The Journal of Nervous & Mental Disease
Issue: Volume 187(9), September 1999, pp 525-531

Publication Type: [Articles]
ISSN: 0022-3018
Accession: 00005053-199909000-00001

[Articles]

Insight in Schizophrenia: Its Relationship to Measures of Executive Functions

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Abstract

Lack of awareness of specific symptoms among persons with schizophrenia has not been adequately studied in the context of neuropsychological function. The purpose of this study is to investigate whether poor insight as measured by the Scale to Assess Unawareness of Mental Disorder is empirically related to performance measures having a known association with executive functions in a group of individuals with chronic schizophrenia. The results showed that unawareness and misattribution of negative symptoms are significantly associated with deficits in some aspects of executive functioning even after a test of general intelligence had been partialed from the analyses. We conclude that unawareness of negative symptoms is associated with executive functioning in individuals with chronic schizophrenia. Unawareness of other symptoms (*i.e.,* positive symptoms) may reflect dysfunction in other types of neuropsychological processes, or it may reflect motivation to deceive oneself or others.

Poor insight or denial of illness is a prevalent feature of schizophrenia (Carpenter et al., 1978; Wilson et al., 1986). Many individuals with schizophrenia deny they are ill, are unwilling to enter or remain in the hospital, and discontinue their prescribed medications after discharge, resulting in clinical deterioration and rehospitalization (Heinrichs et al., 1985). Poor insight can be conceptualized as an expression of the disorder, much as hallucinations or delusions, and is noted to be an important discriminating factor in making subtype diagnoses of schizophrenia (Carpenter et al., 1976). Therefore, denial of illness plays an important role in the course and treatment of schizophrenia (Schwartz et al., 1997; Smith et al., 1997).

Two main broad theoretical accounts of insight have been proposed, namely the "motivational" and the "defect" theories. The former assumes that poor insight is a manifestation of attempts to deceive oneself in order to preserve one's self-esteem. The defect theory, conversely, assumes that poor insight is a direct result of cognitive deficits. This theory draws support from research on anosognosias (unawareness of deficits) in patients with brain lesions. Poor insight in schizophrenia shares common features with anosognosias in neurological disorders such that both are largely resistant to direct confrontation, and delusional explanations are often provided to explain circumstances such as hospitalizations (Cuesta and Peralta, 1994).

In evaluating the merits of the motivational and defect theories for explaining poor insight in schizophrenia, one should consider research on poor insight in other disorders such as Alzheimer's disease (AD). Unawareness of deficits is more frequent in AD than in other progressive dementing disorders (Brandt and Mower, 1985; DeBettignies et al., 1990). Furthermore, there is evidence that poor insight in AD is associated with lower regional cerebral blood flow in the right frontal lobe (Starkstein and Vazquez, 1995), as well as with severity of cognitive impairments (Migliorelli, et al., 1995) and specific deficits in frontal/executive functions (Lopez et al., 1994). Finally, McGlynn and Kaszniak (1991) have argued that if defensive denial were important, one might expect more mildly demented patients, who are beginning to experience changes related to cognitive decline, to show the greatest denial of deficits. However, their inaccuracy increases with the severity of the dementia (Anderson and Tranel, 1989; Feher et al., 1991; McGlynn and Kaszniak, 1991; Vasterling et al., 1995). Thus, poor insight in AD appears to be a function of cognitive impairment rather than motivational issues.

If the "defect" theory is correct, the next question is which cognitive deficits are associated with poor insight in schizophrenia? An argument has been made that although neurologically based disorders of awareness may involve separate cerebral areas and systems from schizophrenia, a common denominator among these disorders is mediation by frontal or pre-frontal lobe functions (Stuss and Benson, 1986). Of particular significance is that the frontal and pre-frontal areas of the cortex have become increasingly implicated as primary areas of dysfunction in schizophrenia. Findings from neuropsychology, neuroradiology, and neurophysiology have largely converged in this regard (Seidman, 1993; Weinberger et al., 1992).

