Schizophrenia Bulletin vol. 35 no. 5 pp. 1003–1011, 2009
doi:10.1093/schbul/sbn039
Advance Access publication on May 20, 2008

Taking the Perspective of the Other Contributes to Awareness of Illness in Schizophrenia

Robyn Langdon[1–5] and Philip Ward[4,5]

[2]Macquarie Centre for Cognitive Science, Macquarie University, Sydney, New South Wales, Australia; [3]Schizophrenia Research Institute, Sydney, New South Wales, Australia; [4]Schizophrenia Research Unit, Sydney South West Area Health Service, Sydney, New South Wales, Australia; [5]School of Psychiatry, University of New South Wales, Sydney, New South Wales, Australia

Two approaches dominate research on the lack of awareness of illness that characterizes schizophrenia. The "deficit" approach uses standardized neuropsychological batteries to identify the neural underpinnings of intact insight; the "nondeficit" approach investigates the psychological defense mechanisms that motivate denial of illness. We adopt, instead, a cognitive neuropsychological approach to model the cognitive processes which underpin insight and which might be either damaged (because of neuropathology) or not used (because of motivational forces). We conceive of these processes in terms of a metacognitive capacity "to see *ourselves* as others see us." We predict that a general difficulty with adopting other mental perspectives (with "seeing the world as others do"), indexed by performance deficits on theory of mind (ToM) tasks, will impair insight in schizophrenia. Thirty schizophrenic patients (also assessed for insight) and 26 healthy controls completed a battery of ToM tasks which varied presentation modality, response mode and instruction type (picture sequencing, joke appreciation and story comprehension tasks). While patients performed more poorly than controls on all ToM tasks, impairment in patients was not concordant across tasks. ToM scores from the picture sequencing and joke appreciation tasks, and not the story comprehension task, intercorrelated significantly in patients and predicted insight. Findings support the view that insight relies upon a cognitive capacity to adopt the other perspective, which, if intact, contributes to the metacognitive capacity to reflect upon "one's own" mental health from the other perspective. Findings also suggest that the nature of perspective-taking difficulty which disrupts insight in schizophrenia is best revealed using ToM tasks with "indirect" instructions.

[1]To whom correspondence should be addressed; tel: +61-2-9850-6733, fax: +61-2-9850-6059, e-mail: robyn@maccs.mq.edu.au.

Key words: social cognition/anosognosia/perspective-taking/psychosis

Introduction

Lack of awareness of illness, also termed poor insight in clinical contexts, refers to a patient's seeming inability to recognize his/her own illness or injury. The inexplicable quality of poor insight, the denial of good commonsense, and the dismissal of the obvious all apply to lack of awareness of illness whether seen in neurological or psychiatric conditions. The phenomenon is particularly common in schizophrenia where it affects an estimated 80%–97% of patients[1,2] and impacts negatively on treatment compliance,[3–7] course of illness and prognosis,[8–13] and response to vocational rehabilitation.[14,15]

Two theoretical perspectives have dominated research to date on the etiology of lack of awareness of illness in schizophrenia.[16–18] Broadly speaking, these can be conceived of as "deficit" versus "nondeficit" approaches.[19] The deficit approach is to conceive lack of insight as a failure of competence, ie patients lack insight because their illness has directly caused the loss of some critical neuropsychological faculty (see, eg, Aleman et al[20] for a recent meta-analysis of insight and neuropsychological function). In support of this approach are the findings that better insight in schizophrenia is associated with higher levels of intelligence[9,21] and executive function[22–25] with the latter implicating the frontal lobes. Not all studies, however, find associations between awareness of illness and neuropsychological function and, even when significant correlations are found, the size of the correlation coefficients is generally small.[17] The implication here is that much about lack of awareness of illness in schizophrenia remains unexplained by deficits identified using standardized neuropsychological test batteries.

The alternative, nondeficit approach is to conceive lack of insight as a performance failure, ie patients who lack insight have the capacity to recognize their own illness or injury but are motivated (without conscious awareness of their motives) to avoid the distress and the threat to self-esteem which explicit acknowledgment of such "negative" facts about self would cause. Support for the

nondeficit approach comes from the findings that lack of insight in schizophrenia is associated with a greater desire for positive appraisal,[15] escape-avoidance coping styles[17] and self-defensive attributional biases.[19] Doubts remain, however, about the adequacy of a nondeficit approach. These stem from the prevailing clinical view that poor insight is a primary feature of schizophrenic illness, rather than a secondary consequence of the stigma that is generally associated with psychiatric diagnoses.[26]

This article proposes an alternative approach from a cognitive neuropsychological perspective in order to model the cognitive processes which directly underpin insight and which might be either damaged (because of neuropathology) or not used (because of motivational forces). In conceiving lack of insight in this way, we take as our starting point David[27,28] who highlighted 2 themes in the original writings of Lewis. These are, first, that awareness of illness involves self-reflection and, second, that insight entails a "correct" attitude to morbid change in oneself. That the insightful attitude is directed toward oneself as the object of reflection is straightforward. What it means for this insightful attitude to be correct is less so. Nevertheless, references to such ideas as adopting a correct attitude, making correct realistic judgments, and being objective recur in writings about insight. More recently, authors refer to the notion of a correct attitude in terms of "taking the perspective of the other." McNally and Goldberg,[29] eg, described patients as adopting a strategy of trying to stand outside of one's own experience in order to reflect upon self from the perspective of another, while David[28] borrowed from Robbie Burns to title his article on insight "To see oursels as others see us." That the correct attitude toward morbid change in oneself relies upon the capacity to reflect upon self from the perspective of the other implicates "theory of mind" (ToM).

