Original article

Predictive factors of functional capacity and real-world functioning in patients with schizophrenia

I. Menendez-Miranda a, M.P. Garcia-Portilla a,b, L. Garcia-Alvarez b,*, M. Arrojo c, P. Sanchez d, F. Sarramea e, J. Gomar b,g, M.T. Bobes-Bascaran b, P. Sierra h, P.A. Saiz a,b, J. Bobes a,b

a Area de Psiquiatría, Universidad de Oviedo, c/Julian Claveria s/n, 33006 Oviedo, Spain
b Servicio de Psiquiatría, Complejo Hospitalario Universitario de Santiago, Instituto de Investigación Sanitaria (IDIS), Santiago de Compostela, Spain
c Centro de Investigación Biomédica en Red de Salud Mental, CIBERSAM, Spain
d Área de Psicosis Refractarias, Hospital Psiquiátrico de Alava, Vitoria, Spain
e Unidad de Psicosis Refractarias, Hospital Psiquiátrico de Alava, Vitoria, Spain
f ESM Montoro, Hospital Reina Sofia de Córdoba, Spain
g Uninova Zucker Alzheimer’s Disease Center, Feinstein Institute for Medical Research/AECOM, Manhasset, NY
h FIDMAG, Hermanas Hospitalarias Sant Boi de Llobregat, Spain
i Servicio de Psiquiatría, Hospital Universitario La Fe, Avda, Fernando Abril Martorell 106, 46026 Valencia, Spain

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ABSTRACT

Purpose: This study was performed to identify the predictive factors of functional capacity assessed by the Spanish University of California Performance Skills Assessment (Sp-UPSA) and real-world functioning assessed by the Spanish Personal and Social Performance scale (PSP) in outpatients with schizophrenia.

Methods: Naturalistic, 6-month follow-up, multicentre, validation study. Here, we report data on 139 patients with schizophrenia at their baseline visit. Assessment: Positive and Negative Syndrome Scale (PANSS), Clinical Global Impression-Severity (CGI-S), Sp-UPSA and PSP. Statistics: Pearson’s correlation coefficient (r) was used to determine the relationships between variables, and multivariable stepwise linear regression analyses to identify predictive variables of Sp-UPSA and PSP total scores.

Results: Functional capacity: scores on the PSP and PANSS-GP entered first and second at P < 0.0001 and accounted for 21% of variance (R² = 0.208, model df = 2, F = 15.724, P < 0.0001). Real-world functioning: scores on the CGI-S (B = −5.406), PANSS-N (B = −0.657) and Sp-UPSA (B = 0.230) entered first, second and third, and accounted for 51% of variance (model df = 3, F = 37.741, P < 0.0001).

Conclusion: In patients with schizophrenia, functional capacity and real-world functioning are two related but different constructs. Each one predicts the other along with other factors; general psychopathology for functional capacity, and severity of the illness and negative symptoms for real-world functioning. These findings have important clinical implications: (1) both types of functioning should be assessed in patients with schizophrenia and (2) strategies for improving them should be different.

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1. Introduction

Schizophrenia is a chronic and disabling mental disorder that frequently leads to substantial deficits in personal, social and occupational functioning. In high-income countries, in people under 60 years of age, it ranks 7th on the list of leading health conditions associated with moderate and severe disability [37]. There is agreement that functional outcomes should be related to abilities or skills that are essential to an individual’s ability to function independently in the community [20]. These everyday adaptive skills include general organization, communication skills, finance management, transportation, performance of household chores, medication management and social interactions with others [20,31,7,28]. With respect to them, there is an important distinction between the ability to perform these skills under optimal conditions, called functional capacity, and the patient’s actual performance in real life, called real-world functioning [17,29,36].

The discrepancy between what a person can do and what that person actually does can be predicted by multiple factors [12]. It has been proposed that real-world functioning is predicted by
functional capacity [4,21] but many other clinical, motivational and environmental factors may influence functional performance in everyday life [16]. In addition, prior experience with everyday adaptive skills play a more prominent role in predicting real-world functioning than functional capacity, meaning that these skills may be learned but not utilized [22].

