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Are There Gender Differences in Social Cognition in First-Episode Psychosis?

Marina Verdaguer-Rodríguez [1,2], Raquel López-Carrilero [1,2,3], Marta Ferrer-Quintero [1,2,3,4], Helena García-Mieres [1,2,3], Luciana Díaz-Cutraro [1,2,5], Eva Grasa [3,6,7], Esther Pousa [3,6,7,8,9], Ester Lorente [3,10], Irene Birulés [2,4], Trinidad Peláez [2,3], María Luisa Barrigón [11], Isabel Ruiz-Delgado [12], Fermín González-Higueras [13], Jordi Cid [14], Alfonso Gutiérrez-Zotes [3,15], Daniel Cuadras [16], Spanish Metacognition Group †, Ana Barajas [17,18,*,‡] and Susana Ochoa [1,2,3,*,‡]

1 Etiopatogènia i Tractament dels Trastorns Mentals Greus (MERITT), Institut de Recerca Sant Joan de Déu, Santa Rosa 39-57, 08950 Esplugues de Llobregat, Spain; marina.verdaguer@sjd.es (M.V.-R.); raquel.lopezc@sjd.es (R.L.-C.); marta.ferrerq@sjd.es (M.F.-Q.); helena.garcia@sjd.es (H.G.-M.); luciana.diaz@sjd.es (L.D.-C.)
2 Parc Sanitari Sant Joan de Déu, Doctor Antoni Pujadas 42, 08830 Sant Boi de Llobregat, Spain; irene.birules@sjd.es (I.B.); mtrinidad.pelaez@sjd.es (T.P.)
3 Investigación Biomédica en Red de Salud Mental (CIBERSAM), 28029 Madrid, Spain; EGrasa@santpau.cat (E.G.); epousa@santpau.cat (E.P.); esterlorente@hotmail.com (E.L.); gutierreza@peremata.com (A.G.-Z.)
4 Social and Quantitative Psychology Department, University of Barcelona, 08035 Barcelona, Spain
5 Psychology Department, FPCEE Blanquerna, Universitat Ramon Llull, 08022 Barcelona, Spain
6 Department of Psychiatry, Institut d'Investigació Biomèdica-Sant Pau (IIB-Sant Pau), Hospital de la Santa Creu i Sant Pau, 08041 Barcelona, Spain
7 Departament de Psicologia Clínica i de la Salut, Facultat de Psicologia, Universitat Autònoma de Barcelona, Cerdanyola del Vallès, 08193 Barcelona, Spain
8 Salut Mental Parc Taulí. Sabadell, Hospital Universitari, UAB Universitat Autònoma de Barcelona, Sabadell, 08208 Barcelona, Spain
9 Neuropsiquiatria i Addicions, Hospital del Mar. IMIM (Hospital del Mar Medical Research Institute), 08003 Barcelona, Spain
10 Psychiatry Service, Hospital Clínico Universitario de Valencia, 46010 Valencia, Spain
11 Departamento de Psiquiatría, Hospital Universitario Virgen del Rocio, 41013 Sevilla, Spain; marisabe@gmail.com
12 Unidad de Salud Mental Comunitaria Málaga Norte, UGC Salud Mental Carlos Haya, Servicio Andaluz de Salud, 29014 Málaga, Spain; isabelruizdelgado@hotmail.com
13 Comunidad Terapéutica Jaén Servicio Andaluz de Salud, 23001 Jaén, Spain; pablofermingh78@gmail.com
14 Mental Health & Addiction Research Group, IdiBGi—Institut d'Assistencia Sanitària, 17119 Girona, Spain; jordi.cid@telefonica.net
15 Institut d'Investigació Sanitària Pere Virgili (IISPV), Hospital Universitari Institut Pere Mata, Universitat Rovira i Virgili, 43206 Reus, Spain
16 Statistical Unit, Fundació Sant Joan de Déu, Esplugues de Llobregat, 08950 Barcelona, Spain; daniel.cuadras@sjd.es
17 Serra Húnter Programme, Department of Clinical and Health Psychology, Universitat Autònoma de Barcelona, Cerdanyola del Vallès, 08193 Barcelona, Spain
18 Centre d'Higiene Mental Les Corts, Department of Research, 08029 Barcelona, Spain
* Correspondence: ana.barajas@uab.cat (A.B.); susana.ochoa@sjd.es (S.O.)
† Membership of the Spanish Metacognition Study Group is provided in the Acknowledgments.
‡ These authors contributed equally to this work.

Abstract: The aim of this study was to explore gender differences in social cognition in a sample of first-episode psychosis (FEP). An observational descriptive study was performed with 191 individuals with FEP. Emotion perception was assessed using the Faces Test, theory of mind was assessed using the Hinting Task, and attributional style was assessed using the Internal, Personal and Situational Attributions Questionnaire. No gender differences were found in any of the social cognitive domains. Our results suggest that men and women with FEP achieve similar performances in social cognition. Therefore, targeting specific needs in social cognition regarding gender may not be required in early interventions for psychosis.

