Subjective Dimension of Cognitive Deficit in People With Schizophrenia and Schizoaffective Disorder

Maite Pereda, Ramona Casado, Mariasun Garay, Begoña Iriarte, Aránzazu Iribarren, Jose J. Uriarte

American Journal of Psychiatric Rehabilitation, Volume 21, Numbers 1-2, Spring-Summer 2018, pp. 16-32 (Article)

Published by University of Nebraska Press

Subjective Dimension of Cognitive Deficit in People With Schizophrenia and Schizoaffective Disorder

MAITE PEREDA, RAMONA CASADO, MARIASUN GARAY, BEGOÑA IRIARTE, ARÁNZAZU IRIBARREN, AND JOSE J. URIARTE

ABSTRACT

A large body of research indicates that people with serious mental illness experience cognitive difficulties. However, research is less clear regarding whether affected individuals are aware of these deficits. In this study we explored the objective and subjective cognitive problems of people with schizophrenia or schizoaffective disorders, and tried to identify the factors associated with greater awareness of cognitive deficits. One hundred and four hospitalized people were evaluated by means of a comprehensive neuropsychological evaluation, subjective measures of cognitive functioning, and other measures including awareness of illness. The results indicated moderate correlations between objective and subjective measures of cognitive functioning. Also, a relationship between global awareness of illness and subjective awareness of cognitive deficits was found. This study emphasizes the relevance of taking into account the subjective dimension in the cognitive evaluation of people affected by these disorders.

KEYWORDS

schizophrenia, schizoaffective disorder, neurocognition, subjective cognitive complaints, awareness of illness.

1. Introduction

Cognitive impairment is considered a core feature of schizophrenia, being also present in other psychiatric disorders such as affective psychosis (Reichenberg et al., 2009). Cognitive impairment sets limits to learning and adherence to psychosocial rehabilitation interventions, with a nega-

tive impact on social and occupational functioning (Bowie et al., 2008; Ojeda et al., 2012; Sánchez et al., 2009). Scientific evidence considers that cognitive impairment in people with schizophrenia is generalized and moderate-severe in degree (Bilder et al., 2000; Bowie & Harvey, 2005; Keefe et al., 2011). The neuropsychological profile of such people is characterized by marked deficits in learning and memory, working memory, executive functions, attention, and processing speed (Reichenberg, 2010).

In recent years interest has increased for investigating whether this objective impairment is recognized by people with these disorders. Improved subjective perception of cognitive deficits would facilitate adherence to cognitive rehabilitation interventions that have been developed for this population. Moreover, a more accurate awareness of one's cognitive performance has been associated with better outcomes in the occupational area at follow-up (Verdoux, Monello, Goumilloux, Cognard, & Prouteau, 2010), with some investigators suggesting that it contributes to quality of life (Johnson et al., 2009; Prouteau et al., 2004).

Some authors have included subjective cognitive complaints within the broader framework of metacognition along with cognitive insight. The cognitive insight construct is different from the insight a person has about cognitive difficulties. It is defined as the capability of patients with psychosis to distance themselves from their psychotic experiences, reflect on them, and respond to corrective feedback (Riggs, Grant, Periovoliotis, & Beck, 2012). Tastet, Verdoux, Bergua, Destaillats, and Prouteau (2012) explored the relationship among cognitive insight, clinical insight, and subjective neurocognitive complaints in 54 people with a diagnosis of schizophrenia or schizoaffective disorder. They did not find any significant associations between cognitive insight and clinical insight; however, they found some between cognitive insight and subjective neurocognitive complaints. Thus, when people were aware of their cognitive difficulties, they were also more able to distance themselves from their judgments and beliefs, think them over, and question them. On the other hand, some studies have found a disparity between awareness of cognitive deficits (cognitive complaints) and awareness of illness and symptoms commonly associated with disease (clinical insight; Bengoechea et al., 2010; Lecardeur et al., 2009; Potvin et al., 2014).

Nevertheless, it is still unclear whether people with psychotic disorders as a group are able to recognize the extent of their cognitive problems,

with some studies concluding that they are aware of them (Bengoechea et al., 2010; Lecardeur et al., 2009; Sanjuán et al., 2006; Stip, Caron, Renaud, Pampoulova, & Lecomte, 2003), and others finding that their perspective on their cognitive function does not coincide with objective cognitive assessment through neuropsychological testing (Cella, Swan, Medin, Reeder, & Wykes, 2014; Chang et al., 2008; Johnson, Tabbane, Dellagi, & Kebir, 2011; Medalia & Lim, 2004, Medalia & Thysen, 2010; Medalia, Thysen, & Freilich, 2008).

