Common Sense, Insight, and Neuropsychological Test Performance in Schizophrenia Patients


Abstract

We report an exploratory study examining the interrelationships among common sense, insight into psychosis, and performance on a battery of neuropsychological tests in 32 patients with schizophrenia evaluated at the time of discharge from involuntary hospitalization at a State psychiatric hospital. Common sense, as measured by the Social Knowledge Questionnaire, was associated with better performance across tests measuring parietal lobe functioning and vocabulary. In addition, patients with more common sense were more likely to say that they were ill and needed treatment. A global measure of insight, the Insight and Treatment Attitudes Questionnaire (ITAQ), was related to performance on a test of left parietal lobe function. However, the responses to the ITAQ item that may best reflect current awareness of mental illness in patients at the time of discharge ("After you are discharged, is it possible you may have mental problems again?") were related to performance on tests of the functioning of the prefrontal lobes and the right and left parietal lobes. These results add to the growing evidence that some of the deficits in awareness of illness among patients with schizophrenia are related to the neuropsychological dysfunction commonly seen in patients with this disorder.


Recent research reports have focused on two aspects of thinking disturbance in individuals with schizophrenia that have important implications for treatment and outcome. The first is the patients' poor ability to understand social interactions in the real world; the second is their frequent unawareness of their illness.

Cutting and Murphy (1988, 1990) developed the Social Knowledge Questionnaire (SKQ) to measure how individuals think about or judge events in the real world (i.e., common sense). Schizophrenia patients were found to be deficient in their knowledge of everyday social interactions compared to both nonpsychotic psychiatric patients and to inpatients with mania or depression (Cutting and Murphy 1988, 1990). Indeed, 65 percent of the patients with schizophrenia scored at least two standard deviations below the mean of nonpsychotic patients.

A second aspect of judgment that is deficient in many schizophrenia patients involves their lack of insight into their illness (see Amador et al. 1991 for a recent review). Indeed, it is well documented that many patients with schizophrenia deny that they are ill or need treatment, despite their families urging them to take their medicines, despite their repeated hospitalizations, and despite the disengagement from normal social patterns that the illness brings.

The importance of insight is underscored by the findings of significant relationships of insight to course of illness and compliance with treatment (Lin et al. 1979; McEvoy et al. 1989a, 1989b; Buchanan 1992). Nevertheless, there appears to be no strong relationship between insight and severity of symptomatology, number of hospitalizations, or chronicity (McEvoy et al. 1988c; Amador et al. 1994; but see Young et al. 1993 for an exception). Similarly, there is no clear association between social knowl-
edge and subtype of schizophrenia, length of hospitalizations, or the presence of formal thought disorder, perceptual disturbance, or inattention (Cutting and Murphy 1988, 1990).

The purpose of the current study was twofold. The first goal was to determine whether deficiencies in common sense among schizophrenia patients are related to their lack of insight into their mental disorder. If these patients have a generalized inability to make effective judgments about the world, their lack of insight might be a manifestation of a more global deficit in social judgment. If so, individuals with less insight should also display less accurate judgment about everyday events; conversely, patients with more insight should evidence better social judgment.

The second question addressed by this study is whether social knowledge and insight are related to cognitive deficits (McGlynn and Kaszniak 1991). Although schizophrenia patients frequently perform poorly on standardized neuropsychological tests, it is not currently known how this type of deficit is related to awareness of self or of social interactions that occur in everyday life. This issue has not been investigated extensively, but several recent studies have failed to find significant relationships between global insight and composite measures of neuropsychological performance (McEvoy et al. 1993; Peralta and Cuesta 1994). One aspect of insight—awareness of current symptoms as measured by the Scale to Assess Unawareness of Mental Disorder (Amador et al. 1994)—has been linked to impaired scores on the Wisconsin Card Sorting Test (WCST; Heaton et al. 1993), a neuropsychological test of prefrontal lobe functioning (Young et al. 1993).

In summary, we report a study examining the interrelationships among common sense, insight into psychosis, and performance on a battery of neuropsychological tests in patients with schizophrenia. Both the relationships between insight and social knowledge, as well as their association with neuropsychological deficits, were investigated in patients at the time of their discharge from involuntary hospitalization at a State psychiatric hospital.