ToM refers traditionally to the ability to represent the mental lives of conspecifics in order to predict and manipulate others' behavior.[30] Classic ToM tasks require participants to go beyond the objective facts of a situation, as presented to that participant, in order to demonstrate awareness that another person's behavior will be governed by that other person's view of the situation, rather than the participant's own assumptions concerning the facts. Subjects can fail ToM tasks for different reasons. Autistic individuals purportedly fail ToM tasks because of "mindblindness" or a failure to "metarepresent." "Metarepresentation" refers to a capacity to "decouple" mental states from reality. In other words, when a "factual" proposition—eg "Today is Tuesday"—is embedded into a higher-order representation (ie, a metarepresentation) of the type "Fred thinks 'Today is Tuesday'", it becomes possible to represent the potential falsity of the embedded proposition.[31] The distinction between metarepresentation and "metacognition" is a rather slippery one. The latter term also refers to a higher order representation—a thought about a thought[32]—which, in the traditional theory of mind literature, would be termed a second-order metarepresentation. This obviously becomes very confusing and so to promote clarity we will use the term metacognition, as it is often used in the literature, to refer specifically to thoughts about "one's own" thoughts (eg, to metacognize "How well do I understand what is happening in my mind?"; we thank a reviewer for this helpful suggestion).

People with schizophrenia show pervasive deficits on a range of ToM tasks (see Brüne,[33] Harrington et al,[34] and Langdon[35,36] for reviews). Moreover, these difficulties cannot be explained by more general deficits. Harrington et al,[34] eg, reported that 21 of the 25 studies of ToM in schizophrenia they reviewed had included control tasks to assess general intellectual ability, memory, or executive function; in all 21 cases, ToM impairment was independent of control task performances. Langdon et al[37–39] similarly found ToM impairment and executive dysfunction made significant independent contributions to discriminating between schizophrenic patients and healthy controls, while Rowe et al[40] reported similar results in patients with frontal lesions. The implication here is that both types of performance deficit (ToM and executive) in schizophrenic and frontal patients likely reflect the disruption of neuroanatomically close, yet functionally dissociable, frontal regions.

Langdon and colleagues[35,36,41–43] have argued that the domain-specific compromise of ToM seen in schizophrenia is not well explained by a metarepresentation failure. While autistic individuals might be conceived of as mindblind, or unable to metarepresent,[31] this hardly seems tenable for people with schizophrenia who clearly know that other people have minds and who, when experiencing persecutory delusions, go well beyond the surface facts of a situation so as to inaccurately infer the malevolent, conspiratorial thoughts of others. Their ToM impairment is better conceived as stemming from a difficulty with interpersonal perspective-taking or, as Goldman[44] terms it, simulation. Simulation refers to the capacity to project oneself imaginatively into the "mental shoes" of another person so as to simulate what that other person most likely thinks and feels in particular circumstances. If performance deficits on ToM tasks in schizophrenia reflect a difficulty with interpersonal perspective-taking, or "seeing the world as others do," as Langdon and colleagues propose, then it follows that a more specific metacognitive capacity to reflect upon the self's inner world from the imagined perspective of the other (ie, insight, the capacity to see "oneself" as others do) will be impaired in schizophrenic patients with poor ToM function.

Very little data exist on the relationship between ToM and insight and what data do exist is inconsistent—eg, Drake and Lewis[45] found no evidence of an association between ToM and insight, while Bora et al[46] reported

that second-order story-based ToM tests (testing the understanding of what one character thinks about another character's thoughts) explained up to 29.9% of the variance in patients' insight scores. These inconsistencies may reflect the range of tasks which are used to assess ToM including, eg, story-based tasks, visual joke appreciation tasks, and tasks to test inferences of mental states from the eye regions of a face. While all such tasks are labeled "ToM," they might not tap equally a unitary underlying construct.

A final comment before outlining the specific study hypotheses: implicit in our account, but not yet directly stated, is that poor insight will only occur when a patient fails to adopt the perspective of the other toward the self and when that patient's own self-perspective inaccurately represents the true state of affairs. In other words, one does not need to adopt the other perspective in order to be insightful concerning the state of one's own health if the information provided by the self-perspective is accurate. In 20%–30% of patients with hemiplegia who lack insight for their paralysis following a stroke, a concurrent neglect for the paralyzed side of space might account for these patients' distorted self-perspectives concerning their paralysis (see Davies et al[47] for discussion). In people with schizophrenia, a distorted self-perspective on reality (ie, delusional and/or hallucinatory reality distortion) is the core of psychosis. Another consideration here is that some people with neurological or psychiatric illness who are generally adept at adopting other mental perspectives (indexed by normal ToM task performance) might still lack insight. This is so because it is one thing to have the capacity to adopt another person's point of view so as to imagine what it would be like to think something different than what one actually believes about self, and an entirely different thing to be able to accept that the other person's point of view provides the more accurate representation of the true state of affairs. Such acceptance might be particularly difficult in individuals who avoid negative self-reflection. In other words, intact ToM might be necessary for intact insight but is unlikely to be sufficient.

Aims and Hypotheses

This study investigated the relationship between insight, conceived as reflecting a metacognitive capacity to adopt the mental perspective of another toward the circumstances of one's own mental health, and ToM task performance, conceived as indexing a more basic cognitive capacity to adopt other mental perspectives, in patients with schizophrenia. In order to systematically assess ToM, we used a battery of tasks which varied presentation modality (verbal vs. visual) and response mode (verbal vs. nonverbal). Based on the literature, it was predicted that patients would perform more poorly than controls on all ToM tasks and that, if such tasks tap a unitary contruct, there would be a concordance of impairment across tasks in the patients. It was further hypothesized that ToM impairment in the patients would predict impaired insight.