It has been also shown that different factors may predict real-world functioning in different major functional domains [16,15]. In this sense, in the interpersonal relationships domain, both the severity of negative and depressive symptoms as the presence of these symptoms in a residual manner have significant and negative effects that are independent of functional capacity [4,6,3]. On the other hand, cognitive impairments and negative symptoms have been pointed out as the most consistent predictors of disability in different studies [15,34,35]. A certain specificity of their negative impact on functioning has been suggested, i.e. that while cognitive deficits have the greatest impact on residential and vocational dimensions of functioning [15] by reducing the ability to perform critical everyday functional skills [18], negative symptoms show the greatest impact on interpersonal skills and social functioning [4,6,18]. Furthermore among negative symptoms, expressive deficits (alogia and blunted affect) and subjective experiences (amotivation, anhedonia and asociality) would have different impact on real-world functioning. In this sense, a recent study found that while expressive deficits did not have impact on real-world functioning, avolition was the strongest predictor of interpersonal relations and social network [33].

Taking into account this complex background and due to the fact that the majority of the studies included a limited number of variables, we decided to examine in more depth the relationships between age and gender, psychopathology, severity of the illness, functional pragmatic variables (i.e., civil status, education, working status, mental disability benefit), functional capacity, and real-world functioning. The aim of our study is to identify those factors predicting both functional capacity and real-world functioning in outpatients with stable schizophrenia. Furthermore, we will also identify the specific variables contributing to the prediction of each of the different areas of the real-world functioning. We hypothesize that the variables included in our study will have different contribution to the prediction of each construct. While receiving a mental disability benefit, and psychopathological and functional capacity variables will be the strongest predictors of real-world functioning and its areas, education (years of education and level of education), age and real-world functioning will be of functional capacity.

2. Methods

2.1. Study Design

Data displayed in this paper are from a naturalistic, 6-month follow-up, multicentre, validation study in outpatients with schizophrenia and bipolar disorder conducted at 7 sites in Spain [9]. Here we report data only on patients with schizophrenia obtained at their baseline visit. It was approved by the Clinical Research Ethics Committee of one of the sites, Hospital Universitario Central de Asturias, Oviedo, Spain and conducted in accordance with the 1975 Declaration of Helsinki as revised in 1983. Written informed consent was obtained from all subjects prior to enrolment.

2.2. Subjects

Participants included 139 outpatients with stable schizophrenia defined as those patients who were clinically stable and did not require any change in their current pharmacological treatment during the past 3 months.

Patient inclusion criteria were:

- age ≥ 18 years;
- ICD-10 diagnosis of schizophrenia spectrum disorder;
- currently on outpatient treatment for his/her illness and;
- written informed consent to participate in the study.

Exclusion criteria were designed to be minimal due to the design of the study and consisted only of patients with intellectual developmental disorder or acquired brain injury, or refusal to participate in the study.

2.3. Clinical measures

Demographic and clinical data were collected. The Spanish versions of the Positive and Negative Syndrome Scale (PANSS) [32] and the Clinical Global Impression-Severity (CGI-S) [13] were used to assess psychopathology. Functional capacity was assessed by means of the Spanish version of the University of California Performance-based Skills Assessment (Sp-UPSA) [9] and real-world functioning using the Spanish version of the Personal and Social Performance Scale (PSP) [10].

The PSP [30] is a clinician-rated instrument that evaluates patient functioning in the following 4 areas:

- self-care;
- socially useful activities including work and study;
- personal and social relationships and;
- disturbing and aggressive behaviours.

It provides scores in each of the 4 areas where higher scores indicate worse functioning, and a single global score ranging from 0 to 100 where higher scores reflect better personal and social functioning.

The UPSA [31] measures functional capacity. Participants engage in role-play or respond to stimulus items in four domains of functioning:

- finance;
- communication;
- planning recreational activities and;
- transportation.

Each of these domains generates a raw score that is converted to a domain score ranging from 0 to 25 points. The sum of the four domain scores yields a total score potentially ranging from 0 to 100 points, where higher scores indicates better performance.