There has been inconsistent support, however, for the role of frontal and prefrontal lobe functioning in poor insight in schizophrenia. Specifically, studies by Young et al. (1993) and Lysaker et al. (1994) found significant, yet small, correlations between insight and measures sensitive to frontal lobe dysfunction. However, Cuesta and Peralta (1994) failed to replicate these results. Instead, they found that lack of insight was associated with better performance on immediate verbal, immediate visual, and delayed visual memory tasks. It should be noted that only one of these studies used a comprehensive measure of awareness of symptoms (Young et al., 1993). Furthermore, none of these studies investigated insight in terms of awareness of positive versus negative symptoms.

Several studies have pointed to the association between negative symptoms and neural pathology, particularly of the frontal subcortical type. Brown and White (1991) reported that patients with a higher rating of negative symptoms were found to have more severe tardive dyskinesia, drug-induced Parkinsonism, and more impaired performance on frontal psychological tests. Goldman et al. (1993) reported that reduced attentional ability predicted the presence of higher negative symptoms, whereas neurocognitive status was unrelated to positive symptoms. Stolar et al. (1994) reported that more severe levels of certain negative symptoms were associated with poorer performance on tests that are linked with frontal lobe functioning. These findings were replicated by Hammer et al. (1995), who reported that subjects with more negative symptoms performed more poorly on neuropsychological tests sensitive to frontal lobe functioning. These findings suggest that similar mechanisms may underlie poor insight and negative symptoms in schizophrenia. In light of the association between negative symptoms and neural pathology, it seems to be theoretically interesting to distinguish between awareness of positive versus negative symptoms and to investigate their correlations with neuropsychological functioning separately.

The purpose of this study is to investigate whether insight, as measured by The Scale to Assess Unawareness of Mental Disorder (SUMD; Amador and Strauss, 1990), is associated with executive functions in a group of stabilized inpatients with chronic schizophrenia. It is hypothesized that greater deficits of awareness and misattribution of symptoms will be associated with poorer executive functioning.

Methods

Participants

Twenty-one female and 25 male subjects participated in the study. The participants were inpatients at the Lincoln Regional Center, Extended Care Program (ECP). The ECP is a psychiatric rehabilitation program from which patients are typically discharged to a less restrictive setting after 12 to 24 months of treatment. Only those individuals meeting DSM-III-R diagnostic criteria for schizophrenia were included in the study. All the data were archival, collected in the course of routine service provision. Patients with concomitant axis I diagnoses, known neuropathological conditions, or current substance abuse were excluded. Subjects' average age was 36.3 (SD = 9.8), and they had an average of 12.3 years of education (SD = 1.96).

Measures

The Scale for Unawareness of Mental Disorders (SUMD; Amador and Strauss, 1990). The SUMD is a semi-structured interview that assesses awareness of illness. The first three items assess, in turn, the subject's general awareness of a mental disorder (SUMD1), the effects of medication on the disorder (SUMD2), and a general understanding of the consequences of the disorder (SUMD3). These three items are asked of all subjects and their level of awareness, current and past, is rated on a 5-point Likert scale (1 = full awareness and 5 = full unawareness). Items 4 to 20 pertain to specific symptoms, such as delusions, hallucinations, thought disorder, alogia, avolition, and flat affect, and are asked only if it has been established via chart reviews and interviews with the treating clinical psychologist or psychiatrist that the subject has experienced the symptom either currently or in the past. The same 5-point Likert scale is used. If the subject shows awareness of a symptom, defined as a score of between 1 (full awareness) and 3 (partial awareness), the subject's attribution of the symptom is assessed and rated on a 5-point Likert scale (1 = correct attribution and 5 = incorrect attribution).

For the purpose of the present study, four additional subscale scores were computed: unawareness of negative symptoms (UNS), attribution of negative symptoms (ANS), unawareness of positive symptoms (UPS), and attribution of positive symptoms (APS). The items comprising the UPS and UNS scales were based on the breakdown of items from the Scale for the Assessment of Positive Symptoms (SAPS; Andreasen, 1984) and the Scale for the Assessment of Negative Symptoms (SANS; Andreasen, 1983). The UPS scale was comprised of the following symptom items: hallucination, delusion, thought disorder, inappropriate affect, unusual dress or appearance, stereotypic or ritualistic behaviors, poor social judgment, poor control of aggressive impulses, and poor control of sexual impulses. The UNS scale was comprised of the following items: alogia, flat or blunt affect, avolition, anhedonia, unusual eye contact, and poor social relationship. Each scale was computed by dividing the sum of Likert scale scores by the number of symptoms present.