Methods

Participants

Participants were drawn from a larger project investigating reasoning biases associated with delusions in schizophrenia. Thirty clinical participants were recruited from the Sydney South West Area Health Service and volunteer registers established by the Macquarie Centre for Cognitive Science, Macquarie University, and the Schizophrenia Research Institute of Australia. Diagnosis was confirmed using the Diagnostic Interview for Psychosis,[48] a structured clinical interview designed to diagnose psychotic disorders for an Australian National Mental Health Survey conducted in 1997–1998. Twenty-five patients met diagnostic criteria for schizophrenia according to the Diagnostic and Statistical Manual of Mental Disorders, IV Edition (DSM-IV) and 5 were diagnosed with schizoaffective disorder. All but one patient was in receipt of antipsychotic medication at the time of testing (6 typical, 23 second-generation atypical). Twenty-six healthy controls were recruited from the general community (n = 20) and from among mature-age first-year psychology students (n = 6). The patients and the controls were matched on gender distribution, years of age, and years of formal education (see table 1). Controls were screened using the affective, psychotic, and substance abuse screening modules from the Structured Clinical Interview for DSM-IV Axis 1 Disorders.[49] Exclusion criteria for both groups included past history of central nervous system disease or head injury, current substance abuse, and less than 8 years of formal education. All participants were English speaking and gave written informed consent.

Materials and Procedure

Three ToM tasks were selected to vary presentation modality (verbal vs. visual) and response mode (verbal vs. nonverbal). The first was a purely nonverbal picture sequencing task developed originally to test ToM in nonclinical schizotypy[50] and used since to demonstrate that ToM difficulties in schizophrenia cannot be completely explained by impairments of general intelligence, executive planning, or inhibitory control.[37,38] Participants were instructed to rearrange 16 four-card picture sequences (laid out in a prearranged incorrect order) into a logical order. There were 4 story types (4 sequences per story type): the critical "false-belief" (FB) stories test ToM ability to go beyond objective facts so as to infer a story character's mistaken belief (one FB sequence was a slight modification of a story used in earlier versions.);

Table 1. Demographic Data for Patients and Controls and Clinical Data for Patients

	Patients	Healthy Controls
N	30	26
Males:females	19:11	16:10
Age (years)	38.5 ± 1.8 (21–59)	35.3 ± 2.6 (17–58)
Formal education (years)	10.6 ± 0.4 (8–18)	11.0 ± 0.5 (9–14)
Age at illness onset (years)	23.5 ± 1.3 (15–42)	
Duration of illness (years)	14.1 ± 1.6 (1.3–41)	
Clinical symptoms[a]		
Negative	1.5 ± 0.2 (0–4)	
Positive	1.6 ± 0.2 (0.25–4)	
Insight		
Total SAI-E score	20.2 ± 1.6 (2–28)	
Awareness of mental illness	9.4 ± 0.6 (1–12)	
Capacity to recognize symptoms as abnormal	7.7 ± 0.9 (0–12)	
Treatment compliance	3.2 ± 0.2 (0–4)	

Note: Data expressed as means ± SE (ranges in parentheses). SAI-E, Schedule for the Assessment of Insight—Expanded.
[a]Mean global rating (0 = not present; 1 = questionable; 2 = mild; 3 = moderate; 4 = marked; 5 = severe).

"social-script" stories control for logical reasoning about other people's behavior without needing to infer mental states; "mechanical" stories control for physical cause-and-effect reasoning; and "capture" stories control for inhibitory suppression (the capacity to inhibit salient, misleading cues). Order of cards was scored as per Langdon and Coltheart[50] and scores were averaged across the 4 examples per story type (range 0–6).

The second ToM task, a joke appreciation task, was based on the work of Happé et al[51] The test stimuli were nonverbal, while the response mode was verbal; participants were shown visual cartoons and asked to "Explain the joke." Two sets of 11 cartoons were selected from cartoon books and magazines. ToM cartoons require an appreciation of what is going on in the minds of cartoon characters in order to "get the joke." Physical cartoons depict slapstick or behavioural/situational humor and can be understood without inferring mental states. The 2 sets of cartoons were intermixed and the cartoons presented one per page in a fixed pseudorandom order. Responses were recorded and scored: "3" for a full explicit explanation (involving appropriate use of mental state language for ToM cartoons); "2" for a partial or implicitly correct response; "1" for a description of some relevant details without partial or implied explanation of the joke; and "0" for an incorrect response (ie, a "don't know" response or an obvious error). Scores were averaged across the 11 jokes per set (range 0–3). The number of words generated by participants when explaining the jokes was also recorded.

The final ToM task was entirely verbal. This was the story comprehension task developed originally by Happé[52] to investigate ToM development in children and adolescents. This task has been developed further and used since in neuroimaging studies of ToM in healthy adults[53] and to demonstrate ToM deficits in patients with acquired brain injury.[51] Sixteen written stories (8 ToM and 8 physical) were intermixed and presented one per page in a fixed pseudorandom order. ToM stories test appreciation of story characters' mental states while physical stories match ToM stories on sentence length and complexity. Participants read each story silently at their own pace, after which they turn the page to reveal a question, typically asking about the motives of a story character. Responses were recorded and scored: "2" for a full explicit explanation (involving appropriate use of mental state language for ToM stories); "1" for a partial or implicitly correct response; and "0" for an incorrect response. Scores were averaged across the 8 stories per set (range 0–2). Average number of words generated per set was also recorded.

IQ was assessed using the National Adult Reading Test (NART), while the WMS-R Logical Memories subtests (LM1 and LM2: immediate and delayed recall) assessed verbal memory.

