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MCCB cognitive profile in Spanish first episode schizophrenia patients

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ABSTRACT

The objective of the study was to examine the cognitive profile of Spanish patients with a first episode of schizophrenia (FESz) and to compare that to the profile of patients with a chronic schizophrenia (CSz) and non-psychiatric (NP) control subjects. The study included 106 FESz, 293 CSz, and 210 NP, assessed with the Spanish version of the MATRICS Consensus Cognitive Battery (MCCB). The MCCB cognitive profile in a Spanish sample of FESz was similar to the cognitive profile of CSz with some discrepancies in select domains. The scores of both patient samples were about 1–2 SD below the scores of non-psychiatric control subjects.

1. Introduction

Cognitive dysfunction has been considered a core symptom of the schizophrenia since the first descriptions of the disorder (Kraepelin, 1919; Bleuler, 1950). Cognitive deficits have been described in patients with a chronic schizophrenia (CSz) (Reichenberg, 2010), and in patients with a first episode of schizophrenia (FESz) (Addington et al., 2003; Galderisi et al., 2009; Mesholam-Gately et al., 2009; Barder et al., 2013). There have been contradictory results regarding the comparison of cognitive profiles in FESz and CSz. Specifically, some authors have found a similar deficit (Hoff et al., 1992), but others have found less impairment in FESz than in CSz (Saykin et al., 1994; Albus et al., 1996; Addington and Addington, 2002; Townsend and Norman, 2004; Braw et al., 2008). A meta-analysis by Mesholam-Gately et al. (2009) included 47 cognition studies (43 separate samples) in FESz and found cognitive deficits with mean effect sizes from −0.64 to −1.20, similar to that described in CSz (i.e., from −0.46 to −1.41) in the meta-analysis by Heinrichs and Zakzanis (1998). Among the limitations of the meta-analysis in FESz is that the studies used a wide variety of neuropsychological measures, and it was suggested that future studies use the MATRICS Consensus Cognitive Battery (MCCB) to ensure a common core cognitive battery across studies.

McCleery et al. (2014) conducted the first study with a sample of FESz using the MCCB and found that the pattern and overall magnitude of cognitive impairment in FESz were similar to those observed in CSz. Both FESz and CSz showed marked impairment across MCCB domains compared to healthy participants. The MCCB domain scores were similar in FESz and CSz, with the exception of relative preservation of Working Memory and Social Cognition in FESz.

The MCCB was developed by the *Measurement and Treatment Research to Improve Cognition in Schizophrenia* (MATRICS) initiative of the U.S. National Institute of Mental Health. It is comprised of 10 tasks (Nuechterlein et al., 2008; Kern et al., 2008) which evaluate seven separable cognitive domains that are impaired in schizophrenia

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(Nuechterlein et al., 2004). Our group developed the co-norming and standardization of the MCCB in Spain in collaboration with developers of the MCCB (Rodriguez-Jimenez et al., 2012). We previously described the profile of MCCB impairment for a Spanish CSz sample (Rodriguez-Jimenez et al., 2015), finding that CSz patients were impaired compared with healthy participants across all MCCB domains, similar to the results previously reported with a U.S. sample by Kern et al. (2011). Hence, the objective of the present study was to examine the cognitive profile of Spanish FESz patients and to compare that between FESz and CSz and healthy participants, similar to what McCleery et al. (2014) did with a U.S. sample. We also examined the differences in the distribution of severity of cognitive impairment between these samples, based on the criteria outlined by Heaton et al. (1991).

2. Materials and methods

2.1. Sample

The present cross-sectional study was carried out with 106 Caucasian FESz outpatients, who were consecutively included in the First Episode Program of the San Juan Hospital (Alicante, Spain). The assessment of the FESz patients was completed. The inclusion criteria were: 1) diagnosis of schizophrenia or schizophreniform disorder according to DSM-IV criteria, using the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I) (First et al., 1995), 2) at least eight weeks of stabilization on their antipsychotic medication after discharge from the hospitalization unit, 3) age of 18 to 45 years, and 4) sufficient fluency in Spanish to allow the completion of the protocol. Exclusion criteria were: 1) substance abuse/dependence in the past eight weeks, 2) neurological or somatic diseases that could interfere the performance of the tasks, and 3) traumatic head injury. The study was approved by the Clinical Research Ethics Committee. The 210 non-psychiatric (NP) control subjects were the same sample of community residents used in the standardization process of the MCCB in Spain (Rodriguez-Jimenez et al., 2012). The 293 CSz subjects were the same sample as in our previous study (Rodriguez-Jimenez et al., 2015). The demographic and clinical characteristics of the FESz, CSz patients and NP groups are presented in Table 1.

Table 1
Demographic and clinical characteristics.