2.4. Statistical analysis

The statistical analysis was done using SPSS 17.0. The two-tailed level of significance used was 0.05. Student’s t and Chi² tests were used to determine statistically significant differences according to demographic, clinical and functional status. We used the Pearson’s correlation coefficient (r) to determine the relationships between variables. Finally we performed a multivariable stepwise linear regression analysis to identify predictive variables of functional capacity (Sp-UPSA total score) and real-world functioning (PSP total score, and scores on each of its 4 areas). Specifically in the case of the Sp-UPSA a stepwise regression analysis was performed with the following independent variables: age, scores on the clinical scales [PANSS-P, PANSS-N, PANSS-MNF (PANSS-Marder Negative Factor) [27], PANSS-GP, PANSS-AnxDep
recreational education, independent 3. receiving istics

PANSS-P: Positive and Negative Syndrome Scale-Positive Subscale; PANSS-N: Negative Subscale; PANSS-MNF: Marder Negative Factor; PANSS-GP: General Psychopathology Subscale; PANSS-AnxDep: Anxiety/Depression Subscale; CGI-S: Clinical Global Impression-Severity Scale; PSP: Personal and Social Performance scale; Sp-UPSA: Spanish version of the University of California Performance Skills Assessment; sd: standard deviation.

Not working includes permanently disabled for health conditions other than mental disorder, temporarily disabled, retired, and unemployed.

3. Results

Table 1 shows demographic, clinical and functional characteristics of the sample. As can be seen in the table, our patients are very similar to those included in the majority of the naturalistic studies on schizophrenia. Concerning functioning, almost two-thirds were receiving a mental disability benefit, had mild impairment in their functional capacity (Sp-UPSA total score = 70.2) and had a manifest degree of disability in real-world functioning (total PSP score = 61.9).

Regarding functional capacity, the communication domain obtained the lowest score (15.4) while planning recreational activities got the highest (20.3), with no statistically significant differences by sex. The most impaired area of real-world functioning was socially useful activities (2.2), and the less aggressive behaviours (0.6). In this case women showed significantly less impairment than men in self-care (P = 0.001), socially useful activities (P = 0.024), and personal and social relationships (P = 0.010).

Functional capacity significantly and moderately correlated with real-world functioning (r = 0.417, P < 0.0001) (Table 2).

3.1. Factors influencing functional capacity (Sp-UPSA)

In Table 2 we show the variables significantly associated with Sp-UPSA total score. Age and scores on clinical scales significantly and slightly correlated with Sp-UPSA total score (r between 0.209 and 0.385). In addition patients receiving a mental disability benefit scored significantly lower on Sp-UPSA total score compared with those who did not (67.4 vs. 73.6, Student’s t test = 2.083, P = 0.039).

The stepwise linear regression model showed that scores on the PSP and PANSS-GP qualified first and second at P < 0.0001 and accounted for 21% of the variance (R² = 0.208, model df = 2, F = 15.724, P < 0.0001) (Table 3). The total PSP score had significant positive regression weight, indicating that patients with higher scores on this scale were expected to have higher levels of functional capacity, after controlling for the other variables in the model. The PANSS-GP score had a significant negative weight, indicating that after accounting for PSP total score, those patients with higher PANSS-GP scores were expected to have lower levels of functional capacity.

3.2. Factors influencing real-world functioning (PSP)

Among demographic characteristics, only number of years of education significantly correlated with PSP total score, although this correlation was low in magnitude (r = 0.265) (Table 2). Scores on the clinical scales significantly and moderately correlated with

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sp-UPSA total score r, P</th>
<th>PSP total score r, P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-0.385, &lt; 0.0001</td>
<td>n.s.</td>
</tr>
<tr>
<td>Years of education</td>
<td>n.s.</td>
<td>0.265, 0.004</td>
</tr>
<tr>
<td>Clinical</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PANSS-P</td>
<td>-0.295, &lt; 0.0001</td>
<td>-0.458, &lt; 0.0001</td>
</tr>
<tr>
<td>PANSS-N</td>
<td>-0.268, 0.001</td>
<td>-0.617, 0.001</td>
</tr>
<tr>
<td>PANSS-MNF</td>
<td>-0.221, 0.009</td>
<td>-0.572, 0.009</td>
</tr>
<tr>
<td>PANSS-GP</td>
<td>-0.358, &lt; 0.0001</td>
<td>-0.584, &lt; 0.0001</td>
</tr>
<tr>
<td>PANSS-AnxDep</td>
<td>-0.209, 0.014</td>
<td>-0.173, 0.042</td>
</tr>
<tr>
<td>CGI-S</td>
<td>-0.384, &lt; 0.0001</td>
<td>-0.662, &lt; 0.0001</td>
</tr>
<tr>
<td>Functioning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mental disability benefit (P)</td>
<td>0.039</td>
<td>0.001</td>
</tr>
<tr>
<td>Sp-UPSA</td>
<td>0.047, &lt; 0.0001</td>
<td>0.417, &lt; 0.0001</td>
</tr>
</tbody>
</table>