Clinical symptoms were rated using the Scales for Assessment of Positive and Negative Symptoms of Schizophrenia,[54,55] while insight was assessed using the Schedule for the Assessment of Insight—Expanded (SAI-E[56]). The SAI-E provides a general measure of insight (0–28) along with 3 subscales for awareness of mental illness (0–12), capacity to recognize psychotic symptoms as abnormal (0–12), and acknowledgment of the need for medication (range 0–4).

Results

Table 1 summarizes demographics of the 2 participant groups and clinical characteristics of the patients. The NART-estimated IQ of patients and controls did not differ significantly, $t(54) = 0.94$, $P = .35$, as was the case for the years of formal education (see table 1). There were, however, significant differences in verbal memory, whether indexed by immediate recall—LM1: $t(54) = 4.23$, $P < .0005$—or delayed recall—LM2: $t(54) = 4.09$, $P < .0005$ (see table 2). The total memory score (LM1 + LM2) was therefore used as a covariate in all subsequent analyses with results summarized in table 2.

The design for the picture sequencing task was a (2 × 4) mixed model with 2 levels on the between-factor group (patients vs. controls) and 4 levels on the repeated factor story type (social-script vs. mechanical vs. capture vs. FB). There were significant main effects of group,

Table 2. IQ, Verbal Memory, and Theory of Mind (ToM) Task Performances of Patients and Controls

		Patients	Healthy Controls	Significance
NART-IQ		100.9 ± 1.8	103.9 ± 2.6	NS
Verbal memory	LM1[a] (immediate)	17.1 ± 1.4	25.7 ± 1.2	$P < .0005$
	LM2[b] (delayed)	12.1 ± 1.5	20.5 ± 1.1	$P < .0005$
ToM tasks				
Story comprehension task	Physical stories	0.81 ± 0.08	0.93 ± 0.06	NS
	ToM stories	0.76 ± 0.05	1.10 ± 0.05	$P < .0005$
Joke appreciation task	Physical jokes	1.89 ± 0.09	2.00 ± 0.06	NS
	ToM jokes	1.29 ± 0.11	1.67 ± 0.06	$P = .04$
Picture sequencing task	Social-script	5.44 ± 0.12	5.92 ± 0.05	NS
	Mechanical	5.05 ± 0.17	5.59 ± 0.14	NS
	Capture	3.39 ± 0.19	4.50 ± 0.15	$P < .0005$
	False-belief (ToM)	3.55 ± 0.29	5.99 ± 0.11	$P < .0005$

Note: Data expressed as means ± SE. Appropriate adjusted means are provided for ToM data. NART, National Adult Reading Test.
[a]LM1: WMS-R Logical Memories I (immediate recall).
[b]LM2: Logical Memories 2 (delayed recall).

$F(1,53) = 23.88$, $P < .0005$, and story type, $F(2.65,142.97) = 61.36$, $P < .0005$, as well as a significant 2-way interaction of group × story type, $F(2.65,142.97) = 13.35$, $P < .0005$ (Greenhouse-geisser corrections are reported since the assumption of sphericity was violated). The contrast driving the 2-way interaction indicated that patients were more impaired than controls when sequencing both the FB and capture stories, relative to the social-script and mechanical scores, $F(1,54) = 22.76$, $P < .0005$. Nevertheless, a post hoc analysis of covariance comparing the FB scores of patients and controls, adjusting for the capture scores, as well as verbal memory, indicated that patients still continued to make significantly more errors than controls when sequencing the FB stories, $F(1,52) = 13.66$, $P = .001$.

The design for the joke appreciation task was a (2 × 2) mixed model with 2 levels on the between-factor group (patients vs. controls) and 2 levels on the repeated factor cartoon type (ToM vs. physical). As expected, the number of words generated by participants proved to be a significant predictor of scores ($P < .02$) and was included as a covariate. There was a significant main effect of cartoon type, $F(1,53) = 87.69$, $P < .0005$, and a significant 2-way interaction of group × cartoon type, $F(1,53) = 8.47$, $P = .005$. Patients had greater difficulty than controls when explaining the humor of ToM cartoons, $F(1,52) = 4.15$, $P = .04$, despite the 2 groups explaining the physical cartoons equally well, $F(1,52) = 0.05$, $P = .82$.

The design for the story comprehension task was similar, a (2 × 2) mixed model with 2 levels on the between-factor group (patients vs. controls) and 2 levels on the repeated factor story type (ToM vs. physical). Once again, number of words generated by participants was a significant predictor of scores and included as a covariate. The only significant result was a main effect of group, $F(1,52) = 1.98$, $P = .002$. While the 2-way interaction of group × story type, $F(1,53) = 3.75$, $P = .06$, failed to reach statistical significance, simple contrasts revealed that the patients only differed significantly from the controls on the ToM stories, $F(1,52) = 23.08$, $P < .0005$, and not on the control stories, $F(1,52) = 1.33$, $P = .25$.

The correlations between the ToM scores in the patients were examined next. The correlation between the FB picture sequencing score and the ToM joke appreciation score was moderate to strong, $r = .55$, $P = .002$, while these 2 measures did not correlate significantly with the ToM story comprehension score, r's of .28 and .31, P's $> .09$. Since correlations can prove nonsignificant for a number of reasons (eg, the non-ToM processing demands of the story comprehension task might not be tapped, or not tapped to a similar degree, by the other 2 tasks), we also conducted several logistic regression analyses to better understand the interrelationships between the task measures. First, the ToM FB score, the ToM joke score, and the ToM story score were fitted into a logistic regression equation predicting the odds of being a patient, and the model was backward reduced using the L-R statistic. If all ToM tasks tap the same underlying construct to varying levels of sensitivity, one would expect only the score from the more sensitive task to remain in the final reduced model discriminating between the patients and the controls; this is not what happened.