Instruments used to measure awareness of cognitive difficulties of people with schizophrenia spectrum disorders are the Subjective Scale to Investigate Cognition in Schizophrenia (SSTICS) of Stip et al. (2003) and the Measure of Insight Into Cognition–Clinician Rated (MIC-CR) and Self Report (MIC-SR) of Saperstein, Thysen, and Medalia (2012). SSTICS is a 21-item self-administered scale. MIC-CR consists of a semistructured interview including 12 items that assess both awareness and patient's attribution regarding their cognitive difficulties in the areas of attention, executive performance, and memory. The MIC-SR is a complementary self-report measure of perceiving frequency of difficulty experienced in the same cognitive domains. In a recent meta-analysis, Potvin, Pelletier, and Stip (2014) found that the association between subjective cognitive difficulties and objectively measured cognitive performance was larger in studies using the SSTICS compared to studies using other scales.

The objectives of the present study are (a) to examine demographic and clinical correlates of subjective cognitive complaints, clinical insight, and cognitive performance in people with schizophrenia or schizoaffective disorder admitted to inpatient rehabilitation units; (b) to examine the associations of cognitive complaints with clinical insight and cognitive performance; and (c) to identify the factors that are associated with an increase in subjective cognitive complaints.

2. Methods

2.1. Participants

People who met ICD-10 diagnostic criteria for schizophrenia or schizoaffective disorder were considered eligible for this evaluation. Diagnosis was determined through chart review. All were admitted to the rehabilitation units of the three psychiatric hospitals (Zamudio Hospital, Zaldibar Hospital, and Bermeo Hospital, all located in Bizkaia) belonging

to the Bizkaia Mental Health Services, which provide treatment to people with serious mental illnesses. All participants were on antipsychotic medication. They were not abusing any drugs at the time of the assessment and gave their consent to participate in this study. People with comorbid intellectual disabilities and/or neurological disease were removed from this analysis.

2.2. Measures

2.2.1. *Sociodemographic variables*: Age, sex, and educational level were considered and controlled for their influence.

2.2.2. *Clinical variables*: Clinical diagnosis, length of disease, length of hospitalization, and presence of drug abuse before hospitalization were considered.

Assessment of the clinical status was carried out with the Health of the Nation Outcomes Scales (HoNOS) in their Spanish version (Uriarte et al., 1999). They are an assessment instrument developed by the Royal College of Psychiatrists' Research Unit that consist of a set of 12 scales designed to measure a range of health and social domains including psychiatric symptoms, physical health, relationships, and social status.

To assess awareness of illness, the Scale to Assess Unawareness of Mental Disorder (SUMD) was used in its Spanish adaptation by Ruiz et al. (2008). Its reduced version has 15 items and provides three scores: global awareness of mental disorder, awareness of symptoms, and symptom attribution.

2.2.3. *Neuropsychological assessment*: A comprehensive neuropsychological assessment was completed, comprising evaluation of the following cognitive domains and tests:

- Premorbid intelligence: Estimated by a test of verbal IQ, the Vocabulary Test of the Wechsler Adult Intelligence Scale, Third Edition (WAIS-III; Wechsler, 1997).
- Information processing speed: Stroop Test (Golden, 1978), Symbol-Digit Test (WAIS-III; Wechsler, 1997), Trail Making Test, part A (Reitan, 1985).
- Working memory: Digit Span (WAIS-III; Wechsler, 1997), Spatial Span of the Wechsler Memory Scale–III (WMS-III; Wechsler, 1987).
- Learning and memory: Word List subtest (WMS-III; Wechsler, 1997) and Family Pictures (WMS-III; Wechsler, 1997).
- Executive functions: Trail Making, Part B (Reitan, 1985), Wisconsin Card Sorting Test–64 Card Version (WCST-64; Kongs, Thompson, Iverson, & Heaton, 2000), Interference Score from the Stroop Test (Golden, 1978), Verbal Fluency from the Barcelona Test (Peña-Casanova, 1990).

- Social cognition: Spanish adaptation of the Mayer-Salovey-Caruso Emotional Intelligence Test, Managing Emotions Branch (MSCEIT; Mayer, Salovey, & Caruso, 2002), proposed by the National Institute of Mental Health's Measurement and Treatment Research to Improve Cognition in Schizophrenia (Nuechterlein et al. 2008). It is a performance-based test that examines the ability to perceive, assess, and manage one's own emotions, as well as the emotions of others. The MSCEIT Managing Emotions branch includes, in addition to a global score, two subtests: Social Management and Emotion Management.