The first 25 interviews were videotaped and scored independently by two raters. The intraclass correlation coefficients ranged from .78 to .86.

Neuropsychological Measures

Four neuropsychological measures were chosen. Each measure has well-established validity in the assessment of executive functions, although each assesses a different domain of function. These measures are the Verbal Fluency Test (Borkowski et al., 1967), the Design Fluency Test (Jones-Gotman and Milner, 1977), the Trail Making Test (Reitan and Wolfson, 1985), and a modified version of the Wisconsin Card Sorting Test (WCST; Spaulding et al., 1989a). For the Verbal Fluency Test, subjects are presented with three letters of the alphabet, F, A, and S, and are given 1 minute to orally produce as many words as possible beginning with each letter. Proper names and words with the same root but different suffixes are not permitted. Performance is indexed as the sum of all words produced in the three one-minute trials. For the Design Fluency Test, subjects are asked to draw as many different "abstract" drawings that represent neither actual objects nor nameable abstract forms (*i.e.,* geometric shapes), three indices of performance were used. First, the total number of drawings conforming to the test rules was used as an overall score. Second, the proportion of perseverative responses relative to total output (excluding unacceptable drawings) was used as the percent perseverative score. Finally, the proportion of drawings not conforming to the test rules was used as the percent random error score. Trails B is a pencil and paper test in which the subject is required to connect 25 consecutively numbered circles scattered on a sheet of paper. The subject must alternate between numeric and alphabetic stimuli. Performance on this task is indexed as the total time required to complete the test.

Two scores from a version of the WCST were used. The first is the number of random errors, and the second is the number of perseverative errors across the entire test (note: the test ends when 25 correct responses have been made). WCST requires the participant to sort cards according to one of three parameters, either color, number, or shape. The participant is given feedback as to whether she/he has selected correctly. In the Heaton's version of this test (Heaton et al., 1993), after 10 correct sorts, the task shifts to another of the parameters without prior warning to the participant. Perseverative errors occur either when the subject continues to sort according to a previously successful principle or when the subject persists in sorting on the basis of an initial erroneous guess.

For the purpose of the present study, a computerized version of the WCST designed by Spaulding et al. (1989a) as part of a more comprehensive battery (COGLAB) was used. This concept processing measure in the COGLAB is derived from an adaptation of the WCST (Fey, 1952). In this version of the WCST, the category shift criterion is five nonconsecutive correct responses. The COGLAB has been subjected to extensive multivariate analyses in normal and psychiatric subjects and was found to discriminate normal subjects from patients with less than 20% overlap (Spaulding et al., 1989b). Both indices of performance (*i.e.,* random errors and perseverative errors) have been found to discriminate schizophrenics and other psychiatric patients from normal subjects (Fey, 1952; Spaulding et al., 1989b). There is also some evidence that the relationship between the two measures discriminates between subtypes of schizophrenia (Spaulding et al., 1989b).

The Wechsler Intelligence Scale-Revised (WAIS-R, Wechsler, 1981) was used as a measure of general intelligence for the purpose of partialing out the effect of general intelligence from the relationship between insight and executive functioning.

Results

Preliminary Analysis

Table 1 summarizes the descriptive statistics for the insight scales. These statistics suggest that there is a reasonable level of variance among the participants' level of insight. Based on the test manual (Amador and Strauss, 1990), a score of three is considered the cutoff to consider an individual's level of insight sufficient to inquire about attribution (please see detailed description of the test administration above). Table 2 summarizes the percentage of participants classified as having high-partial to full insight (*i.e.,* a score < 3), or no to low-partial insight (*i.e.,* a score >= 3; higher score indicates worse insight). These results indicate that our sample included individuals with variable levels of insight.

Scale	Mean (SD)	Scale	Mean (SD)
UPS[b]	2.82 (1.45)	UNS[c]	2.79 (1.57)
APS[d]	3.16 (1.29)	ANS[e]	3.34 (1.30)
SUMD1	2.42 (1.75)	SUMD2	2.33 (1.59)
SUMD3	2.60 (1.76)		

[a]Range = 1–5.
[b]Unawareness of positive symptoms.
[c]Unawareness of negative symptoms.
[d]Misattribution of positive symptoms.
[e]Misattribution of negative symptoms.