The ToM story score and the ToM FB score remained in the final reduced model, each offering unique predictive power to discriminating between the patients and the controls (see Equation 1, table 3). Thus, whatever predictive power the ToM joke score might offer was accounted for by one or the other of the remaining 2 ToM scores, or perhaps both combined. To better determine which, we ran separate logistic regression analyses, first combining the ToM joke score with the ToM story score, and then combining the ToM joke score with the FB score

Table 3. Logistic Regression Equations Predicting the Odds of Being a Patient

	Predictor Variables		
	Expβ′	Expβ	Log L-R χ^2_1
Equation 1			
ToM-story	.02 ($P < .0005$)	.01	8.82 ($P = .003$)
ToM-FB	.16 ($P < .0005$)	.18	18.81 ($P < .0005$)
Equation 2			
ToM-joke	.18 ($P < .0005$)	.29	2.93 ($P = .08$)
ToM-story	.02 ($P > .0005$)	.03	17.86 ($P < .0005$)
Equation 3			
ToM-joke	.18 ($P = .003$)	.92	0.01 ($P = .93$)
ToM-FB	.16 ($P < .0005$)	.16	24.92 ($P < .0005$)

Note: ToM-FB is the false-belief picture sequencing score; ToM-joke is the theory of mind (ToM) joke appreciation score; and ToM-story is the ToM story comprehension score. Expβ′ is the odds ratio coefficient for each variable when fitted as a single predictor (if < 1, the odds of being a patient rather than a control decrease by this multiplier as the variable increases by a standardized unit; if > 1, the odds increase as the variable increases). Expβ is the odds ratio coefficient for each variable in the full or reduced model. Log L-R χ^2_1 statistic tests significance of drop in predictive power if variable removed.

(see Equations 2 and 3, table 3). This pattern of results suggests that the ToM FB score and the ToM joke score likely reflect a common ToM capacity (with the FB score being the more sensitive with regard to discriminating between patients and controls), while the ToM story score indexes something different. Whatever this something different is, it is not just the different demands on IQ and verbal memory in the story task. This is because, when these additional measures were also fitted into the logistic regression equation, the ToM story score and the ToM FB score continued to offer unique predictive power to discriminating between patients and controls, *P*'s <.02. Overall, the best predictive equation combined verbal memory: Expβ = .92, log likelihood ratio (L-R) $\chi^2_1 = 6.11$, $P = .01$; the ToM story score: Expβ = .92, log L-R $\chi^2_1 = 6.11$, $P = .01$; and the ToM FB score: Expβ = .19, log L-R $\chi^2_1 = 12.75$, $P < .0005$. The implication here is that our 3 ToM tasks do not tap a single underlying ToM mechanism and that the FB task and the joke task are alike and different from the story task.

The correlations between the patients' insight scores and their years of age, age of illness onset and duration of illness were examined next and were all found to be nonsignificant. Next, the correlations between the ToM scores and the levels of insight in the patients were examined, partially out any effects of IQ and verbal memory (see table 4). Overall, treatment compliance correlated least strongly with the ToM measures. While awareness of mental illness and capacity to recognize symptoms as abnormal correlated significantly

Table 4. Partial Correlations (Adjusting for IQ and Verbal Memory) of Patients' Theory of Mind (ToM) Scores and Levels of Insight Assessed Using the Total Score from the Schedule for the Assessment of Insight—Expanded (SAI-E) Score and 3 Subscale Scores for Awareness of Mental Illness, Capacity to Recognize Symptoms as Abnormal and Acknowledgment of Need for Treatment

	Total SAI-E	Awareness of Mental Illness	Recognition of Symptoms as Abnormal	Treatment Compliance
ToM story score	.21	.20	.17	.28
ToM joke score	.46*	.42*	.43*	.35
ToM FB picture sequencing score	.39*	.40*	.39	.28

*$P < .05$.

with the ToM scores from the joke appreciation and picture sequencing tasks, all correlations with the ToM story score failed to reach statistical significance. Once again, there appears to be something different about the story task.

Discussion

This study investigated the relationship between insight, conceived as the metacognitive capacity to adopt the mental perspective of another when reflecting upon one's own mental health and ToM task performance, conceived as indexing a more basic cognitive capacity to adopt other mental perspectives, in schizophrenia or schizoaffective disorder. ToM was assessed in 30 schizophrenic patients and 26 healthy controls using 3 tasks which varied presentation modality and response mode. If all ToM tasks tap equally a unitary underlying mechanism, we expected patients to perform more poorly than controls on all ToM tasks and to show concordance of impairment across tasks. It was further hypothesized that, if awareness of illness relies upon the metacognitive capacity "to see *oursels* as others see us," performance deficits on ToM tasks, indexing a general inability to "see the world as others do," will be associated with poor insight in patients.

As predicted, and consistent with previous results, patients performed more poorly than controls on all 3 ToM tasks and the ToM impairment in patients could not be completely explained by their lower levels of general intelligence, verbal memory or inhibitory control. ToM impairment in patients was not, however, concordant across tasks; only 2 of the ToM tasks, the picture sequencing and the joke appreciation tasks (and not the story comprehension task), generated ToM scores that intercorrelated reliably in patients and predicted levels of insight. Findings nonetheless support the hypothesis that a general difficulty with adopting other mental perspectives, indexed by performance deficits on some ToM tasks, contributes to impaired insight in schizophrenia.

Correlations were, however, only moderate, also consistent with the view that other factors, independent of ToM disruption (eg, motivational factors), also contribute to impaired insight in schizophrenia.