2.2.4. *Subjective perception/neurocognitive complaints*:

- SSTICS: Developed by Stip et al. (2003), it has been adapted and translated into Spanish by Soriano and Jiménez (translation not published) and used in recent research (Bengoechea et al., 2010; Garay, Pousa, & Pérez, 2014). It is a 21-item, Likert-type scale designed to collect the subjective cognitive complaints of people with a diagnosis of schizophrenia. Factor analysis found that the scale comprised six different factors: Sustained Executive Function, Memory of Information, Consciousness of Effort, Daily Life, Distractibility, and Alertness. Also it provides a total score, which is the sum of all items. Example scale items include, "Do you have difficulty remembering the names of your medication?" (item 4) and "Do you have difficulty making out what's important when you are presented with different bits of information simultaneously? For example, the name of your medication or your next doctor's appointment while two people are talking about music nearby?" (item 14).

2.3. Statistical Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS-PC), version 22.0. Neuropsychological scores in all individual tests were transformed into *z* scores according to appropriate normative data to make them comparable. To reduce the number of comparisons to be made, a *z* score for every cognitive domain was obtained by averaging all *z* scores in specific tests that comprised that particular domain. Last, a global *z* score that summarized all the scores in one composite performance score was calculated. The social cognition test was considered an independent domain that did not contribute to the global neuropsychological score.

First, means and standard deviations were calculated for all variables of interest. Second, exploratory analyses were performed. Demographic and clinical information were correlated with neuropsychological performance, clinical insight, and subjective cognitive complaints using

Student's t test, analysis of variance, or correlational analyses as needed. Assessments of clinical insight, subjective cognitive complaints, and neuropsychological performance were also correlated with one another. Pearson's correlation coefficient was used for this purpose. Correction for multiple comparisons was not used because the interest was in identifying all the preliminary variables that could be associated with cognitive complaints to be included in the regression model. Last but not least, multiple linear regression analyses were used to detect the possible influence of relevant variables (predictors) on the outcome variable (cognitive complaints). Variables that were found to be associated with the outcome variable in the univariate analyses were included in the models as predictors, and remained there if they continued to be statistically significant.

3. Results

3.1. Socio-demographic and Clinical Variables, and Their Relationship to Cognitive Performance, Subjective Cognitive Complaints, and Clinical Insight

One hundred and four people were evaluated. Characteristics of the sample are shown in Table 1. No significant differences between men and women were found in any of the clinical, neuropsychological, or subjective variables. However, women scored worse than men in one measure of the social cognition test (MSCEIT Emotion Management subtest) ($t = -2.39$, $p = .019$).

Age was only significantly correlated with premorbid intelligence ($r = .247$, $p = 0.012$) and with learning and memory domain ($r = .234$, $p = .019$), where older patients got better scores. Age was not correlated with any other neuropsychological, clinical, or subjective variables.

To analyze educational level the sample was divided into two groups: primary education (54.8%), and secondary and higher education (45.2%). People in the secondary and higher education group had higher scores on domains of premorbid intelligence ($t = -3.811$, $p < .001$), working memory ($t = -2.09$, $p = .039$), and global z score ($t = -2.5$, $p = .014$). The primary education group had consistently higher mean scores on the subjective cognitive scales reflecting more complaints of cognitive impairment, but these differences were not statistically significant. Educational level was not associated with clinical variables.

No differences between people who consumed drugs before admis-

Table 1. Characteristics of the Sample

	n (%)
Sex	
Male	67 (64.4%)
Female	37 (35.6%)
Age (years)	
Mean (*SD*)	40.97 (9.9)
Range	18–65
Educational level	
Primary	57 (54.8%)
Secondary	38 (36.5%)
College	9 (8.7%)
Diagnosis	
Paranoid schizophrenia	51 (49%)
Non-paranoid schizophrenia	31 (29.8%)
Schizoaffective disorder	22 (21.2%)
Length of illness	
Mean (*SD*)	18.03 (8.22)
Length of hospitalization	
< 6 months	53 (51%)
6 months–1 year	17 (16.3%)
1–2 years	16 (15.4%)
> 2 years	18 (17.3%)
Drug use before admission	
None	45 (43.3%)
Alcohol	16 (15.4%)
THC	13 (12.5%)
Opiates	1 (1%)
Amphetamines/cocaine	1 (1%)
More than one toxic substance	18 (26.9%)

Note. $N = 104$.

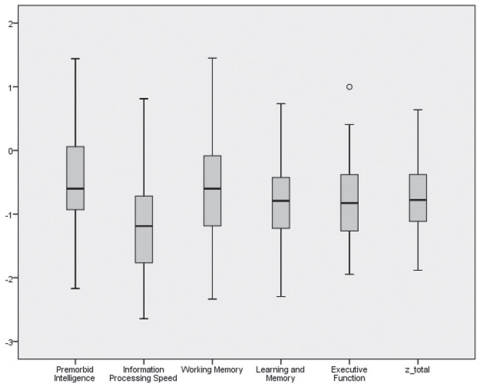

Figure 1. Neuropsychological profile of the sample by cognitive domain. Scores are transformed into *z* scores ($M = 0$, $SD = 1$).

sion and those who did not were detected in any of the subjective or objective neuropsychological variables.