TABLE 1 Scores on Subscales of the Scale for Unawareness of Mental Disorders[a]

	Level of insight (%)	
Item/subscale	No–partial	Partial–full
SUMD1	60	40
SUMD2	62	38
SUMD3	55	45
UNS[a]	55	45
UPS[b]	47	53
ANS[c]	27	73
APS[d]	28	71

Higher score = less awareness.
[a]Unawareness of negative symptoms.
[b]Unawareness of positive symptoms.
[c]Misattribution of negative symptoms.
[d]Misattribution of positive symptoms.

TABLE 2 Distribution of Participants' Scores on the SUMD Items and Subscales

Data Reduction

In the interest of data reduction, the inter-relationships between the neuropsychological measures were investigated. Because the scores for the Figure Fluency, and the Card Sorting Task (CST) random and perseverative errors were positively skewed, a square root transformation was first employed (Johnson and Wichern, 1982). A principal components factor analysis of the scores on Figure Fluency, Card Sorting Task, Trails B, and Word Fluency revealed three substantively interpretable factors with eigenvalues greater than 1. Table 3 shows the factor loadings for the Varimax-rotated solution.

	Factor 1	Factor 2	Factor 3
[a]Design Fluency PSV Errs Free	.655	.258	−.154
[a]Design Fluency PSV Errs Cont	.950	−.059	−.041
[a]Design Fluency Rnd Errs Free	.898	−.068	.042
[a]Design Fluency Rnd Errs Cont	.911	.001	.101
[a]Design Fluency output Free	.588	.677	−.289
[a]Design Fluency output Cont	.584	.644	.021
[a]Card Sorting Rnd Errs	−.033	.037	.916
[a]Card Sorting PSV Errs	.057	−.249	.856
Trails B	.188	−.837	.094
Word Fluency	.029	.808	−.047

[a]Square root.

PSV=perseverative; Errs=errors; Free=free condition; Cont=controlled condition; Rnd=random.

TABLE 3 Orthogonal Transformation Solution: Varimax for the Neuropsychological Measures

The first factor, "design fluency errors," which included random and perseverative errors on the Design Fluency test likely reflects the ability to vary one's responses rapidly; the second factor, "Fluency," comprising the output score of the word fluency test, the output score of the Design Fluency Test, and the score on the Trails B, likely reflects how well a person organizes his/her thinking and seeks a strategy, perseveres, and completes the task without encouragement from the examiner. The third factor, "CST," which included both random errors and perseverative errors on the Card Sorting Task, reflects the patient's ability to utilize feedback from the environment to modulate his/her responses as well as cognitive flexibility.

The three principal components accounted for 77% of the total variance: the rotated first principal component accounted for 36% of the total variance; the rotated second component accounted for 24%; and the final rotated component accounted for 17%. Component scores were computed using the standard regression method (Harman, 1967). Each score was a weighted sum of the standardized variables' scores where the weights are functions of the factor structure matrix. Because the three component scores are orthogonal to one another, they were used separately in all subsequent analyses.

Intercorrelations between Insight and Executive Functioning

The hypothesized relationship between executive functioning and insight was first tested through a series of bivariate correlations. Startup (1995) postulated the existence of a curvilinear relationship between insight and executive functioning. He hypothesized that motivation for self-deception and brain deficits are not independent processes and that they both affect insight, with a trade-off between the two, giving rise to a quadratic relationship between insight and cognitive deficits. He postulated that very good and very poor insight are only available to those patients who have relatively slight deficits. To test for a curvilinear relationship between insight and executive functioning, a set of hierarchical regressions was performed in which the three component scores were treated as dependent variables and the four insight scores (UPS, UNS, APS, and ANS) served as predictors. Multiple regression was required beyond bivariate correlations to evaluate possible nonlinear relationships and was not intended to discriminate between correlation and cause.

In these multiple regression analyses, each component score was regressed separately on each insight measure. There were, therefore, 12 separate hierarchical regressions (3 neuropsychological component scores x 4 insight measures).4 There were significant linear relationships between the second factor (Fluency) and the Unawareness of Negative Symptoms Score (UNS; $r = .39$, $t = 1.98$, $df = 24$, $p = .05$), and the third factor (Card Sorting) and the Unawareness of Positive Symptoms Score (UPS; $r = .45$, $t = 2.46$, $df = 27$, $p = .02$). There were marginally significant relationships between CST scores and Attribution of Negative Symptoms Score (ANS; $r = .45$, $t = 1.88$, $df = 16$, $p = .08$). Table 4 shows the correlations from this first step.