PANSS-P: Positive and Negative Syndrome Scale-Positive Subscale; PANSS-N: Negative Subscale; PANSS-MNF: Marder Negative Factor; PANSS-GP: General Psychopathology Subscale; PANSS-AnxDep: Anxiety/Depression Subscale; CGI-S: Clinical Global Impression-Severity Scale; PSP: Personal and Social Performance scale; Sp-UPSA: Spanish version of the University of California Performance Skills Assessment.
PSP total score, with the exception of the PANSS Anxiety/Depression subscale ($r = −0.173$, $P = 0.042$) (Table 2). Finally patients who were receiving a mental disability benefit scored significantly lower on the PSP than those who were not (57.6 vs. 68.5, Student’s $t$ test = 3.303, $P = 0.001$).

The linear regression model showed that scores on the CGI-S ($B = −5.406$), PANSS-N ($B = −0.657$) and Sp-UPSA ($B = 0.230$) entered first, second and third, and accounted for 51% of the variance (model $df = 3$, $F = 37.741$, $P < 0.0001$) (Table 3). As can be seen in Table 3, Sp-UPSA total score had significant positive regression weight, indicating that patients with higher scores on this scale were expected to have higher levels of real-world functioning, after controlling for the other variables in the model. CGI-S and PANSS-N scores had significant negative weight, indicating that after accounting for Sp-UPSA total score, patients with higher CGI-S and PANSS-N scores were expected to have lower real-world functioning levels.

Linear regression models for each of the 4 areas of the PSP are shown in Table 4. As can be seen in the Table, with the exception of the model for Aggressive behaviours ($R^2 = 0.122$) the percentages of the variance explained by the rest of the models are quite respectable (from 44.8 to 54.3).

4. Discussion

The aim of this study was to identify factors influencing the level of functioning of patients with schizophrenia in terms of both functional capacity and real-world functioning and each of its major areas. This study adds to the growing literature that focuses on both types of functioning and their predictive factors in a sample of outpatients with schizophrenia recruited from clinical settings. We found that both types of functioning moderately correlate and that each one explains 17% of the variance of the other, as previously reported [26]. This finding supports the need to evaluate both dimensions when assessing individuals with schizophrenia, and highlights the existence of other factors underlying each.

### Table 3
Linear regression model (stepwise method).

<table>
<thead>
<tr>
<th>Functional capacity (Sp-UPSA)</th>
<th>$R^2$</th>
<th>$df$</th>
<th>$F$</th>
<th>$P$</th>
<th>$B$</th>
<th>Beta</th>
<th>95% CI</th>
<th>$t$</th>
<th>$P$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>0.222</td>
<td>2</td>
<td>15.724</td>
<td>&lt; 0.0001</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Constant</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>64.964</td>
<td>43.256–86.672</td>
<td>5.931</td>
<td>&lt; 0.0001</td>
<td>–</td>
</tr>
<tr>
<td>PSP total score</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>0.277</td>
<td>0.086–0.469</td>
<td>2.869</td>
<td>0.005</td>
<td>–</td>
</tr>
<tr>
<td>PANSS-GP score</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>−0.404</td>
<td>−0.783– −0.025</td>
<td>−2.112</td>
<td>0.037</td>
<td>–</td>
</tr>
<tr>
<td>Real-world functioning (PSP)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Model</td>
<td>0.510</td>
<td>3</td>
<td>37.741</td>
<td>&lt; 0.0001</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Constant</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>78.356</td>
<td>62.377–94.336</td>
<td>9.719</td>
<td>&lt; 0.0001</td>
<td>–</td>
</tr>
<tr>
<td>CGI-S score</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>−5.406</td>
<td>−8.454– −2.357</td>
<td>−3.514</td>
<td>0.001</td>
<td>–</td>
</tr>
<tr>
<td>PANSS-N score</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>−0.657</td>
<td>−1.101– −0.213</td>
<td>−2.931</td>
<td>0.004</td>
<td>–</td>
</tr>
<tr>
<td>Sp-UPSA total score</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>0.230</td>
<td>0.072–0.387</td>
<td>2.890</td>
<td>0.005</td>
<td>–</td>
</tr>
</tbody>
</table>