No significant correlations between length of the disease or the duration of the hospitalization and objective cognitive performance were detected. A relationship between length of the disease and emotional management was found: People with shorter disease duration scored best in the MSCEIT Managing Emotions branch ($r = -.217$, $p = .034$). By contrast, length of hospitalization significantly correlated with global awareness of illness ($r = -.334$, $p = .001$), awareness of symptoms ($r = -.254$, $p = .012$), and subjective complaints in the Memory of Information factor of the SSTICS scale ($r = .292$, $p = .003$). Patients with longer hospitalizations showed better awareness of disease and more subjective memory complaints.

Analysis of the differences among the three diagnostic groups in the cognitive domains only found differences in their premorbid intelligence ($F = 5$, $p = .008$). The group diagnosed with paranoid schizophrenia performed best on this domain, exhibiting a statistically significant difference compared to the non-paranoid schizophrenia group. On the other hand, the schizoaffective disorder group had a lower score (better awareness) for awareness of symptoms on the SUMD ($F = 3.11$, $p = .049$). There were no other differences between the three groups.

3.2. Subjective Cognitive Complaints, Neuropsychological Functioning, and Clinical Insight

The transformed mean scores by cognitive domain are shown in Figure 1. As can be seen, all *z* scores are below the mean of the general population.

The mean score on the SSTICS scale of subjective cognitive complaints was 24.42 (SD = 15.05), similar to that obtained by Stip et al. (2003; M = 25.94, SD = 9.72). Correlations between subjective cognitive complaints and objective performance on neuropsychological tests, including performance on the social cognition test, are presented in Table 2. All SSTICS factors, except Alertness, correlated with all objective cognitive domains, except for premorbid intelligence and learning and memory. Although scores in the social cognition task were significantly correlated with all cognitive domains, subjective cognitive complaints and social cognition (MSCEIT) were not correlated.

Statistically significant correlations between awareness of illness and neuropsychological performance were detected. A lower score on global awareness of mental disorder (SUMD), reflecting better clinical insight, was significantly associated with better scores on the information processing speed (r = –.257, p = .011) and executive function domains (r = –.225, p = .02), and on the global neuropsychological score (r = –.218, p = .034). Also, better awareness of symptoms was significantly associated with better scores on the MSCEIT Emotions Management subtest (r = –.215, p = .039).

Concerning subjective cognitive complaints, people with greater subjective consciousness of effort had greater global awareness of illness (r = –.216, p = .037) and also a better awareness of symptoms (r = –.212, p = .04). Global awareness of illness was also significantly associated with the Alertness factor of the SSTICS scale (r = –.27, p = .008).

Subjective cognitive complaints did not correlate with scores on the HoNOS scale. In contrast, there was an association between a lower global awareness of illness and higher scores on the HoNOS, reflecting worse functioning (r = .298, p = .003).

3.3. Predictors of Subjective Cognitive Complaints

All the variables previously found significant in the univariate analysis were considered in a multiple regression analysis (entry method) to identify which of them better explained the total score from the SSTICS scale.

Table 2. Correlations Between Subjective Cognitive Complaints and Objective Neuropsychological Performance

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*
1. Premorbid intelligence domain														
2. Information processing speed domain	.49**													
3. Working memory domain	.52**	.65**												
4. Learning and memory domain	.46**	.16	.45**											
5. Executive function domain	.4**	.62**	.63**	.25*										
6. Global neuropsychological score	.79**	.79**	.87**	.58**	.75**									
7. Social cognition task	.32**	.41**	.44**	.24*	.4**	.47**								
8. Sustained Executive Function[a]	−.12	−.5**	−.3**	−.12	−.3**	−.4**	−.18							
9. Memory of Information[a]	−.25*	−.4**	−.3**	−.05	−.19	−.3**	−.15	.56**						
10. Consciousness of Effort[a]	−.12	−.4**	−.3**	−.14	−.25*	−.3**	−.1	.66**	.59**					
11. Daily Life[a]	−.13	−.4**	−.3**	−.11	−.3**	−.3**	−.2	.68**	.51**	.69**				
12. Distractibility[a]	−.12	−.4**	−.4**	−.09	−.25*	−.3**	−.1	.72**	.47**	.68**	.61**			
13. Alertness[a]	−.08	−.16	−.07	−.13	−.09	−.14	−.12	.5**	.39**	.4**	.35**	.44**		
14. SSTICS total score	−.17	−.5**	−.4**	−.13	−.3**	−.4**	−.18	.88**	.73**	.87**	.83**	.84**	.55**	

[a]Subjective Scale to Investigate Cognition in Schizophrenia (SSTICS; Stip et al., 2003) factor.