Neuropsychological variable	Awareness variable	Linear correlation
Design Fluency Errors	UNS[a]	$r = .28$ $df = 24$
	UPS[b]	$r = .30$ $df = 27$
	ANS[c]	$r = .30$ $df = 16$
	APS[d]	$r = .24$ $df = 20$
Fluency	UNS	$r = .39$** $df = 24$
	UPS	$r = .15$ $df = 27$
	ANS	$r = .14$ $df = 16$
	APS	$r = .38$ $df = 20$
Card Sorting Task	UNS	$r = .02$ $df = 24$
	UPS	$r = .44$** $df = 27$
	ANS	$r = .45$* $df = 16$
	APS	$r = 04$ $df = 20$

[a]Unawareness of negative symptoms.
[b]Unawareness of positive symptoms.
[c]Misattribution of negative symptoms.
[d]Misattribution of positive symptoms.
*$p < .10$; **$p < .05$

TABLE 4 Correlation Analysis of Fluency and Card Sorting Components with Symptom Awareness Scores

Following the recommendations of Cohen and Cohen (1983), the square of each insight measure was entered in the second step of the appropriate regression to test the significance of the quadratic relationship. None of the squared insight measures explained a significantly greater amount of variance.

To partial out the effect of general intelligence from the relationship between insight and executive functioning, another set of hierarchical regressions was performed in which the full scale IQ of the WAIS-R was included. In this set of regressions, IQ was entered first, followed by the insight measures. This allowed for partialing IQ out of neuropsychological performance. After controlling for IQ, the correlation between UNS and the Fluency component ($r = .41$, $t = 2.54$, $df = 23$, $p = .01$) remained significant and the correlation between ANS and Card Sorting component became significant ($r = .59$, $t = 2.26$, $df = 15$, $p = .04$). All other correlations were not significant.

Finally, it should be noted that none of the correlations between the SUMD1, SUMD2, and SUMD3 items and any of the neuropsychological factors reached statistical significance.

Discussion

We examined the association between poor insight and executive performance in a group of patients diagnosed with chronic schizophrenia. The principal conclusion of the present study is that unawareness and misattribution of negative symptoms is significantly associated with deficits in some aspects of executive functioning. The relationship remained significant even after the role of general intelligence had been partialled out from the executive measures. We conclude that a common mechanism may be responsible for both poor insight for negative symptoms and executive dysfunction in individuals with chronic schizophrenia.

It is noteworthy that not all of the neuropsychological measures correlated significantly with all of the awareness measures. Thus, there is likely some degree of specificity in terms of the neuropsychological dysfunction that coexists with unawareness of symptoms in schizophrenia. For example, unawareness and misattribution of positive symptoms were generally not significantly associated with any of the executive cognitive measures. Unawareness of positive symptoms may reflect dysfunction involving different neuropsychological functions or a generalized cognitive impairment. Conversely, it may reflect motivation to deceive oneself or others, to preserve one's self-esteem, maintain an optimistic outlook, or some similar reason. These alternative hypotheses are supported by research showing that persons with schizophrenia who have good insight into their illness are more pessimistic (Thompson, 1988), more depressed (Amador et al., 1994), and have lower self-esteem (Taylor and Perkins, 1991; Warner et al., 1989) than those with poor insight, albeit this evidence is far from conclusive.

Before further discussion, some limitations of our study should be pointed out. First, due to the nature of the SUMD interview, not every subject provided data on each item. Therefore, due to the small sample size, the correlations might have been unstable estimates of the actual effect size. Second, our sample consisted of stabilized inpatients at least 2 weeks post-hospitalization; as such, these results may not generalize to a more acutely ill population. Third, our subject population included individuals with different severities of symptoms. Because we did not include a symptom severity measure in our battery, we were unable to control for this variable on the analysis.

