

Social Cognition in Schizophrenia: An Overview

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The purpose of this column is to provide an overview of social cognition in schizophrenia. The column begins with a short introduction to social cognition. Then, we describe the application of social cognition to the study of schizophrenia, with an emphasis on key domains (i.e., emotion perception, Theory of Mind, and attributional style). We conclude the column by discussing the relationship of social cognition to neurocognition, negative symptoms, and functioning, with an eye toward strategies for improving social cognition in schizophrenia.

Key words: social cognition/attributions/emotion perception/theory of mind/functional outcome

What Is Social Cognition?

Social cognition refers to how people think about themselves and others in the social world. The term originated within social psychology during the general “cognitive revolution”¹ of the late 1960s and early 1970s. The social cognition construct provides a broad theoretical perspective that focuses on how people process information within social contexts. It includes person perception, causal attributions concerning self and others, and bringing social judgments to decision making, among other elements.^{2–5}

Social cognition research shares 4 common features.³ The first is an unabashed *mentalism*, a focus on mental representations such as “schemas.” These are organized sets of ideas, such as a person’s conceptualization of oneself, attitudes toward racial groups, or notions about the physical properties of the external world. Once schemas are activated and accessible, they have far-reaching consequences, such as when inferring whether someone is

friendly or when deciding whether to continue a romantic relationship.

Researchers have also shown that “metacognitive” experiences are critical to people’s mental representations.⁶ These are subjective experiences that accompany schemas, such as the ease or difficulty of recall or association. For example, if one attempts to retrieve examples supporting another’s trustworthiness but finds this subjectively difficult to accomplish, one may instead infer that the other is *untrustworthy*. Reliance on metacognitive experience for making judgments is heightened under conditions of relatively limited cognitive resources (eg, distraction, load, or working memory deficits)⁷ that are common in schizophrenia. Thus, this process has paradoxical implications for the common technique of “generating alternatives” used in cognitive therapy for psychosis. For example, an individual may report that he saw a black car in front of his house and is therefore certain that the Central Intelligence Agency is after him. This will lead the therapist to suggest that the individual think of other possible reasons why the car may be parked there. However, cognitive deficits may make this such an effortful process for the individual that, even if he can generate other possibilities, he may conclude that the belief must be true (because the other reasons do not readily come to mind), further entrenching his delusion. Thus, research on metacognition suggests that clinicians may need to strike a balance between asking them to think flexibly about situations but not to the extent that the process becomes effortful, aversive, and countertherapeutic.

A second common feature is that social cognition is *process oriented*. Researchers attempt to understand the precise causal mechanisms intervening between initial interactions with stimulus persons and product behaviors. For example, upon being asked for money by a panhandler, a person’s response may differ greatly depending on whether an intervening attribution engendered annoyance or sympathy. Social cognition researchers have used increasingly sophisticated referential methods ranging from reaction timing to brain imaging to assess intervening processes.⁸ For example, because of potential limits to insight or honesty, social cognition researchers have developed a variety of “implicit” measures involving reaction timing to examine the automatic association between attitudes and behaviors.⁹

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Third, social cognition is characterized by interdisciplinary approaches and *cross-fertilization* of ideas. Not only is there an obvious melding of social with traditional cognitive psychology but also a melding with other fields such as developmental psychology, clinical psychology, and neuroscience. For example, neuroscientific approaches have found that specific brain regions are activated in response to social decision making. These regions, like the striatum, which are active for basic rewards, also appear to encode more abstract social rewards such as positive feelings produced by mutual cooperation,¹⁰ commonalities that would not have been uncovered without an interdisciplinary approach.

Finally, social cognition researchers are concerned with *real-world applications*. One interesting example is that social cognition research has been used to enlighten legal decisions of the US Supreme Court.¹¹ Researchers have been called as expert witnesses to testify to the antecedent conditions, indicators, consequences, and remedies of stereotyping. This has influenced decisions about prejudice and discrimination cases ranging from trials and appeals courts to the Supreme Court's reviews.