$df$: degrees of freedom; CI: confidence interval; PSP: Personal and Social Performance scale; PANSS-GP: Positive and Negative Syndrome Scale-General Psychopathology Subscale; CGI-S: Clinical Global Impression-Separate Scale; PANSS-N: Positive and Negative Syndrome Scale-Negative Subscale; Sp-UPSA: Spanish version of the University of California Performance Skills Assessment-Communication Subscale; PANSS-P: Positive and Negative Syndrome Scale-Positive Subscale; CGI-S: Clinical Global Impression-Separate Scale.

### Table 4
PSP-subscale linear regression model (stepwise method).

<table>
<thead>
<tr>
<th>PSP subscales</th>
<th>$R^2$</th>
<th>$df$</th>
<th>$F$</th>
<th>$P$</th>
<th>$B$</th>
<th>Beta</th>
<th>95% CI</th>
<th>$t$</th>
<th>$P$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-care</td>
<td>0.448</td>
<td>4</td>
<td>21.911</td>
<td>&lt; 0.0001</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Model</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.931</td>
<td>0.026–1.836</td>
<td>2.040</td>
<td>0.044</td>
<td>–</td>
</tr>
<tr>
<td>Constant</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>0.054</td>
<td>0.033–0.075</td>
<td>5.120</td>
<td>&lt; 0.0001</td>
<td>–</td>
</tr>
<tr>
<td>PANSS-N</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
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<tr>
<td>Sp-UPSA</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>−0.028</td>
<td>−0.060–0.004</td>
<td>−1.712</td>
<td>0.090</td>
<td>–</td>
</tr>
<tr>
<td>Communication</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>−0.066</td>
<td>−0.219– −0.112</td>
<td>−2.852</td>
<td>0.005</td>
<td>–</td>
</tr>
<tr>
<td>Years of education</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>0.035</td>
<td>0.000–0.066</td>
<td>2.165</td>
<td>0.033</td>
<td>–</td>
</tr>
<tr>
<td>PANSS-P</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>0.184</td>
<td>0.103–0.348</td>
<td>3.059</td>
<td>0.003</td>
<td>–</td>
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<tr>
<td>Useful activities</td>
<td></td>
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<td></td>
<td></td>
<td>0.517</td>
<td>0.016–0.836</td>
<td>2.975</td>
<td>0.004</td>
<td>–</td>
</tr>
<tr>
<td>Model</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.046</td>
<td>0.015–0.075</td>
<td>3.059</td>
<td>0.003</td>
<td>–</td>
</tr>
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<td>Constant</td>
<td>–</td>
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<td>–</td>
<td>–</td>
<td>0.312</td>
<td>0.257–0.366</td>
<td>2.165</td>
<td>0.032</td>
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</tr>
<tr>
<td>PANSS-N</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>−1.281</td>
<td>−1.734– −0.827</td>
<td>−3.926</td>
<td>&lt; 0.0001</td>
<td>–</td>
</tr>
<tr>
<td>Working status</td>
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<td>–</td>
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<td>0.314</td>
<td>0.016–0.075</td>
<td>3.059</td>
<td>0.003</td>
</tr>
<tr>
<td>CGI-S</td>
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<td>–</td>
<td>–</td>
<td>–</td>
<td>0.294</td>
<td>0.090–0.494</td>
<td>3.059</td>
<td>0.003</td>
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<tr>
<td>Level of education</td>
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<td>–</td>
<td>–</td>
<td>0.138</td>
<td>0.036–0.240</td>
<td>3.059</td>
<td>0.003</td>
<td>–</td>
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<td>Relationships</td>
<td>0.543</td>
<td>3</td>
<td>43.161</td>
<td>&lt; 0.0001</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Model</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>−0.988</td>
<td>−1.780– −0.200</td>
<td>−2.475</td>
<td>0.015</td>
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</tr>
<tr>
<td>Constant</td>
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<td>–</td>
<td>–</td>
<td>−0.562</td>
<td>−0.740– −0.384</td>
<td>−3.059</td>
<td>&lt; 0.0001</td>
<td>–</td>
</tr>
<tr>
<td>PANSS-N score</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>−0.354</td>
<td>−0.537– −0.171</td>
<td>−2.475</td>
<td>0.015</td>
<td>–</td>
</tr>
<tr>
<td>CGI-S score</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>−0.283</td>
<td>0.015–0.552</td>
<td>2.095</td>
<td>0.038</td>
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<tr>
<td>Level of education</td>
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<td>–</td>
<td>–</td>
<td>–</td>
<td>0.209</td>
<td>0.190–0.229</td>
<td>2.095</td>
<td>0.038</td>
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<td>2</td>
<td>7.659</td>
<td>0.001</td>
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<tr>
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<td></td>
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<td>0.650</td>
<td>0.404–0.902</td>
<td>2.418</td>
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<td>Constant</td>
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<td>–</td>
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<td>–</td>
<td>0.743</td>
<td>0.134–1.352</td>
<td>2.418</td>
<td>0.017</td>
<td>–</td>
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<td>PANSS-P</td>
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<td>–</td>
<td>–</td>
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<td>0.014–0.067</td>
<td>2.996</td>
<td>0.003</td>
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<td>–</td>
<td>−0.060</td>
<td>−0.252–0.130</td>
<td>−2.804</td>
<td>0.006</td>
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</table>