*$p < .05$. **$p < .01$.

Specifically, educational level, length of hospitalization, SUMD global awareness of illness score, and global neuropsychological score were introduced in the model as predictors, while total score in the SSTICS scale was introduced as the criterion variable. The analysis found that worse global neuropsychological performance ($\beta = -0.435$, $t = -4.518$, $p < .001$) and greater awareness of illness ($\beta = -0.268$, $t = -2.779$, $p = .007$) were associated with more subjective cognitive complaints. These two variables together explained 19.4% of the variance in the subjective cognitive complaints variable. The variables of educational level and length of hospitalization were removed from the model because they did not reach statistical significance.

Afterward, another multiple regression analysis was made including subjective cognitive complaints as the criterion variable and summary z scores in the different cognitive domains as predictors. Information processing speed was the cognitive domain that, alone, better explained the variance of the SSTICS scale (accounting for 20.7% of the variance). Given the influence of the information processing speed domain in the subjective cognitive complaints of participants, we replaced in the previous multiple regression analysis the global neuropsychological score with the information processing speed domain score as a predictor of subjective complaints along with awareness of illness, proving that these two variables explained 28.8% of the variance.

4. Discussion

The main conclusion of this study is that, in general, hospitalized people with schizophrenia spectrum disorders are aware of suffering from cognitive problems, which is consistent with previous results of some research (Bengoechea et al., 2010; Lecardeur et al., 2009; Stip et al., 2003) and contradicts the conclusions reached by others (Cella et al., 2014; Chang et al., 2008; Johnson et al., 2011; Medalia et al., 2008; Medalia & Lim, 2004; Medalia & Thysen, 2010).

Discrepancies between studies can be interpreted in part as related to differences between the methodology being used. To see whether people are aware of their cognitive problems, studies have to compare results of subjective complaints measures to results obtained by other means. Among these, neuropsychological measures are most utilized. However, the composition and comprehensiveness of neuropsychological batteries

are quite different among studies. Besides, some researchers compare the scores obtained from subjective measures of cognitive complaints to those obtained from other scales; for example, symptom scales, which are answered by the clinician and do not take into account any objective performance of the person. On the other hand, there are differences among the instruments used to evaluate cognitive complaints. In this study participants themselves evaluated their cognitive problems, without taking into account clinician's opinion about the awareness they have of these problems. Most studies that have previously used this same scale have found similar results (Bengoechea et al., 2010; Potvin et al., 2014; Stip et al., 2003).

In this study, there was a relationship between objective and subjective cognitive measures, with some positive correlations within the moderate range. All the objective cognitive domains showed significant associations with the subjective cognition of patients except for the learning and memory domain. Other studies (e.g., Prouteau et al., 2004) have concluded that people with schizophrenia do not conceptualize their cognitive functioning in the same way as clinicians do, and thus they can complain about attentional problems even as objective neuropsychological tests detect problems in memory and planning. A recent study by Ojeda et al. (2012) revealed the fundamental role of processing speed deficits in other cognitive domains in people affected by chronic schizophrenia. Our study has found that performance in the information processing speed domain best explains participants' subjective cognitive complaints. One possible explanation is that difficulties in information processing and slow processing contribute to increased awareness of cognitive problems, because of the impact these problems have on this population's daily functioning.

One of the fields that deserves more attention in future studies is the social cognition domain and its relationship to duration of illness and objective and subjective cognition, as well as its relationship to gender issues. This study supports others that establish the relationship between neurocognition and social cognition (Ventura, Wood, & Helleman, 2013). Subjective cognition and social cognition did not show a significant correlation in this study, which could be related to the construction of the subjective cognition scale as not including the social dimensions of cognition. Besides that, the social cognition structure is multidimensional (Mancuso, Horan, Kern, & Green, 2011; van Hooren et al., 2008), so as-

sessing only one dimension of social cognition, as done in this study, does not help to discriminate which social cognition aspects should influence interventions on different patients.

Some studies have found differences in affect recognition between men and women (Weiss et al., 2007), while others have suggested that women could have better performance than men in emotional perception tasks (Vaskinn et al., 2007). In this study, however, women have shown worse performance than men in the social cognition task while not showing any difference in the neurocognitive domains. This contradictory result could be related to the fact that all the participants were hospitalized at the time of the assessment. It could be that women access rehabilitation services of this type less often than men, and that when they do, the personal and social consequences of the mental health problem are more severe. Due to the exploratory nature of this finding, caution and further attention are needed.