Social Cognition in Schizophrenia

What do we know about social cognition in schizophrenia? There appear to be 3 primary domains of inquiry: emotion perception, Theory of Mind (ToM), and attributional style. In regard to emotion perception (eg, identifying emotion displayed in various facial expressions or tone of voice), the following conclusions can be drawn (reviewed by Edwards et al¹², Hellewell and Whittaker¹³, Kohler and Brennan¹⁴, and Mandal et al¹⁵). First, individuals with schizophrenia display deficits compared with nonclinical control participants. Second, these deficits are more severe relative to individuals with other psychiatric disorders such as depressive disorder (unless psychotic features are present). Third, the greatest deficits are evident in the perception of negative emotions (compared with positive emotions). Fourth, the deficit in emotion perception is stable over time, although evidence suggests that individuals in remission may outperform individuals in an acute phase of the disorder. Fifth, individuals with schizophrenia perform worse trying to "read between the lines" (ie, identifying what a given individual is thinking or feeling) but are less impaired on more concrete social judgments (ie, identifying what a person is wearing or doing). Sixth, many individuals with schizophrenia display restricted visual scanning and spend less time examining salient facial features during emotion perception tasks.^{16,17} Finally, impairments in emotion perception are present early in the course of illness.¹⁸⁻²⁰

ToM refers to the ability to represent human mental states and/or to make inferences about another's intentions. It includes understanding false beliefs, hints, inten-

tions, deception, metaphor, irony, and faux pas. Over 30 studies have been conducted on ToM in schizophrenia, leading to the following conclusions (reviewed in Brune²¹ and Harrington et al²²). In general, individuals with schizophrenia exhibit deficits in ToM relative to nonill and psychiatric controls. The bulk of research supports the conclusion that this impairment in schizophrenia is a trait deficit. First-degree relatives of individuals with schizophrenia who also score high on schizotypy have impaired ToM,²³ lending support for ToM as a potential endophenotype for schizophrenia. ToM deficits are present in both inpatient and outpatient samples, are not accounted for by deficits in general cognitive functioning, and are not uniquely associated with any specific symptom type (eg, paranoia). The etiology of ToM deficits in schizophrenia remains unclear, in part because the genesis of normal ToM is still unknown (eg, Leslie²⁴ and Harris²⁵).

Attributional style refers to explanations people generate regarding the causes of positive and negative events in their lives. Normally, people attribute responsibility for positive events to themselves and responsibility for negative events to others. The majority of work in schizophrenia has focused on attributional style in individuals with paranoia or persecutory delusions. Such individuals tend to blame others rather than situations for negative events, an attributional style known as a "personalizing bias."^{26,27} This becomes a dynamic mechanism for regulating self-esteem because attributing negative intentions to others maintains a positive self-image. However, it comes at the cost of increasingly negative perceptions of others. Such negative attributions to others are not corrected in paranoia, even when one obtains subsequent disconfirming information about the other's culpability. According to Bentall et al,²⁶ 2 factors prevent individuals with persecutory delusions from correcting their bias in the face of disconfirming situational information: a strong need for closure (ie, an intolerance of ambiguity) and impairments in ToM. Indeed, preliminary research shows an association between need for closure and persecutory delusions²⁸ and between deficits in ToM and personalizing attributions.^{29,30} Individuals with persecutory delusions may of course have other social cognitive biases such as the tendency to "jump to conclusions" and to demonstrate a "confirmation bias" (ie, seeking confirmatory evidence for a belief rather than disconfirmatory evidence; reviewed in Freeman³¹). In all, a variety of social cognitive deficits and biases may underlie paranoia.

Relationship of Social Cognition to Cognition and Negative Symptoms

How does social cognition relate to other domains, most notably neurocognition (eg, attention, memory, executive function) and negative symptoms?³² Conceptually,

social cognition involves the interface of emotional and cognitive processing, whereas neurocognitive processing is relatively affect-neutral.^{33–35} In contrast, negative symptoms could spring from a similar affective processing dysfunction as social cognitive impairments. For example, diminished social reward salience found in negative symptoms (eg, anhedonia and amotivation) may contribute to subtypes of social cognitive dysfunction.³⁶ Alternatively, failed empathy or mental simulation of others' cognitive-affect states (a putatively social cognitive phenomenon)^{37–40} may underlie ToM deficits and also foster the extinction of social reinforcement, leading to increased negative symptoms.