$df$: degrees of freedom; CI: confidence interval; PANSS-N: Positive and Negative Syndrome Scale-Negative Subscale; Sp-UPSA communication: Spanish version of the University of California Performance Skills Assessment-Communication Subscale; PANSS-P: Positive and Negative Syndrome Scale-Positive Subscale; CGI-S: Clinical Global Impression-Separate Scale.
Previously reported UPSA total scores for patients with schizophrenia ranged from 58.8 [31] to 83.2 [20]. Our schizophrenia patients’ total scores fall between these and were very similar to those reported by Leifker et al. [25] (70.2 and 72.2 respectively) indicating a mild level of impairment. On the contrary, our patients’ PSP total score (61.9) describes a population with a manifest degree of disability that consistent with the majority of studies in this type of population [33]. Thus our patients show a discrepancy between functional capacity and real-world functioning as previously reported [12] in the sense that they have a greater impairment in real-world functioning than they do in functional capacity. In addition to the difficulties of assessing real-world functioning [12], this discrepancy may also be explained by the complexity of real-world functioning. This construct is affected by multiple social factors, including but not limited to country wealth, job availability, disability benefit, social resources, etc. that may be an incentive or disincetive in certain functional domains in individuals with schizophrenia [14]. In the case of our patients, this discrepancy could be expected since Spain has the highest rate of unemployment across the world developed countries (26.7% in the year 2013, ILO web reference). However, the level of functioning of our patients is consistent with the literature, as mentioned above, thus questioning the influence of cross-cultural factors in the level of real-world functioning and the discrepancy between the two constructs.

Finally we used two regression models to explain functional capacity and real-world functioning respectively. Although our study included demographic variables and so-called ‘pragmatic functioning variables’ none of those were included in the final models. Our functional capacity model explained only 21% of the variance. This may be due to the fact that among the candidate predictive variables there were no cognitive variables. In this regard, several studies have demonstrated that neurocognition predicted functional capacity in patients with schizophrenia [12,4,21,22,6]. Other reported predictive factors were demographic variables (age, education and race) [11], duration of first hospitalization, depressive symptoms and time in hospital since first episode [12]. However, and contrary to the hypothesized, we did not find any of these. Instead our model’s predictive factors were real-world functioning and general psychopathology. It seems logical that real-world functioning should be a predictor of functional capacity in as much as real-world functioning implies a great deal of experience with the functional skills included in functional capacity.