Not all facets of insight were strongly associated with ToM; only levels of insight concerning the presence of mental illness and a capacity to recognize symptoms as abnormal correlated significantly with ToM scores. That treatment compliance dissociated from the other facets of insight in this way is consistent with the prevailing conception of insight as multifaceted, comprising overlapping but distinct dimensions, and the observation that treatment compliance is a more complex facet of insight; eg, some patients will refuse treatment despite showing insight concerning their mental illness, while other patients will accept treatment despite denial of their illness.[27]

Most intriguing is why ToM assessed using the picture sequencing and joke appreciation tasks, and not the story comprehension task, should intercorrelate most reliably in patients and better predict patients' insight. This pattern of results could not be explained by the differential demands on general intelligence and verbal comprehension/memory across the tasks. An obvious difference between tasks, consistent with the study findings, is presentation modality; ie, the story comprehension task, the odd one out with regard to intercorrelations between ToM scores and associations with insight, was the only task to use verbal rather than nonverbal test stimuli. We think it unlikely, however, that the use of visual vs. verbal test stimuli in a ToM task is making for the critical distinction here.

We think it more important to consider the effects of instruction type. The memory literature, eg, makes a distinction between "direct" and "indirect" instructions. Direct instructions are termed thus since they tap "explicit" memory by directly asking participants to consciously recall as many words as possible from a prior studied list; indirect instructions might, instead, simply prompt participants to complete word stems with the first word that comes to mind. Indirect instructions make no mention of the prior study list and "implicit" memory is indexed by the percentage of study words generated spontaneously to complete the word stems. With regard to ToM tasks, instructions might be considered indirect if they neither mention nor cue mental state causation, as occurred on the picture sequencing and joke appreciation tasks when participants were simply instructed to sequence the cards and to explain the jokes, respectively. In contrast, a direct instruction might probe, "What does Jane *think*?" While the story comprehension task instructions were not as direct as this, they nevertheless used questions which queried agents' reasons for their actions (eg, "Why did the burglar do that?") and thus might have cued awareness of the relevance of mental state causation.

But, if it is instruction type which makes for the intriguing dissociations between ToM tasks, why should an implicit, or automatic, sensitivity to other people's mental states, rather than a cued awareness of the relevance of mental state causation, better predict insight in schizophrenia? While we have argued that it is primarily the perspective-taking component of ToM tasks which explains why people with schizophrenia perform so poorly on these tasks, most ToM theoreticians would argue that ToM tasks tap both first-person perspective-taking ability (imagining what it would be like to be in the "mental shoes" of another person so as to understand the other "from the inside looking out") and third-person inferencing about minds (reasoning about the thoughts of another person to explain that other's actions "from the outside looking in"), perhaps to varying degree. If so, the degree to which different tasks tap these 2 types of ToM capacity might be nuanced by the task instructions. Since the more direct ToM story instructions likely alert participants to the relevance of mental state causation, perhaps these more direct instructions bias participants to use their third-person ToM inferencing more than their first-person perspective-taking.

This might then explain why scores from the ToM story comprehension task are less strongly associated with insight in patients. This is because these scores might very well show the degree to which patients can engage their third-person ToM inferencing to reason that other people do not think or believe what they themselves think or believe. But such reasoning is not sufficient for insight. Insight requires that the patients imagine what it would be like to stand in the "mental shoes" of the other person (perhaps better indexed by ToM tasks using indirect instructions to tap a spontaneous ability to appreciate the world from other first-person viewpoints) so as to imagine what it would be like to actually think what that other person thinks (in the case of insight, to think what that other person thinks about the circumstances concerning one's own mental health). And then, of course, there is the point raised in the introduction that even this is not sufficient for insight. This is because it is one thing to allow oneself to imagine what it would be like to think what others think (eg, that one has a mental illness) and an entirely different thing to accept that the other perspective is the more accurate concerning the true state of affairs, an acceptance which might be particularly difficult for people who are motivated (unconsciously) to avoid negative self-reflection.

Clearly the conceptual territory of insight needs to be mapped out with considerable clarity in order to better understand all the cognitive and the metacognitive capacities, as well as the motivational factors, which promote intact insight. Nevertheless, this study has highlighted some important distinctions between these various components and has further highlighted that ToM tasks with indirect task instructions might better tap the cognitive capacity "to see the world as others do" which is required for insight but which is not sufficient to ensure insight.

The limitations of this study need to be acknowledged before a final summary and conclusions. The primary focus of this study was to explore a potential relationship between ToM and insight. In future work, it would be fruitful to also include tasks which require self-description of facts about the self but which do not require comment on one's own mental states, as well as ToM scenarios about other people's mental illness and brain injury. Moreover, the general cognitive battery used in the present study was limited, including only additional tasks to assess general intelligence and verbal comprehension/memory. Finally, it might be informative, in light of our findings, and the comments above concerning a distinction between third-person ToM inferencing and first-person ToM perspective-taking, to systematically vary the probing of insight so as to contrast responses to questions such as "What do other people think about the state of your mind?" (see, eg, Koren et al[57]); "Do they have any grounds for thinking such thoughts?" (perhaps more likely to tap first-person persepective-taking); "What would you think about someone who said and did the things that you do?"; and "Can you imagine ever thinking such thoughts about yourself?" A future study which more comprehensively assesses neurocognition, ToM, and also motivational factors, while also systematically varying the probing of insight in the same sample of schizophrenia patients would likely be very informative.