Of particular interest is the relationship between global awareness of mental disorder and subjective cognitive complaints, suggesting that, although they are different constructs, they might be related. Apart from that, it is interesting to see which people show poorer awareness of disease: people with worse clinical status, more objective neuropsychological problems, and fewer neurocognitive complaints who have been recently hospitalized. These are the patients that mostly need rehabilitative interventions but who are probably more resistant to them. They are a challenge to our services, as we can have a good intervention that does not reach exactly the person who needs it.

This study has some limitations. First, it is possible that some emotional factors such as anxiety and depressive symptoms contributed to the subjective dimension of cognitive difficulties in patients with severe mental health problems (Johnson et al., 2009; Saperstein et al., 2012; Sellwood et al., 2013), so that future studies on this subject should include specific measures of depression and anxiety. Another limitation is that no specific measures of functionality have been used, which would have helped to clarify the relationship among objective cognitive performance, subjective awareness of cognitive deficits, and their impact on people's life.

To sum up, we want to emphasize the importance of including subjective measures along with the objective ones that are already commonly used in the cognitive assessment of people diagnosed with schizophrenia

and other psychotic disorders. The inclusion of subjective measures would serve several purposes. It is consistent with recovery principles that establish the need to take into account the person's point of view in their own evaluation and treatment; it complements the objective assessment and considers the affected individuals' perception of the impact of cognitive problems on their daily lives; and it can be used to evaluate the impact and satisfaction with cognitive rehabilitation interventions or other interventions designed to improve cognitive functioning. Lack of awareness of cognitive difficulties and related issues would alert the clinician so that these issues could be attended properly.

MAITE PEREDA, Department of Psychiatry, Basurto University Hospital, Osakidetza

RAMONA CASADO, Zaldibar Psychiatric Hospital, Bizkaia Mental Health Services, Osakidetza

MARIASUN GARAY, Community Mental Health Rehabilitation Services, Bizkaia Mental Health Services, Osakidetza

BEGOÑA IRIARTE, Community Mental Health Rehabilitation Services, Bizkaia Mental Health Services, Osakidetza

ARÁNZAZU IRIBARREN, Zamudio Psychiatric Hospital, Bizkaia Mental Health Services, Osakidetza

JOSE J. URIARTE, Clinical Management Unit, Bizkaia Mental Health Services, Osakidetza

ACKNOWLEDGMENTS

This work was supported by a grant from Kronikgune (Kronik 11/031). We would like to thank Sergi Andrés, Vital Arce, Laura Narro, Batirtze Quintana, José María Regidor, and Pedro Rico for their help with neuropsychological assessment.

REFERENCES

Bengoechea, R., Gil, D., Fernandez, M., Arrieta, M., Sánchez, R., Prat, R., . . . Alvarez, A. (2010). Cognitive complaints in schizophrenia: Relationship with insight and other cognitive measures. *Revista de Psiquiatria y Salud Mental (Barc), 3,* 55–60. doi:10.1016/j.rpsm.2010.03.002

Bilder, R. M., Goldman, R. S., Robinson, D., Reiter, G., Bell, L., Bates, J. A., . . . Lieberman, J. A. (2000). Neuropsychology of first-episode schizophrenia: Initial characterization and clinical correlates. *American Journal of Psychiatry, 157,* 549–559. doi:10.1176/appi.ajp.157.4.549

Bowie, C. R., & Harvey, P. (2005). Cognition in schizophrenia: Impairments, determinants, and functional importance. *Psychiatric Clinics of North America, 28,* 613–633. doi:10.1176/appi.ajp.157.4.549

Bowie, C. R., Leung, W. W., Reichenberg, A., McClure, M. M., Patterson, T. L., Heaton, R. K., & Harvey, P. D. (2008). Predicting schizophrenia patients' real-world behavior with specific neuropsychological and functional capacity measures. *Biological Psychiatry, 63,* 505–511. doi:10.1016/j.biopsych.2007.05.022

Cella, M., Swan, S., Medin, E., Reeder, C., & Wykes, T. (2014). Metacognitive awareness of cognitive problems in schizophrenia: Exploring the role of symptoms and self-esteem. *Psychological Medicine, 44,* 469–476. doi:10.1017/S0033291713001189

Chang, R. C., Wang, Y., Ma, Z., Hong, X. H., Yuan, Y., Yu, X., . . . Gong, Q. Y. (2008). Objective measures of prospective memory do not correlate with subjective complaints in schizophrenia. *Schizophrenia Research, 103,* 229–239. doi:10.1016/j.schres.2008.02.019

Garay, M., Pousa, V., & Pérez, L. (2014). The relationship between self-reported cognitive functioning and self-stigma with the subjective recovery process in people with serious mental illness. *Revista de la Asociación Española de Neuropsiquiatría, 34,* 459–475. doi:10.4321/S0211-57352014000300002

Golden, C. J. (1978). *Stroop Color and Word Test: A manual for clinical and experimental uses.* Chicago: Stoelting Co.