Our real-world functioning model explained 51% of the variance. The variables included were severity of illness and negative symptoms, and functional capacity. Negative symptoms along with cognitive deficits are the most consistent predictive variables of real-world functioning found in the literature [16,6,3,3,5,2,24]. Although we did not include cognitive variables in our study, we included functional capacity that significantly mediates the strong relationship between global cognitive ability and real-world functioning [4,2]. Furthermore, Harvey et al. [19] found that neuropsychological functioning and functional capacity are highly correlated thus raising the question whether both measures need to be used in clinical trials. When focusing in specific areas of the real-world functioning, pragmatic functioning variables [education level of education achieved and years of education] and working status] were included in the models along with symptomatic and functional capacity variables.

The consistently replicated finding that negative symptoms have a great impact on real-world functioning merits some reflection. There is general agreement that the PANSS and other first-generation scales for assessing the negative syndrome have significant limitations [8]. On the one hand, they have inappropriate content validity (they do not assess the five negative signs and symptoms or they assess other non-negative symptoms) and on the other, they use behavioural rather than experiential referents for assessing negative symptoms [8]. If behavioural referents are used for assessing asociality, avolition or anhedonia there will be an overlap between the assessment of these symptoms and of real-world functioning. For instance item N4 “Passive/apathetic social withdrawal” of the PANSS is defined as Diminished interest and initiative in social interactions due to passivity, apathy, anergia or avolition. This leads to reduced interpersonal involvements and neglect of daily activities [23] and its anchor points are based on social functioning rather than on the subjective experience of social withdrawal (score 5 = … Generally spends little time with others; 6 = … Has very few spontaneous social contacts; and so on). The same applies to the “Avolition/Apathy” dimension of the Scale for the Assessment of Negative Symptoms (SANS). Three questions evaluate this dimension and the two first are more related to functioning than to inner experiences. Question number 1 – Grooming and hygiene – is defined as The patient’s clothes may be sloppy or soiled, and he may have greasy hair, body odor, etc. [1]. This refers more to self-care functioning than to the inner experience of avolition or apathy. Question number 2 – Impersistence at Work or School – is defined as The patient has difficulty seeking or maintaining employment, completing school work, keeping house, etc. [1]. Again the different of this question is closer to functioning (socially useful activities) than to inner experiences.

The redundancy in the measurement of negative symptoms and real-world functioning would explain the high correlation between these two constructs found in most studies. Future research should adequately assess the negative syndrome to determine whether or not these symptoms really have such great impact on real-world functioning.

Our study has some limitations that should be pointed out. Firstly the study was primarily designed to validate the Spanish version of the UPSA instead of to identify predictive factors of functional outcomes. Secondly the lack of neuropsychological measures could undermine the value of the predictive model for functional capacity. Thirdly, there was no specific training for optimizing interrater reliability in the use of the Sp-UPSA and PSP scales. However, the potential negative impact of this lack of training on reliability is minimized by the fact that the instruments used for assessing both types of functioning, i.e. capacity (Sp-UPSA) and real-world functioning (PSP), are structured scales with well-defined operational criteria. On the contrary the generalizability of this study can be considered an advantageous feature since the patients enrolled were similar to patients on maintenance treatment for schizophrenia seen in daily clinical practice throughout Spain. The study inclusion and exclusion criteria were very non-restrictive and it was a multicentre study that included patients from seven different cities in Spain.

In conclusion we have demonstrated that in patients with schizophrenia, functional capacity and real-world functioning are two related but different constructs. Each one predicts the other along with other factors: general psychopathology in the case of functional capacity and severity of illness and negative symptoms in the case of real-world functioning. In relation with specific areas of real-world functioning pragmatic functioning variables play also an important role. These findings have important clinical implications. Firstly they imply that both types of functioning should be assessed in patients with schizophrenia as they provide different type of information. Secondly as their predictive factors are different, strategies for improving them should be different as well. For instance, in order to improve the level of real-world functioning in the self-care area reduce positive and negative symptoms, work with basic skills of communication, and improve knowledge in this area may be helpful strategies.
Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

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References


Further reading