Methods

The study included 19 men and 13 women ranging in age from 19 to 59 (mean ± standard deviation [SD] = 34 ± 10 years) and having had 6 (± 6) previous hospitalizations (range = 0–29). All had clinical diagnoses of schizophrenia (12 paranoid subtypes, 14 undifferentiated subtypes) or schizoaffective disorder (n = 6) according to DSM–III–R criteria (American Psychiatric Association 1987). They had completed 11 (± 2) years of education (range = 7–15). Twenty-seven were right-handed and five left-handed. All provided signed informed consent to participate after the study procedures were reviewed with them.

Awareness of how people tend to act in society was assessed by the SKQ (nine items, scored 1 = correct or 0 = incorrect; adapted from Cutting and Murphy 1990; see appendix).

Insight into psychosis was measured by the Insight and Treatment Attitudes Questionnaire (ITAQ; McEvoy 1989a) (11 items, scored 0 = no insight, 1 = partial insight, or 2 = good insight; copies and scoring criteria are available from the corresponding author). We also explored relationships between the ITAQ items, the SKQ, and neuropsychological test performance because of the recent report of a significant relationship between a specific aspect of insight—awareness of current symptoms—and the number of categories completed and the percentage of perseverative responses on the WCST (Young et al. 1993).

Neuropsychological tests were selected to assess functioning of the left and right parietal lobes and the prefrontal lobes. We focused on these areas of the brain because lesions to these areas have been associated with reduced awareness of deficits (Stuss and Benson 1984; McGlynn and Schacter 1989). In particular, parietal lesions have been linked to a loss of awareness of the contralateral side of space and to an absence of awareness of cognitive deficits; patients with prefrontal damage tend to show reduced self-awareness and disturbances in social awareness and self-control. Thus, the test battery included three measures of right parietal function: Judgment of Line Orientation (Benton et al. 1983), Block Design subtest of the Wechsler Adult Intelligence Scale–Revised; (WAIS–R; Wechsler 1981), and Rey-Osterrieth Complex Figure Test (Osterrieth 1944). The battery also included two measures of left parietal function (Finger Localization Test and Right–Left Orientation Test [Benton et al. 1983]) and three measures of prefrontal function: one left prefrontal test (Controlled Word Association Test; Benton and Hamsher 1976), one right prefrontal test (Ruff Figural Fluency Test; Ruff et al. 1987), and one global prefrontal test (WCST).

In addition, a measure of verbal ability was included (the Vocabulary subtest of the WAIS–R). Tests were scored using standard procedures, and raw scores were used for all statistical analyses.

The Brief Psychiatric Rating Scale
(BPRS; Overall and Gorham 1962) was used to measure the psychopathology of schizophrenia. The test has 16 items scored 1–7.

A principal components factor analysis with varimax rotation was performed to determine whether patients' performance on the nine neuropsychological tests clustered into factors with face validity. Factor loadings were applied to each patient's test scores to determine factor scores; the factor scores as well as individual raw test scores were used in the calculation of correlations between neuropsychological test performance and the SKQ and ITAQ. Because the distributions of some of the variables were not normal, we ranked the scores before computing Pearson correlation coefficients. Because some of the neuropsychological tests showed correlations with age, we report partial correlations with age removed. We also list in tabular form the simple correlations between the neuropsychological tests, age, the SKQ, and ITAQ. As this is an exploratory study, the \( p \) values have not initially been corrected for multiple tests so that trends in the data can be shown. However, we also report Bonferroni-corrected \( p \)-value requirements and note the effects of correction. As a final method for testing the hypotheses, exploratory regression analyses were also conducted in an effort to identify combinations of variables that predicted the SKQ and ITAQ scores. In these analyses, only test scores that showed correlations with uncorrected \( p \) values \( \leq 0.05 \) with the SKQ or ITAQ were entered into the model.