Johnson, I., Kebir, O., Ben Azouz, O., Dellagi, L., Rabah, Y., & Tabbane, K. (2009). The self-assessment scale of cognitive complaints in schizophrenia: A validation study in Tunisian population. *BMC Psychiatry, 8,* 66. doi:10.1186/1471-244X-9-66

Johnson, I., Tabbane, K., Dellagi, L., & Kebir, O. (2011). Self-perceived cognitive functioning does not correlate with objective measures of cognition in schizophrenia. *Comprehensive Psychiatry, 52,* 688–692. doi:10.1016/j.comppsych.2010.12.008

Keefe, R. S. E., Fox, K. H., Harvey, P. D., Cucchiano, J., Siu, C., & Loebel, A. (2011). Characteristics of the MATRICS Consensus Cognitive Battery in a 29-site antipsychotic schizophrenia clinical trial. *Schizophrenia Research, 125,* 161–168. doi:10.1016/j.schres.2010.09.015

Kongs, S. K., Thompson, L. L., Iverson, G. L., & Heaton, R. K. (2000). *Wisconsin Card Sorting Test–64 Card Version.* Lutz, FL: Psychological Assessment Resources.

Lecardeur, L., Briand, C., Prouteau, A., Lalonde, P., Nicole, L., Lesage, A., & Stip, E. (2009). Preserved awareness of their cognitive deficits in patients with schizophrenia: Convergent validity of the SSTICS. *Schizophrenia Research, 107,* 303–306. doi:10.1016/j.schres.2008.09.003

Mancuso, F., Horan, W. P., Kern, R. S., & Green, M. F. (2011). Social cognition in psychosis: Multidimensional structure, clinical correlates and relationship with functional outcome. *Schizophrenia Research, 125,* 143–151. doi:10.1016/j.schres.2010.11.007

Mayer, J. D., Salovey, P., & Caruso, D. R. (2002). *MSCEIT. Mayer-Salovey-Caruso Emotional Intelligence Test.* Toronto, Ontario: Multi-Health Systems.

Medalia, A., & Lim, R. W. (2004). Self-awareness of cognitive functioning in schizophrenia. *Schizophrenia Research, 71,* 331–338. doi:10.1016/j.schres.2004.03.003

Medalia, A., & Thysen, J. (2010). A comparison of insight into clinical symptoms versus insight into neuro-cognitive symptoms in schizophrenia. *Schizophrenia Research, 118,* 134–139. doi:10.1016/j.schres.2009.09.027

Medalia, A., Thysen, J., & Freilich, B. (2008). Do people with schizophrenia who have objective cognitive impairment identify cognitive deficits on a self-report measure? *Schizophrenia Research, 105,* 156–164. doi:10.1016/j.schres.2008.07.007

Nuechterlein, K. H., Green, M. F., Kern, R. S., Baade, L. E., Barch, D. M., Cohen, J. D., . . . Marder, S. R. (2008). The MATRICS Consensus Cognitive Battery, Part 1: Test selection, reliability, and validity. *American Journal of Psychiatry, 165,* 203–213. doi:10.1176/appi.ajp.2007.07010042

Ojeda, N., Peña, J., Schretlen, D. J., Sánchez, P., Aretouli, E., Elizagarate, E., . . . Gutiérrez, M. (2012). Hierarchical structure of the cognitive processes in schizophrenia: The fundamental role of processing speed. *Schizophrenia Research, 135,* 72–78. doi:10.1016/j.schres.2011.12.004

Peña-Casanova, J. (1990). *Programa integrado de exploración neuropsicológica. Manual.* Barcelona: Masson.

Potvin, S., Pelletier, J., & Stip, E. (2014). Neurocognitive insight in schizophrenia: A meta-analysis. *Santé mentale au Québec, 39,* 183–200.

Prouteau, A., Verdoux, H., Briand, C., Lesage, A., Lalonde, P., Nicole, L., . . . Stip, E. (2004). Self-assessed cognitive dysfunction and objective performance in outpatients with schizophrenia participating in a rehabilitation program. *Schizophrenia Research, 69,* 85–91. doi:10.1016/j.schres.2003.08.011

Reichenberg, A. (2010). The assessment of neuropsychological functioning in schizophrenia. *Dialogues in Clinical Neuroscience, 12,* 383–392.

Reichenberg, A., Harvey, P. D., Bowie, C. R., Mojtabai, R., Rabinowitz, J., Heaton, R. K., & Bromet, E. (2009). Neuropsychological function and dysfunction in schizophrenia and psychotic affective disorders. *Schizophrenia Bulletin, 35,* 1022–1029. doi:10.1093/schbul/sbn044

Reitan, R., & Wolfson, D. (1985) *The Halstead-Reitan Neuropsychological Test Battery*. Tucson, AZ: Neuropsychology Press.

