a relationship with any symptoms (Bertrand et al., 2007; Bora et al., 2006; Inoue et al., 2006; Kucharska-Pietura et al., 2005). One possible explanation for these discrepancies is the different symptom rating scales and social cognitive measures used across studies as well as varying methods of assessing this relationship (i.e., correlational analysis versus symptom subtyping). Efforts such as the MATRICS initiative (see Green et al., 2005) may help elucidate this subject further.

One major limitation of the current study concerns the low number of women in the ES and control samples due to the unavoidable recruiting needs in the larger study from which the data

were collected. However, there has been no evidence for the influence for gender on trustworthiness ratings in the normative sample used for its development (Adolphs et al., 1998). In addition, although there is some evidence for gender differences on the Eyes Task in individuals with high-functioning autism or their relatives (Baron-Cohen et al., 2001; Losh & Piven, 2007), these differences do not exist in bipolar patients (Bora et al., 2005), or in relatives of schizophrenia patients (Kelemen et al., 2004). Furthermore, a recent meta-analysis of theory of mind showed that gender did not alter the effect size of patient-control differences in these abilities (Sprong et al., 2007). Finally, in the current study results were not altered by controlling for the effect of gender or removing women from the analysis.

In sum, these cross-sectional results suggest that understanding social cognition prior to illness onset, and early in the course of the disorder, may vary depending on the content of the task as well as the nature of task demands. This underscores that social cognition is not a unilateral construct and that vulnerability may be a reflection of tendencies to respond to social stimuli in a certain way, rather than getting them “right or wrong”. Larger social cognitive batteries as well as longitudinal designs will help to address this issue.

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Table 1
Demographic, Clinical and Social Cognitive Characteristics

	CHR N=88	ES N=26	NCC N=41	Significance Test
Demographic Characteristics				
Age: mean (SD)	18.9 (4.6) ^a	24.9 (5.1)	23.0 (5.9)	$F=18.57^{**}$
% male	57% ^a	88%	93%	$\chi^2=22.1^{**}$
% completed high school	56%	85%	73%	$\chi^2=9.0^*$
Race:				$\chi^2=8.8$, NS
Caucasian	88%	69%	89%	
African-American	7%	27%	8%	
Other	5%	4%	3%	
Symptoms				
PANSS positive symptoms	12.4 (2.67)	13.5 (3.49)	N/A	$t=1.55$, NS
PANSS negative symptoms	11.7 (4.82)	14.4 (4.48)	N/A	$t=2.42^*$
PANSS general symptoms	26.1 (5.25)	26.8 (5.97)	N/A	$t=.474$, NS
Social Cognition				
				Test for Group
Trustworthy Faces	1.28 (.77)	1.46 (.82)	1.34 (.66)	$F=.050$, NS
Untrustworthy Faces	-.70 (.84) ^b	-.86 (.87)	-1.21(.54) ^b	$F=4.03^*$
Eyes percent correct	69.6 (13.8)	62.7 (13.7) ^a	68.8(14.0)	$F=6.31^{**}$

Note. NS=Not significant;

*
p<.05;

**
p<.01.

^a significantly different from all other groups;

^b significantly different from each other; Trustworthy and untrustworthy faces are mean ratings in response to faces based on a -3 (very untrustworthy) to +3 (very trustworthy) scale, Eyes Test is expressed in percentage correct.