**Results**

The mean SKQ score was 5.9 ± 2.1 (range = 1–9), which is similar to the results (5.1 ± 2.3) reported by Cutting and Murphy (1988) in patients with schizophrenia. The mean ITAQ score was 11.1 ± 5.9 (range = 1–22), which is similar to the results we reported in another group of patients with schizophrenia at discharge (McEvoy et al. 1989a). Scores on the individual neuropsychological tests are listed in table 1. They reflect a higher rate of impaired performance (range = 21.9%–67.7%) than we found in our previously studied university hospital outpatient sample (McEvoy et al. 1993), but the range of performance was wide. The mean BPRS total score was 26.9 ± 6.8 (range = 19–41), indicating generally mild psychopathology.

Scree plot analysis indicated that only two factors should be extracted from the neuropsychological test results. To verify the obtained rotated factor structure, we repeated the analysis 10 times using computer-selected random samples of 27 of the 32 subjects. These analyses indicated slight variations in the absolute magnitude of the factor loadings, but the order of the loadings on the factors

<table>
<thead>
<tr>
<th>Test</th>
<th>Maximum possible score</th>
<th>Mean score (SD)</th>
<th>Observed range</th>
<th>Percent of patients impaired ¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right parietal function</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orientation</td>
<td>30</td>
<td>17.6 (9.6)</td>
<td>0–30</td>
<td>34.4</td>
</tr>
<tr>
<td>WAIS–R Block Design</td>
<td>51</td>
<td>20.0 (12.3)</td>
<td>0–42</td>
<td>34.4</td>
</tr>
<tr>
<td>Rey-Osterrieth Complex Figure Test</td>
<td>36²</td>
<td>25.3 (8.0)</td>
<td>9–36</td>
<td>56.3</td>
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<tr>
<td>Left parietal function</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Finger Localization Test</td>
<td>60</td>
<td>53.1 (7.8)</td>
<td>26–60</td>
<td>25.0</td>
</tr>
<tr>
<td>Right–Left Orientation Test</td>
<td>20</td>
<td>16.7 (3.4)</td>
<td>9–20</td>
<td>37.5</td>
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<tr>
<td>Prefrontal function</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Controlled Word Association Test</td>
<td>(³)</td>
<td>25.2 (10.1)</td>
<td>0–49</td>
<td>21.9</td>
</tr>
<tr>
<td>Ruff Figural Fluency Test</td>
<td>(⁴)</td>
<td>48.6 (17.8)</td>
<td>20–84</td>
<td>67.7</td>
</tr>
<tr>
<td>Wisconsin Card Sorting Test</td>
<td>6⁵</td>
<td>3.5 (2.3)</td>
<td>2–6</td>
<td>43.8</td>
</tr>
<tr>
<td>Verbal ability</td>
<td>WAIS–R Vocabulary</td>
<td>70</td>
<td>32.2 (16.9)</td>
<td>46.9</td>
</tr>
</tbody>
</table>

Note.—Judgment of Line Orientation (Benton et al. 1983); WAIS–R = Wechsler Adult Intelligence Scale–Revised (Wechsler 1981); Rey-Osterrieth Complex Figure Test (Osterrieth 1944); Finger Localization Test (Benton et al. 1983); Right–Left Orientation Test (Benton et al. 1983); Controlled Word Association Test (Benton and Hamsher 1976); Ruff Figural Fluency Test (Ruff et al. 1987); Wisconsin Card Sorting Test (Heaton et al. 1993). SD = standard deviation.

¹A score was considered in the impaired range if it was at the fifth percentile or less, based on age- and education-adjusted norms when available.
²Copy score.
³Score reflects the total of three trials.
⁴Score reflects the number of unique designs.
⁵Score reflects the number of categories achieved.
did not change. Using the criterion that a test must have a factor loading of at least 0.7, four tests primarily reflecting parietal function make up the first factor (Judgment of Line Orientation, WAIS-R Block Design, Rey-Osterrieth Complex Figure Test, and Right–Left Orientation Test). The three tests addressing prefrontal function comprise the second factor (Controlled Word Association Test, WCST, Ruff Figural Fluency Test). This pattern of findings supports the validity of the neuropsychological test results. Two tests, Finger Localization and Vocabulary, loaded similarly on both factors with weights that were less than 0.60 (range = 0.42–0.58) and thus were not included on either factor. The percentage of total variance accounted for by the two factors ranged from 58.4 to 68.3 percent during the repeated random-sample iterations.