Based on the data obtained in this research, further exploration of the relationship between neuropsychological deficits and unawareness is clearly warranted. Although poor insight has consistently implicated frontal dysfunction via its association with executive-function tasks, some syndromes such as Capgras syndrome and reduplicative paramnesia appear to include parietal involvement (Ruff and Volpe, 1981). The use of physiological procedures, particularly magnetic resonance imaging, may better clarify the organic correlates of unawareness. It may be especially useful to use such techniques to explore the organic correlates of poor insight for specific constellations of symptoms such as negative and positive symptoms. Our findings of differences in association between neuropsychological measures and unawareness of positive versus negative symptoms suggest that it may have merit to use an awareness measure that addresses unawareness of specific symptoms rather than the presence of a mental disorder or the effects of medication only.

References

Amador XF, Flaum M, Andreasen NC, Strauss DH, Yale SA, Clark SC, Gorman J (1994) Awareness of illness in schizophrenia and schizoaffective and mood disorders. *Arch Gen Psychiatry* 51:826-836. Bibliographic Links | [Context Link]

Amador XF, Strauss DH (1990) *The Scale to Assess Unawareness of Mental Disorders.* New York: Columbia University and New York Psychiatric Institute. [Context Link]

Anderson SW, Tranel D (1989) Awareness of disease states following cerebral infarction, dementia, and head trauma: Standardized assessment. *Clin Neuropsychol* 3:327-339. [Context Link]

Andreasen NC (1983) *The Scale for the Assessment of Negative Symptoms (SANS).* Iowa City, Iowa: The University of Iowa. [Context Link]

Andreasen NC (1984) *The Scale for the Assessment of Positive Symptoms (SAPS).* Iowa City: The University of Iowa. [Context Link]

Ashbrook R, Spaulding W, Cromwell R (1988) Computer-assessed cognition in psychiatric settings: An examination of the issues. In J Mancuso, LGM Shaw (Eds), *Cognition and personal structure: Computer access and analysis* (pp 253-278). New York: Praeger.

Borkowski JG, Benton AL, Spreen O (1967) Word fluency and brain damage. *Neuropsychologia* 5:135-140. Bibliographic Links | [Context Link]

Brandt J, Mower P (1985) Searching for old memories in Alzheimer's and Huntington's dementia. In: *The 13th Annual International Neuropsychological Society Meeting,* San Diego, CA. [Context Link]

Brown KW, White T (1991) The association among negative symptoms, movement disorders, and frontal lobe psychological deficits in schizophrenic patients. *Biol Psychiatry* 30:1182-1190. Bibliographic Links | [Context Link]

Carpenter WT, Bartko JJ, Carpenter CL, Strauss JS (1976) Another view of schizophrenia subtypes. *Arch Gen Psychiatry* 33:508-516. [Context Link]

Carpenter WT, Bartko JJ, Strauss JS, Hawk AB (1978) Signs and symptoms as predictors of outcome: A report from the International Pilot Study of Schizophrenia. *Am J Psychiatry* 135:940-944. [Context Link]

Cohen J, Cohen P (1983) *Applied multiple regression/correlation analysis for the behavioral sciences* (2nd ed). Hillsdale, NJ: Erlbaum. [Context Link]

Cuesta MJ, Peralta V (1994) Lack of insight in schizophrenia. *Schizophr Bull* 20:359-366. [Context Link]

DeBettignies BH, Mahurin RK, Priozzolo FJ (1990) Insight for impairment in independent living skills in Alzheimer's disease and multi-infarct dementia. *J Clin Exp Neuropsychol* 12:355-363. Bibliographic Links | [Context Link]

Feher EP, Mahurin RK, Inbody SB, Crook TH (1991) Anosognosia in Alzheimer's disease. *Neuropsychiatry, Neuropsychol, Behav Neurol* 4:136-146. [Context Link]

Fey, E (1952) The performance of young schizophrenics on the Wisconsin Card Sorting Test. *J Consult Clin Psychol* 15:311-319. [Context Link]

Goldman P, Axelrod B, Tandon R (1993) Spurious WAIS-R cholinergic profiles in schizophrenia. *Clin Neuropsychol* 7:171-178. [Context Link]

Hammer M, Katsanis J, Iacono W (1995) The relationship between negative symptoms and neuropsychological performance. *Biol Psychiatry* 37:828-830. Bibliographic Links | [Context Link]

Harman H (1967) *Modern factor analysis* (2nd ed). Chicago: University of Chicago Press. [Context Link]