Empirically, studies using statistical modeling techniques^{36,41} and matched task designs^{42,43} have concluded that social cognition is best understood as related to, but distinct from, neurocognition and negative symptoms. This distinction is also observed at the neural level because activation circuitry for social cognition vis-a-vis neurocognition and negative symptoms are relatively independent.^{33,44,45}

Treatment Implications

Recent enthusiasm for social cognition in schizophrenia has followed upon research showing that it has a relationship with functional outcomes (eg, social skills, community functioning).^{46,47} This, in turn, has inspired researchers to examine whether social cognition can be improved (reviewed by Horan et al⁴⁸) because social cognition may be an important target for pharmacological and psychosocial treatments. Interestingly, there has been little support for atypical medications improving social cognition in schizophrenia because the one large adequately powered study⁴⁹ found that neither quetiapine nor risperidone resulted in improved emotion perception among 289 individuals with schizophrenia. Thus, there has been growing interest in psychosocial treatments as a means of improving social cognition.

Psychosocial treatment programs use a variety of techniques to ameliorate social cognitive deficits, from “targeted” interventions that focus on a specific skill (eg, asking clients to imitate others' facial expressions to improve emotion perception) to those that target integrative social cognitive abilities via viewing videotapes and role-playing. While there is growing evidence that social cognition can be improved,⁴⁸ future research needs to determine whether improvements in social cognition generalize to other social cognitive domains as well as to behaviors. Initial data from our own laboratory on the Social Cognition and Interaction Training program suggest that targeting social cognition may result in changes in real-world behavior,⁵⁰ although these findings are preliminary and in need of replication.

It might be the case that social cognition training cannot be done in isolation but must be linked with broader

based skills training in a manner consistent with the most effective cognitive remediation studies (reviewed in McGurk et al⁵¹). Thus, one can imagine tailoring treatment (cognitive remediation, social cognitive training, cognitive behavioral therapy, etc.) to the needs of the client with schizophrenia, rather than hoping that a “one-size intervention” will fit all, an unrealistic expectation given the heterogeneity of the disorder (and its changes over time). Clearly, however, social cognition training has promise as an addition to the armamentarium of the treatments for schizophrenia.

References

1. Sperry RW. The impact and promise of the cognitive revolution. *Am Psychol.* 1993;48:878–885.
2. Augoustinos M, Walker I, Donaghue N. *Social Cognition: An Integrated Introduction.* Thousand Oaks, Calif: Sage; 2006.
3. Fiske ST, Taylor SE. *Social Cognition: From Brains to Culture.* New York, NY: McGraw-Hill; 2008.
4. Kunda Z. *Social Cognition: Making Sense of people.* Cambridge, Mass: MIT Press; 1999.
5. Smith ER, Semin GR. Situated social cognition: cognition in its social context. *Advances in Experimental Social Psychology.* 2004;36:53–117.
6. Schwarz N, Sanna LJ, Skurnik I, Yoon C. Metacognitive experiences and the intricacies of setting people straight: Implications for debiasing and public information campaigns. *Adv Exp Soc Psychol.* 2007;39:127–161.
7. Schwarz N, Bless H, Strack F, Klumpp G, Rittenauer-Schatka H, Simons A. Ease of retrieval as information: another look at the availability heuristic. *J Pers Soc Psychol.* 1991;61:195–205.
8. Cacioppo JT, Berntson GE, Adolphs R, et al., eds. *Foundations in Social Neuroscience.* Cambridge, Mass: MIT Press; 2002.
9. Fazio RH, Olson MA. Implicit measures in social cognition research: their meaning and use. *Annu Rev Psychol.* 2003;54:297–327.
10. Sanfey AG. Decision neuroscience: new directions in studies of judgment and decision making. *Curr Dir Psychol Sci.* 2007;16:151–155.
11. Fiske ST, Bersoff DN, Borgida E, Deaux K, Heilman ME. Social science research on trial: use of sex stereotyping research in *Price Waterhouse v. Hopkins.* *Am Psychol.* 2001;46:1049–1060.
12. Edwards J, Jackson HJ, Pattison PE. Emotion recognition via facial expression and affective prosody in schizophrenia: a methodological review. *Clin Psychol Rev.* 2002;22:789–832.
13. Hellewell JSE, Whittaker JF. Affect perception and social knowledge in schizophrenia. In: Mueser KT, Tarrier N, eds. *Handbook of Social Functioning in Schizophrenia.* Boston, Mass: Allyn & Bacon; 1998:197–212.
14. Kohler CG, Brennan AR. Recognition of facial emotions in schizophrenia. *Curr Opin Psychiatry.* 2004;17:81–86.
15. Mandal MK, Pandey R, Prasad AB. Facial expressions of emotion and schizophrenia: a review. *Schizophr Bull.* 1998;24:399–412.
16. Green MJ, Phillips ML. Social threat perception and the evolution of paranoia. *Neurosci Biobehav Rev.* 2004;28:333–342.