The SKQ showed age-corrected partial correlations ($p < 0.05$) with four of the five tests of parietal function (Judgment of Line Orientation: $r = 0.51$, $p = 0.006$; WAIS-R Block Design subtest: $r = 0.37$, $p = 0.045$; Rey-Osterrieth Complex Figure Test: $r = 0.38$, $p = 0.041$; Finger Localization Test: $r = 0.55$, $p = 0.002$; Bonferroni correction: $0.05/8 = 0.00625$) as well as with the parietal factor ($r = 0.50$, $p = 0.006$). There was also significant partial correlation between the SKQ and the WAIS Vocabulary subtest ($r = 0.55$, $p = 0.002$). The simple correlations between these neuropsychological tests, age, and the SKQ are presented in table 2. When all the neuropsychological tests that were correlated at $p$ values $\leq 0.05$ were offered into a stepwise multiple regression analysis, after age had been entered, only the WAIS Vocabulary subtest was selected; age and the WAIS–R Vocabulary subtest score explained 39 percent of the variance in SKQ score ($F = 8.80$; $df = 2,27$; $p = 0.001$). When only the parietal factor was offered after age had been entered, these two variables explained 32 percent of the variance ($F = 6.22$; $df = 2,26$; $p = 0.006$).

With respect to the ITAQ, the Right–Left Orientation Test (a test of left parietal functioning) was the only individual neuropsychological test showing an age-corrected correlation ($p \leq 0.05$; Bonferroni correction: $0.05/8 = 0.00625$) with the ITAQ total score ($r = 0.42$, $p = 0.022$). ITAQ items 2–6 all had correlations ranging from 0.37 to 0.45 ($p \leq 0.05$) with Right–Left Orientation Test scores. However, when Right–Left Orientation was offered into a stepwise multiple regression analysis, after age had been entered, this model did not predict a significant amount of the variance in the ITAQ total score.

Of note, the Right–Left Orientation Test ($r = 0.45$, $p = 0.014$); the WCST Categories score ($r = 0.38$, $p = 0.038$); and the WAIS–R Block Design subtest ($r = 0.39$, $p = 0.036$) were all correlated ($p \leq 0.05$; age-corrected) with ITAQ item 5 ("After you are dis-

| Test                        | Age           | WAIS–R vocabulary | ITAQ       | SKQ  \
|-----------------------------|---------------|-------------------|------------|------
| Right parietal function     |               |                   |            |      
| Judgment of Line Orientation|              |                   |            | 0.49 |
| WAIS–R Block Design         | 0.58          |                   |            | 0.43 |
| Rey-Osterrieth Complex      | 0.53          |                   |            | 0.40 |
| Figure Test                 | (0.002)       |                   |            |      |
| Left parietal function      |               |                   |            |      
| Finger Localization Test    | 0.53          |                   |            | 0.55 |
| Right–Left Orientation Test | 0.37          |                   |            |      |
| Prefrontal function         |               |                   |            |      
| Controlled Word Association Test | 0.54    |                   |            |      |
| Ruff Figural Fluency Test   | -0.58         |                   |            | 0.45 |
| Wisconsin Card Sorting Test | -0.41         |                   |            | 0.49 |
| Sorting Test                | (0.021)       |                   |            | 0.43 |
| Verbal ability              |               |                   |            |      
| WAIS–R Vocabulary           | 0.54          |                   |            |      |

Note.—SKQ = Social Knowledge Questionnaire (Cutting and Murphy 1988, 1990); ITAQ = Insight and Treatment Attitudes Questionnaire (McEvoy et al.1989a); WAIS–R = Wechsler Adult Intelligence Scale–Revised (Wechsler 1981); Judgment of Line Orientation (Benton et al. 1983); Rey-Osterrieth Complex Figure Test (Osterrieth 1944); Finger Localization Test (Benton et al. 1983); Right–Left Orientation Test (Benton et al. 1983); Controlled Word Association Test (Benton and Hamsher 1976); Ruff Figural Fluency Test (Ruff et al. 1987); Wisconsin Card Sorting Test (Heaton et al. 1990).
charged, is it possible you may have mental problems again?"). An argument can be made that this item best reflects current awareness of illness in patients about to be discharged. When these three tests were offered into a stepwise multiple regression analysis, after age had been entered, only Right–Left Orientation was selected; this model explained 19 percent of the variance in the ITAQ item 5 score ($F = 3.361; df = 2.29; p = 0.049$).