Heaton RK, Chelune GJ, Talley JL, Kay GG, Curtiss G (1993) *Wisconsin Card Sorting Test (manual, revised and expanded).* Odessa, FL: Psychological Assessment Resources. [Context Link]

Heinrichs DW, Cohen BP, Carpenter WT (1985) Early insight and the management of schizophrenic patients decompensation. *J Nerv Ment Dis* 173:133-138. [Context Link]

Johnson RA, Wichern DW (1982) *Applied multivariate statistical analysis.* Englewood Cliffs, NJ: Prentice-Hall. [Context Link]

Jones-Gotman M, Milner B (1977) Design fluency: The invention of nonsense drawings after focal cortical lesions. *Neuropsychologia* 15:653-674. Bibliographic Links | [Context Link]

Kotler-Cope S, Camp CJ (1995) Anosognosia in Alzheimer disease. *Alzheimer Dis Assoc Disord* 9:52-56. Ovid Full Text | Bibliographic Links |

Lopez O, Becker J, Somsak D, Dew M (1994) Awareness of cognitive deficits and anosognosia in probable

Alzheimer's disease. *Eur Neurol* 34:277-282. Bibliographic Links | [Context Link]

Lysaker P, Morris, B, Milstein, R, Bryson, G, Beam-Goulet, J (1994) Insight and psychosocial treatment compliance in schizophrenia. *Psychiatry* 57:307-315. [Context Link]

McGlynn S, Kaszniak A (1991) When metacognition fails: Impaired awareness of deficit in Alzheimer's disease. *J Cognit Neurosci* 3:183-189. [Context Link]

Migliorelli R, Teson A, Sabe L, Petracca G (1995) Anosognosia in Alzheimer's disease: A study of associated factors. *J Neuropsychiatry Clin Neurosci* 7:338-344. [Context Link]

Reitan RM, Wolfson D (1985) *The Halstead-Reitan Neuropsychological Test Battery.* Tucson, AZ: Neuropsychology Press. [Context Link]

Ruff R, Volpe B (1981) Environmental reduplication associated with right frontal and parietal lobe injury. *J Neurol Neurosurg Psychiatry* 44:382-386. Bibliographic Links | [Context Link]

Schwartz RC, Cohen BN, Grubaugh A (1997) Does insight affect long-term inpatient treatment outcome in chronic schizophrenia? *Compr Psychiatry* 38:283-288. Bibliographic Links | [Context Link]

Seidman L (1993) Schizophrenia and brain dysfunction: An integration of recent neurodiagnostic findings. *Psychol Bull* 94:195-238. [Context Link]

Smith CM, Barzman D, Pristach CA (1997) Effects of patient and family insight on compliance of schizophrenic patients. *J Clin Pharmacol* 37:147-154. Bibliographic Links | [Context Link]

Spaulding W, Garbin C, Crinean J (1989a) The logical and psychometric prerequisites of cognitive therapy for schizophrenia. *Br J Psychiatry* 155(suppl 5):69-73. Bibliographic Links | [Context Link]

Spaulding W, Garbin C, Dras S (1989b) Cognitive abnormalities in schizophrenic patients and schizotypal college students. *J Nerv Ment Dis* 177:717-728. Ovid Full Text | Bibliographic Links | [Context Link]

Spitzer R, Williams J (1985) *Structured Clinical Interview for DSM-III-R Patient Version.* New York: New York State Psychiatric Institute.

Starkstein S, Vazquez S (1995) A single-photon emission computed tomographic study of anosognosia in Alzheimer's disease. *Arch Neurol* 52:415-420. [Context Link]

Startup M (1995) Insight and cognitive deficits in schizophrenia: Evidence for a curvilinear relationship. *Psychological Medicine* 26:1277-1281. [Context Link]

Stolar N, Berenbaum H, Banich M, Barch D (1994) Neuropsychological correlates of alogia and affective flattening in schizophrenia. *Biol Psychiatry* 35:164-172. Bibliographic Links | [Context Link]

Stuss DT, Benson DF (1986) *The frontal lobes.* New York: Raven Press. [Context Link]

Taylor SE, Perkins RE (1991) Identity and coping with mental illness in long-stay psychiatric rehabilitation. *Br J Clin Psychol* 30:73-85. [Context Link]

Thompson EH (1988) Variation in self-concept of young adult chronic patients: Chronicity reconsidered. *Hosp Community Psychiatry* 93:771-775. [Context Link]