Riggs, S. E., Grant, P. M., Periovoliotis, D., & Beck, A. T. (2012). Assessment of cognitive insight: A qualitative review. *Schizophrenia Bulletin, 38,* 338–350. doi:10.1093/schbul/sbq085

Ruiz, A., Pousa, E., Duñó, R., Crosas, J., Cuppa, S., & García, C. (2008). Spanish adaptation of the Scale to Asses Unawareness of Mental Disorder (SUMD). *Actas Españolas de Psiquiatría, 36,* 111–119.

Sánchez, P., Ojeda, N., Peña, J., Elizagárate, E., Yoller, A. B., Gutiérrez, M. & Ezcurra, J. (2009). Predictors of longitudinal changes in schizophrenia: The role of processing speed. *Journal of Clinical Psychiatry, 70,* 888–896. doi:10.4088/JCP.08m04294

Sanjuán, J., Aguilar, E. J., Olivares, J. M., Ros, S., Montejo, A. L., Mayoral, F., . . . Bousoño, M. (2006). Subjective perception of cognitive deficit in psychotic patients. *Journal of Nervous and Mental Disease, 194,* 58–60. doi:c10.1097/01.nmd.0000195308.62107

Saperstein, A. M., Thysen, J., & Medalia, A. (2012). The Measure of Insight Into Cognition: Reliability and validity of clinician-rated and self-report scales of neurocognitive insight for schizophrenia. *Schizophrenia Research, 134,* 54–58. doi:10.1016/j.schres.2011.10.002

Sellwood, W., Morrison, A. P., Beck, R., Heffernan, S., Law, H., & Bentall, R. P. (2013). Subjective cognitive complaints in schizophrenia: Relation to antipsychotic medication dose, actual cognitive performance, insight and symptoms. *PLoS ONE, 8*(12), e83774. doi:10.1371/journal.pone.0083774.

Stip, E., Caron, J., Renaud, S., Pampoulova, T., & Lecomte, Y. (2003). Exploring cognitive complaints in schizophrenia: The subjective scale to investigate cognition in schizophrenia. *Comprehensive Psychiatry, 44,* 331–340. doi:10.1016/S0010-440X(03)00086-5

Tastet, H., Verdoux, H., Bergua, V., Destaillats, J. M., & Prouteau, A. (2012). Cognitive insight in schizophrenia. The missing link between insight and neurocognitive complaint. *Journal of Nervous and Mental Disease, 200,* 208–210. doi:10.1097/NMD.0b013e31826ba160

Uriarte, J. J., Beramendi, V., Medrano, J., Wing, J. K., Beevor, A. S., & Curtis, R. (1999). Presentación de la traducción al castellano de la Escala HoNOS (Health of the Nation Outcome Scales) [Spanish translation of the Health of the Nation Outcomes Scales]. *Psiquiatría Pública, 11,* 93–101.

van Hooren, S., Versmissen, D., Janssen, I., Myin-Germeys, I., à Campo, J., Mengelers, R., . . . Krabbendam, L. (2008). Social cognition and neurocognition as independent domains in psychosis. *Schizophrenia Research, 103,* 257–265. doi:10.1016/j.schres.2008.02.022

Vaskinn, A., Sundet, K., Friis, S., Simonsen, C., Bierkenaes, A. B., Engh, J. A., . . . Andreassen, O. A. (2007). The effect of gender on emotion perception in schizophrenia and bipolar disorder. *Acta Psychiatrica Scandinavica, 116,* 263–270. doi:10.1111/j.1600-0447.2007.00991.x

Ventura, J., Wood, R. C., & Helleman, G. S. (2013). Symptom domains and neurocognitive functioning can help differentiate social cognitive processes in schizophrenia: A meta-analysis. *Schizophrenia Bulletin, 39,* 102–111. doi:10.1093/schbul/sbr067

Verdoux, H., Monello, F., Goumilloux, R., Cognard, A., & Prouteau, A. (2010). Self perceived cognitive deficits and occupational outcome in persons with schizophrenia. *Psychiatry Research, 178,* 437–439. doi:10.1016/j.psychres.2010.04.031

Wechsler, D. (1987). *The Wechsler Memory Scale–Revised*. New York, NY: Psychological Corporation.

Wechsler, D. (1997). *WAIS–III Manual: Wechsler Adult Intelligence Scale–III*. New York, NY: Psychological Corporation.

Weiss, E. M., Kohler, C. G., Brensinger, C. M., Bilker, W. B., Loughead, J., Delazer, M., & Nolan, K. A. (2007). Gender differences in facial emotion recognition in persons with chronic schizophrenia. *European Psychiatry, 22,* 116–122. doi:10.1016/j.eurpsy.2006.05.003