Summary and Conclusions

The findings of this study are in general support of a cognitive neuropsychological approach to the study of awareness of illness and accord with the hypothesis that a general difficulty with adopting other people's mental perspectives, indexed by performance deficits on (some) ToM tasks, contributed to impaired insight in schizophrenia; in particular, reduced awareness concerning schizophrenic illness and symptoms (but not treatment compliance). The nature of ToM impairment associated with poor insight appears best tapped by ToM tasks which use indirect (rather than direct) instructions to tap an implicit, automatic monitoring of other people's viewpoints. Of perhaps more import, the study findings also caution against a naive assumption that all ToM tasks tap equally a unitary underlying mechanism and highlight the need for future work to systematically investigate the differential effects of task manipulations (eg, instruction type) on ToM task performance. They also suggest that future work on ToM and metacognition in relation to insight might be informed by systematically varying the specific wording of questions used to probe insight in schizophrenia (whether about mental illness, per se, or psychotic symptoms). In future work, we also hope to examine whether awareness of acquired brain injury is also related to ToM task performance in the same way that awareness of schizophrenic illness and symptoms appeared to be in the present study.

Funding

Australian Research Council (ARC) Australian Research Fellowship awarded to R.L.

Acknowledgments

Special thanks to Prof. Max Coltheart for continuing support during data collection and manuscript preparation. Research support was provided by Jennifer McLaren and Tonia Corner. Recruitment of clinical participants was facilitated by the Schizophrenia Research Institute of Australia.

References

1. Amador XF, Gorman JM. Psychopathologic domains and insight in schizophrenia. *Psychiatr Clin North Am*. 1998;21:27–42.
2. Carpenter WT, Straus JS, Bartko JJ. Flexible system for the diagnosis of schizophrenia: report from the WHO International Pilot Study of Schizophrenia. *Science*. 1973;182:1275–1277.
3. Bartko G, Herczeg I, Zador G. Clinical symptomatology and drug compliance in schizophrenic patients. *Acta Psychiatr Scand*. 1988;77:74–76.
4. Buchanan A. A two-year prospective study of treatment compliance in patients with schizophrenia. *Psychol Med*. 1992;22:787–797.
5. Cuffel BJ, Alford J, Fischer EP, Owen RR. Awareness of illness in schizophrenia and outpatient treatment adherence. *J Nerv Ment Dis*. 1996;184:653–659.
6. Donohoe G, Owens N, O'Donnell C, et al. Predictors of compliance with neuroleptic medication among inpatients with schizophrenia: a discriminant function analysis. *Eur Psychiatry*. 2001;16:293–298.
7. Smith TE, Hull JW, Goodman M, et al. The relative influences of symptoms, insight, and neurocognition on social adjustment in schizophrenia and schizoaffective disorder. *J Nerv Ment Dis*. 1999;187:102–108.
8. Amador XF, Flaum M, Andreasen NC, et al. Awareness of illness in schizophrenia and schizoaffective and mood disorders. *Arch Gen Psychiatry*. 1994;51:826–836.
9. David AS, van Os J, Jones P, Fahy T, Harvey I, Fŏrster A. Insight and the course of psychiatric illness: cross-sectional and longitudinal associations. *Br J Psychiatry*. 1995;167:621–626.
10. Fennig S, Everett E, Bromet EJ, et al. Insight in first-admission psychotic patients. *Schizophr Res*. 1996;22:257–263.
11. McEvoy JP, Freter S, Everett G, Geller JL. Insight and the clinical outcome of schizophrenic patients. *J Nerv Ment Dis*. 1989;177:48–51.
12. Schwartz RC. The relationship between insight, illness and treatment outcome in schizophrenia. *Psychiatr Q*. 1998;69:1–22.
13. Schwartz RC, Cohen BN, Grubaugh A. Does insight affect long-term inpatient treatment outcome in chronic schizophrenia? *Compr Psychiatry*. 1997;38:283–288.
14. Lysaker P, Bell M, Milstein R, Bryson G, Beam-Goulet J. Insight and psychosocial treatment compliance in schizophrenia. *Psychiatry*. 1994;57:307–315.