17. Williams LM, Loughland CM, Gordon E, Davidson D. Visual scanpaths in schizophrenia. Is there a deficit in face recognition? *Schizophr Res.* 1999;40:189–199.
18. Addington J, Penn DL, Woods SW, Addington D, Perkins D. Facial affect recognition in individuals at clinical high risk for psychosis. *Br J Psychiatry.* In press.
19. Kucharska-Pietrua K, David A, Masiak M, Phillips M. Perception of facial and vocal affect by people with schizophrenia in early and late stages of illness. *Br J Psychiatry.* 2005;187:523–528.
20. Pinkham AE, Penn DL, Perkins DO, Graham K, Siegel M. Emotion perception and the course of psychosis: a comparison of individuals at risk, and early and chronic schizophrenia spectrum illness. *Cognit Neuropsychiatry.* 2007;12:198–212.
21. Brune M. “Theory of mind” in schizophrenia: a review of the literature. *Schizophr Bull.* 2005;31:21–42.
22. Harrington L, Siegert RJ, McClure J. Theory of mind in schizophrenia: a critical review. *Cognit Neuropsychiatry.* 2005;10:249–286.
23. Irani F, Platek SM, Panyavin IS, et al. Self-face recognition and theory of mind in patients with schizophrenia and first-degree relatives. *Schizophr Res.* 2006;88:151–160.
24. Leslie A. What autism teaches us about meta-representation. In: Baron-Cohen S, Tager-Flusberg H, Cohen D, eds. *Understanding Other Minds: Perspectives From Autism.* Oxford, UK: Oxford University Press; 1993:83–111.
25. Harris PL. The work of the imagination. In: Whiten A, ed. *The Emergence of Mindreading.* Oxford, UK: Blackwell; 1990.
26. Bentall RP, Corcoran R, Howard R, Blackwood N, Kinderman P. Persecutory delusions: a review and theoretical integration. *Clin Psychol Rev.* 2001;21:1143–1192.
27. Garety PA, Freeman D. Cognitive approaches to delusions: a critical review of theories and evidence. *Br J Clin Psychol.* 1999;38:113–154.
28. Bentall RP, Swarbrick R. The best laid schemas of paranoid patients: autonomy, sociotropy, and need for closure. *Psychol Psychother.* 2003;76:163–171.
29. Randall F, Corcoran R, Day JC, Bentall RP. Attention, theory of mind, and causal attributions in people with persecutory delusions: a preliminary investigation. *Cognit Neuropsychiatry.* 2003;8:287–294.
30. Taylor JL, Kinderman P. An analogue study of attributional complexity, theory of mind deficits and paranoia. *Br J Psychiatry.* 2002;93:137–140.
31. Freeman D. Suspicious minds: the psychology of persecutory delusions. *Clin Psychol Rev.* 2007;27:425–457.
32. Penn DL, Corrigan PW, Bentall R, Racenstein JM, Newman L. Social cognition in schizophrenia. *Psychol Bull.* 1997;121:114–132.
33. Adolphs R. Cognitive neuroscience of human social behaviour. *Nat Rev Neurosci.* 2003;4:165–178.
34. Brothers L, Ring B. A neuroethological framework for the representation of minds. *J Cogn Neurosci.* 1992;4:107–118.
35. Fiske ST, Taylor SE. *Social Cognition.* 3rd ed New York, NY: McGraw-Hill; 2007.