Vasterling J, Seltzer B, Foss J, Vanderbrook V (1995) Unawareness of deficit in Alzheimer's disease: Domain-specific differences and disease correlates. *Neuropsychiatry Neuropsychol Behav Neurol* 8:26-32. [Context Link]

Warner R, Taylor D, Powers M, Hyman J (1989) Acceptance of mental illness label by psychotic patients: Effects on functioning. *Am J Orthopsychiatry* 59:398-409. [Context Link]

Wechsler D (1981) *Wechsler Adult Intelligence Scale-Revised, Manual.* Cleveland, OH: The Psychological Corporation. [Context Link]

Weinberger D, Berman K, Suddath R, Torrey E (1992) Evidence of dysfunction of a prefrontal-limbic network in schizophrenia: A magnetic resonance imaging and regional cerebral blood flow study of discordant monozygotic twins. *Am J Psychiatry* 149:890-897. Bibliographic Links | [Context Link]

Wilson WH, Ban TA, Guy W (1986) Flexible system criteria in chronic schizophrenia. *Compr Psychiatry* 27:259-265. Bibliographic Links | [Context Link]

Young DA, Davila R, Scher H (1993) Unawareness of illness and neuropsychological performance in chronic schizophrenia. *Schizophr Res* 10:117-124. Bibliographic Links | [Context Link]

[4] Due to the nature of the SUMD interview, not every subject provided data on each item. Therefore, the degrees of freedom are uneven. [Context Link]

IMAGE GALLERY

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Scale	Mean (SD)	Scale	Mean (SD)
UPS[b]	2.82 (1.45)	UNS[c]	2.79 (1.57)
APS[d]	3.16 (1.29)	ANS[e]	3.34 (1.30)
SUMD1	2.42 (1.75)	SUMD2	2.33 (1.59)
SUMD3	2.60 (1.76)		

[a]Range = 1–5.
[b]Unawareness of positive symptoms.
[c]Unawareness of negative symptoms.
[d]Misattribution of positive symptoms.
[e]Misattribution of negative symptoms.

Table 1

	Level of insight (%)	
Item/subscale	No–partial	Partial–full
SUMD1	60	40
SUMD2	62	38
SUMD3	55	45
UNS[a]	55	45
UPS[b]	47	53
ANS[c]	27	73
APS[d]	28	71

Higher score = less awareness.
[a]Unawareness of negative symptoms.
[b]Unawareness of positive symptoms.
[c]Misattribution of negative symptoms.
[d]Misattribution of positive symptoms.

Table 2

	Factor 1	Factor 2	Factor 3
[a]Design Fluency PSV Errs Free	.655	.258	−.154
[a]Design Fluency PSV Errs Cont	.950	−.059	−.041
[a]Design Fluency Rnd Errs Free	.808	−.068	.042
[a]Design Fluency Rnd Errs Cont	.911	.001	.101
[a]Design Fluency output Free	.588	.677	−.289
[a]Design Fluency output Cont	.584	.644	.021
[a]Card Sorting Rnd Errs	−.033	.037	.916
[a]Card Sorting PSV Errs	.057	−.249	.856
Trails B	.188	−.837	.094
Word Fluency	.029	.808	−.047

[a]Square root.
PSV = perseverative; Errs = errors; Free = free condition; Cont = controlled condition; Rnd = random.

Table 3

Neuropsychological variable	Awareness variable	Linear correlation
Design Fluency Errors	UNS[a]	$r = .28$, $df = 24$
	UPS[b]	$r = .30$, $df = 27$
	ANS[c]	$r = .30$, $df = 16$
	APS[d]	$r = .24$, $df = 20$
Fluency	UNS	$r = .39$** $df = 24$
	UPS	$r = .15$, $df = 27$
	ANS	$r = .14$, $df = 16$
	APS	$r = .38$, $df = 20$
Card Sorting Task	UNS	$r = .02$, $df = 24$
	UPS	$r = .44$** $df = 27$
	ANS	$r = .45$* $df = 16$
	APS	$r = 04$, $df = 20$

[a]Unawareness of negative symptoms.
[b]Unawareness of positive symptoms.
[c]Misattribution of negative symptoms.
[d]Misattribution of positive symptoms.
*$p < .10$; **$p < .05$

Table 4

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