15. Lysaker P, Bryson GJ, Bell MD. Insight and work performance in schizophrenia. *J Nerv Ment Dis*. 2002;190:142–146.
16. Lysaker PH, Bryson GJ, Lancaster RS, Evans JD, Bell MD. Insight in schizophrenia: associations with executive function and coping style. *Schizophr Res*. 2002;59:41–47.
17. Lysaker PH, Lancaster RS, Davis LW, Clements CA. Patterns of neurocognitive deficits and unawareness of illness in schizophrenia. *J Nerv Ment Dis*. 2003;191:38–44.
18. Lysaker PH, Bryson GJ, Marks K, Greig TC, Bell MD. Coping style in schizophrenia: associations with neurocognitive deficits and personality. *Schizophr Bull*. 2004;30:113–121.
19. Langdon R, Corner T, McLaren J, Ward PB, Coltheart M. Externalizing and personalizing biases in persecutory delusions: the relationships with poor insight and theory of mind. *Behav Res Ther*. 2006;44(5):699–713.
20. Aleman A, Agrawal N, Morgan KD, David AS. Insight in psychosis and neuropsychological function: meta-analysis. *Br J Psychiatry*. 2006;189:204–212.
21. Startup M. Insight and cognitive deficits in schizophrenia: evidence for a curvilinear relationship. *Psychol Med*. 1996;26: 1277–1281.
22. Drake JD, Lewis SW. Insight and neurocognition in schizophrenia. *Schizophr Res*. 2003;62:165–173.
23. Rossell SL, Coakes J, Shapleske J, Woodruff PWR, David AS. Insight: its relationship with cognitive function, brain volume and symptoms in schizophrenia. *Psychol Med*. 2003;33:111–119.
24. Young DA, Davila R, Scher H. Unawareness of illness and neuropsychological performance in chronic schizophrenia. *Schizophr Res*. 1993;10:117–124.
25. Young DA, Zakzanis KK, Bailey C, et al. Further parameters of insight and neuropsychological deficit in schizophrenia and other chronic mental disease. *J Nerv Ment Dis*. 1998;186:44–50.
26. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 4th ed. Washington, DC: American Psychiatric Association; 2000.
27. David AS. Insight and psychosis. *Br J Psychiatry*. 1990;156: 798–808.
28. David AS. ''To see ourselves as others see us'': Aubrey Lewis's insight. *Br J Psychiatry*. 1999;175:210–216.
29. McNally SE, Goldberg JO. Natural cognitive coping strategies in schizophrenia. *Br J Med Psychol*. 1997;70:159–167.
30. Premack D, Woodruff G. Does the chimpanzee have a theory of mind? *Behav Brain Sci*. 1978;1(4):515–526.
31. Baron-Cohen S. *Mindblindness: An Essay on Autism and Theory of Mind*. Cambridge, MA: MIT Press; 1995.
32. Koren D, Seidman LJ, Poyurovsky M, et al. The neuropsychological basis of insight in first-episode schizophrenia: a pilot metacognitive study. *Schizophr Res*. 2004;70:195–202.
33. Brüne M. ''Theory of Mind'' in Schizophrenia: a review of the literature. *Schizophr Bull*. 2005;31:21–42.
34. Harrington L, Siegert R, McClure J. Theory of mind in schizophrenia: a critical review. *Cognit Neuropsychiatry*. 2005;10(4):249–286.
35. Langdon R. Theory of mind and social dysfunction: psychotic solipsism versus autistic asociality. In: Repacholi B, Slaughter V, eds. *Individual Differences in Theory of Mind: Implications for Typical and Atypical Development*. Hove, UK: Psychology Press; 2003:241–270.
36. Langdon R. Theory of mind in schizophrenia. In: Malle B, Hodges S, eds. *Other Minds*. New York: Guilford Press; 2005:333–342.
37. Langdon R, Coltheart M, Ward PB, Catts SV. Mentalising, executive planning, and disengagement in schizophrenia. *Cognit Neuropsychiatry*. 2001;6:81–108.
38. Langdon R, Coltheart M, Ward PB, Catts SV. Disturbed communication in schizophrenia: the role of poor pragmatics and poor theory-of-mind. *Psychol Med*. 2002;32:1273–1284.
39. Langdon R, Davies M, Coltheart M. Understanding minds and understanding communicated meanings in schizophrenia. *Mind Lang*. 2002;17:68–104.
40. Rowe A, Bullock PR, Polkey CE, Morris RG. ''Theory of mind'' impairments and their relationship to executive functioning following frontal lobe excisions. *Brain*. 2001;124(3):600–616.
41. Langdon R, Coltheart M. Visual perspective-taking and schizotypy: evidence for a simulation-based account of mentalising in normal adults. *Cognition*. 2001;82:1–26.
42. Langdon R, Coltheart M, Ward PB, Catts SV. Visual and cognitive perspective-taking impairments in schizophrenia: a failure of allocentric simulation? *Cognit Neuropsychiatry*. 2001;6:241–270.
43. Langdon R, Coltheart M, Ward PB. Empathetic perspective-taking is impaired in schizophrenia: evidence from a study of emotion attribution and theory of mind. *Cognit Neuropsychiatry*. 2006;11:133–155.
44. Goldman AI. *Simulating Minds: The Philosophy, Psychology, and Neuroscience of Mindreading*. Oxford, UK: Oxford University Press; 2006.
45. Drake RJ, Lewis SW. Insight and neurocognition in schizophrenia. *Schizophr Res*. 2003;62:165–173.
46. Bora E, Sehitoglu G, Aslier M, Atabay I, Veznedaroglu B. Theory of mind and unawareness of illness in schizophrenia. Is poor insight a mentalizing deficit? *Eur Arch Psychiatry Clin Neurosci*. 2007;257:104–111.
47. Davies M, Davies A, Coltheart M. Anosognosia and the two-factor theory of delusions. *Mind Lang*. 2005;20(2):209–236.
48. Castle DJ, Jablensky A, McGrath JJ, et al. The diagnostic interview for psychoses (DIP): development, reliability and applications. *Psychol Med*. 2006;36:69–80.
49. First MB, Gibbon M, Spitzer RL, Willimas JBW. *User's Guide for the Structural Clinical Interview for DSM-IV Axis 1 Disorders—Research Version—(SCID-1, Version 2.0)*. New York, NY: Biometrics Research; 1996.
50. Langdon R, Coltheart M. Mentalising, schizotypy, and schizophrenia. *Cognition*. 1999;71:43–71.
51. Happé FGE, Hiram WE. Acquired ''theory of mind'' impairments following stroke. *Cognition*. 1999;70:211–240.
52. Happé FGE. An advanced test of theory of mind: understanding of story characters' thoughts and feelings by able autistic, mentally handicapped, and normal children and adults. *J Autism Dev Disord*. 1994;24:129–154.
53. Fletcher PC, Happe F, Frith U, Baker SC. Other minds in the brain: a functional imaging study of ''theory of mind'' in story comprehension. *Cognition*. 1995;57:109–128.
54. Andreasen NC. Negative symptoms in schizophrenia: definition and reliability. *Arch Gen Psychiatry*. 1982;39:784–788.
55. Andreasen NC. *The Scale for the Assessment of Positive Symptoms (SAPS)*. Iowa City, IA: University of Iowa; 1984.
56. Kemp R, David A. Insight, compliance. In: Blackwell B, ed. *Treatment Compliance and the Therapeutic Alliance*. Amsterdam, The Netherlands: Harwood Academic Publishers; 1997:61–84.
57. Koren D, Viksman P, Giuliano AJ, Seidman LJ, Poyurovski M, Klein E. The course and nature of insight change in patients with recent-onset schizophrenia: from unawareness to disagreement. *Schizophr Res*. 2006;86:S106.