36. Sergi MJ, Rassovsky Y, Widmark C. Social cognition in schizophrenia: relationships with neurocognition and negative symptoms. *Schizophr Res.* 2007;90:316–324.
37. Carr L, Iacoboni M, Dubeau M, Mazziotta JC, Lenzi GL. Neural mechanisms of empathy in humans: a relay from neural systems for imitation to limbic areas. *Proc Natl Acad Sci USA.* 2003;100:5497–5502.
38. Frith CD. *The Cognitive Neuropsychology of Schizophrenia.* Hove, UK: Lawrence Erlbaum Associates Ltd; 1992.
39. Frith CD. Schizophrenia and theory of mind. *Psychol Med.* 2004;34:385–389.
40. Shamay-Tsoory SG, Shur S, Barcai-Goodman L, Medlovich S, Harari G, Levkovitz Y. Dissociation of cognitive from affective components of theory of mind in schizophrenia. *Psychiatry Res.* 2007;149:11–23.
41. Allen DN, Strauss GP, Donohue B, van Kammen DP. Factor analytic support for social cognition as a separable cognitive domain in schizophrenia. *Schizophr Res.* 2007;93:325–333.
42. Brunet E, Sarfati Y, Hardy-Boyle M, Decety J. Abnormalities of brain function during a nonverbal theory of mind task. *Neuropsychologia.* 2003;41:1574–1582.
43. Cutting J, Murphy D. Impaired ability of schizophrenics, relative to manics or depressives, to appreciate social knowledge about their culture. *Br J Psychiatry.* 1990;157:355–358.
44. Blakemore SJ, Frith CD. How does the brain deal with the social world? *Neuroreport.* 2004;15:119–128.
45. Pinkham A, Penn DL, Lieberman J, Perkins D. Implications of the neural basis of social cognition for the study of schizophrenia. *Am J Psychiatry.* 2003;160:185–194.
46. Couture SM, Roberts DL, Penn DL. The functional significance of social cognition in schizophrenia: a review. *Schizophr Bull.* 2006;32, suppl 1:S44–S63.
47. Brekke JS, Hoe M, Long J, Green MF. How neurocognition and social cognition influence functional change during community based psychosocial rehabilitation for individuals with schizophrenia. *Schizophr Bull.* 2007;33:1247–1256.
48. Horan WP, Kern RS, Penn DL, Green MF. Social cognition training for individuals with schizophrenia: emerging evidence. *Am J Psychiatr Rehabil.* In press.
49. Harvey PD, Patterson TL, Potter LS, Zhong K, Brecher M. Improvement in social competence with short-term atypical antipsychotic treatment: a randomized double-blind comparison of quetiapine versus risperidone for social competence, social cognition, and neuropsychological functioning. *Am J Psychiatry.* 2006;163:1918–1925.
50. Combs DR, Adams SD, Penn DL, Roberts D, Tiegreen J, Stern P. Social cognition and interaction training (SCIT) for inpatients with schizophrenia spectrum disorders: preliminary findings. *Schizophr Res.* 2007;91:112–116.
51. McGurk SR, Twamley EW, Sitzer DI, McHugo GJ, Mueser KT. A meta-analysis of cognitive remediation in schizophrenia. *Am J Psychiatry.* 2007;164:1791–1802.