Characteristic	FESz (N = 106)	CSz (N = 293)	NP (N = 210)
Age-years mean (SD)	26.1 (7.1)[a,b]	41.2 (9.4)	42.7 (11.3)
Gender n (% men)	77 (72.6)[b]	206 (70.3)[c]	105 (50.0)
Education-years mean (SD)	10.5 (2.7)[a]	11.8 (3.6)[c]	10.7 (3.8)
Illness chronicity (years) mean (SD)	0.7 (0.6)[a]	17.1 (9.6)	
Antipsychotic treatment			
Second Generation n (%)	105 (99.1)[a]	228 (77.8)	
First Generation n (%)	1 (0.9)[a]	30 (10.2)	
Mixed n (%)	0 (0)[a]	35 (12.0)	
Chlorpromazine equivalents mean (SD)	707.2 (359.3)[a]	531.6 (415.0)	
PANSS			
Positive mean (SD)	28.0 (6.4)[a]	13.0 (4.8)	
Negative mean (SD)	26.0 (6.2)[a]	18.1 (7.7)	
General Psychopathology mean (SD)	52.8 (8.4)[a]	30.2 (10.4)	
Total mean (SD)	106.9 (14.1)[a]	61.3 (20.2)	

FESz: first-episode schizophrenia. CSz: chronic schizophrenia. NP: non-psychiatric control subjects.
[a] FESz differs from CSz, $p < 0.05$.
[b] FESz differs from NP, $p < 0.05$.
[c] CSz differs from NP, $p < 0.05$.

2.2. Instruments

2.2.1. MATRICS Consensus Cognitive Battery (MCCB)

The MCCB assesses seven cognitive domains: Speed of Processing, Attention/Vigilance, Working Memory, Verbal Learning, Visual Learning, Reasoning and Problem Solving, and Social Cognition (Nuechterlein et al., 2008; Kern et al., 2008). This study used the published and approved translation of the MCCB for Spain and the Spanish normative and standardized data correction. The MCCB testers had extensive experience in the administration of the battery, and they trained with the group that normed the MCCB in Spain. The training included didactic instruction, hands-on practice, and then certification by an experienced MCCB tester.

2.3. Statistical analysis

Data were managed and analyzed with SPSS v.19. For the MCCB impairment profile, the raw scores from each of the 10 MCCB tests were entered into the MCCB Computer Scoring Program, using the option to produce age- and gender-corrected T-scores for the seven cognitive domains and an Overall Composite (normative mean = 50; standard deviation = 10) based on a Spanish normative sample. To compare the MCCB profiles of the groups, a three (group) by seven (MCCB domain) mixed model analysis was conducted.

To compare the degree of impairment between the FESz, CSz patients and NP groups, the MCCB Overall Composite T-scores were grouped by degree of impairment based on criteria outlined by Heaton et al. (1991): "unimpaired" ($T \geq 45$), "below average" ($T = 40–44$), "mild impairment" ($T = 35–39$), "moderate impairment" ($T = 20–34$), and "severe impairment" ($T < 20$). Differences in the distribution of severity of cognitive impairment in the groups were assessed using Chi-square tests.

3. Results

3.1. Descriptive statistics

Age and gender corrected T-scores for each MCCB domain and the Overall Composite score by group are presented in Table 2. Missing data were minimal (0.9% of data points). The mixed model analyses used all available data.

3.2. Mixed model analysis

The MCCB profiles for each group are presented in Fig. 1. A mixed model was fit to the data, with diagnostic group (n = 3), MCCB domain (n = 7) entered as fixed effects.

There was a significant main effect of group [$F(2, 4236) = 633.59$, $p < 0.001$], a significant main effect of MCCB domain [$F(6, 4236) = 14.14$, $p < 0.001$], and a significant group by MCCB domain interaction [$F(12, 4236) = 9.84$, $p < 0.001$].

Pairwise comparisons to decompose the main effect of group demonstrated that the average score across the seven MCCB domains for the NP group was significantly higher than for FESz [$t(1224.38) = -22.46$, $p < 0.01$; mean difference = −11.83, 95% CI: −12.86, −10.79] and CSz [$t(3478.67) = -35.48$, $p < 0.01$, mean difference = −13.42, 95% CI: −14.16, −12.68]. Thus, the FESz and CSz samples showed significant impairment across MCCB domains compared to NP. The significant interaction indicated that the MCCB profile of the two patient groups significantly differed from that of the control group.

To evaluate the MCCB performance profiles of the patient groups, a mixed model analysis was conducted comparing only the two patient groups. There was no main effect of group [$F(1,2771) = 0.86$, $p = 0.35$], indicating similar magnitude of impairment averaged across the seven MCCB domains in the patient groups. There was a significant main effect of MCCB domains [$F(6,2771) = 18.60$, $p < 0.001$] and a