The SKQ was correlated with the ITAQ total score ($r = 0.39, p = 0.050$) and with ITAQ items 1–3 ($r = 0.37–0.40, p < 0.05$). Thus, patients with greater awareness of their illness also showed better social knowledge. However, offering the SKQ in addition to age and the neuropsychological test scores in the regression model described above did not result in a significant prediction of ITAQ total scores.

The BPRS total score did not correlate with either the SKQ or ITAQ scores.

**Discussion**

The results of this study indicate that, consistent with expectation, patients' social knowledge and their insight appear to be related to each other at the time of discharge. Patients with more common sense are more likely to say that they are ill and need treatment. However, the relationship is weak and is interwoven with patients' intellectual and neuropsychological functioning. Neither of these two aspects of judgment is related to the severity of psychopathology at discharge, as has been previously reported (Cutting and Murphy 1988; McEvoy et al. 1989a).

With regard to the relationship between social knowledge and neuropsychological functioning, it was predicted that a pattern of good performance across a wide variety of cognitive tests would support good common sense. If this type of common sense can be viewed as the ability to assess, and respond successfully to, a variety of more or less difficult situations in everyday life, one would expect such a relationship. Indeed this is the pattern of relationship that was obtained between the SKQ and the neuropsychological test battery. Of particular note, and somewhat unexpectedly, the strongest relationships were observed for tests measuring parietal lobe functioning and vocabulary.

A similar prediction with respect to insight found weaker support in the data. The correlations, although all in the expected direction, were smaller, and only one test—a measure of left parietal lobe functioning—produced a correlation with a $p = 0.05$. Nevertheless, as we focused on awareness of present illness (as reflected by ITAQ item 5), we found some support for the previously reported relationship with performance on the WCST (Young et al. 1993), as well as relationships with other tests of prefrontal and parietal lobe functioning and vocabulary.

Our exploratory look at the ITAQ items revealed that all correlations ($p < 0.05$) with the neuropsychological tests or the SKQ involved items 1–6, which reflect acknowledgment of illness. No such associations were found with items 7–11, which reflect expressed need for medication and intended compliance. These two aspects of insight may be somewhat independent (David et al. 1992; Peralta and Cuesta 1994), with only the former demonstrating clear relationships with cognitive function.

Despite the findings reported here, interpretation of these results does not permit any localization of social knowledge or insight to particular areas of the brain. Both the parietal and prefrontal lobes appear involved, and there was no a priori reason to expect the observed tendency toward stronger relationships with parietal than prefrontal lobe functioning, especially since both types of tests showed similar rates of impairment in the sample population. Thus, further work is needed to clarify these findings. We recommend that future work include patients across the full range of severity of schizophrenia, from successful outpatients to chronically hospitalized, refractory inpatients; such a population was studied by Young et al. (1993), and strong relationships between insight and neuropsychological function were found. When only a narrow sample of schizophrenia patients is studied (e.g., successful outpatients alone [McEvoy et al. 1993] or acutely exacerbated inpatients alone [Cuesta and Peralta 1994]), insufficient variance may be present to delineate relationships between the variables of interest.

In summary, these results provide preliminary evidence for meaningful links between schizophrenia patients' self-awareness (i.e., insight into illness), common sense in social situations, and more pure measures of cognitive functioning. These findings are of particular interest, because of previous failures to find relationships between these aspects of judgment and a variety of measures of illness severity. In addition, they suggest the relevance of neocortical cognitive dysfunction to the ability of these patients to function in everyday life situations. However, these results clearly require replication before our conclusions are accepted as correct.
References


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