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1. Introduction

One of the core features of psychosis is the impairment of social cognition. Deficits in social cognition translate to difficulties in several mental processes, encompassing emotion processing and recognition, theory of mind, attributional style, and social perception [1–4]. Impairments in social cognition are already evident in first-episode psychosis (FEP) [5]. Previous studies suggest that people with FEP have an impaired performance in theory of mind [6,7], facial emotion identification [7] and facial emotion recognition [8,9].

The current evidence regarding gender differences in social cognition in psychosis shows inconsistent results. On one hand, some studies suggest that women with schizophrenia have better emotion processing capabilities than men [10,11], the same as in a healthy population [12]. However, other authors did not find gender differences in emotion processing in patients with schizophrenia [12–14]. Interestingly, although Weiss et al. [14] reported a similar emotion recognition performance in both genders, they observed gender differences in the patterns of error in emotion recognition of neutral faces. Men with psychosis tend to misinterpret neutral faces as angry, while women interpret them more frequently as sad [14]. On the other hand, some studies have reported a better theory of mind performance in women with schizophrenia [15], while others report no significant differences [13]. Of note, research focusing on people with FEP has not reported gender differences in emotion processing and theory of mind [16–19]. Regarding attributional style, Pinkham et al. [4] reported no gender differences in a sample of people with established schizophrenia. To our knowledge, no studies have explored gender differences in FEP in attributional style.

Considering the inconsistency of the evidence to date, we believe examining gender differences in social cognition in FEP is of particular importance. The clinical implications of improving social cognitive abilities are relevant, as they have been associated with improvements in other main outcomes. For instance, a better emotion processing performance has been correlated with lower levels of positive symptoms, impulsiveness and aggression, and more satisfactory social interactions [9]. Significant associations have also been found between emotion processing and social perception, neurocognitive domains [20], and social and community functioning [21–25]. Moreover, social cognition seems to act as a mediator between neurocognition and functioning [26]. Therefore, a better understanding of how social cognition works, and whether it works differently in men and women with FEP, may help clarify the need to tailor early interventions based on gender.

The aim of this study was to further explore gender-related differences in social cognition in FEP. In light of the amount of evidence showing no gender differences in social cognitive domains in FEP, we expect to find a similar performance in emotion processing and theory of mind between women and men. Due to the lack of previous research, we do not establish any hypothesis regarding gender differences in attributional style.

2. Results

A total of 191 individuals with FEP were included in the analysis (62 women). Table 1 shows sociodemographic and clinical variables of the sample, according to gender. Women were significantly older than men and had a higher education level. Men and women differed significantly in diagnosis. Schizophrenia was more common in men than in women, while women were diagnosed more often with other psychotic disorders, such as schizoaffective disorder, delusional disorder, brief psychotic disorder, schizophreniform disorder, and a psychotic disorder not otherwise specified. Women scored significantly higher in the PANSS depression factor.

Table 1. Description of sociodemographic and clinical variables of the sample regarding gender.

	Men (n = 129)	Women (n = 62)	Statistic (U-MW/X^2)	p-Value	Cohen's d	95% CI	
						LL	UL
	Mean (SD)	Mean (SD)					
Age (years)	26.78 (6.79)	30.18 (7.91)	2.844 [a]	0.004 *	−0.473	−0.779	−0.166
Education level (%)			12.124 [b]	0.032 *			
Incomplete primary education	10.9%	4.8%					
Complete primary education	17.1%	14.5%					
Incomplete secondary education	24.0%	16.1%					
Complete secondary education	30.2%	24.2%					
Incomplete superior education	7.8%	16.1%					
Complete superior education	10.1%	24.2%					
Diagnosis (DSM-IV-TR) (%)			8.746 [b]	0.003 *			
Schizophrenia	46.5%	24.2%					
Other psychotic disorders	53.5%	75.8%					
Antipsychotic dose (DDD Olanzapine)	20.13 (47.20)	21.37 (55.71)	−1.416 [a]	0.157	−0.248	−0.351	0.301
PANSS Emsley factors							
Negative	15.94 (6.97)	14.28 (6.43)	−1.582 [a]	0.114	0.244	−0.063	0.550
Positive	16.42 (6.36)	15.67 (15.93)	−0.693 [a]	0.489	0.120	−0.186	0.425
Disorganized	8.52 (3.71)	7.98 (3.60)	−1.395 [a]	0.163	0.145	−0.163	0.453
Excited	5.62 (2.65)	5.27 (2.79)	−1.105 [a]	0.269	0.129	−0.175	0.433
Motor	2.89 (1.49)	2.73 (1.23)	−0.309 [a]	0.758	0.116	−0.189	0.420
Depression	4.47 (2.24)	5.26 (2.48)	2.048 [a]	0.041 *	−0.339	−0.664	−0.033
Anxiety	5.89 (2.25)	5.77 (2.50)	−0.613 [a]	0.540	0.050	−0.254	0.353
GAF	78.74 (12.46)	59.41 (11.99)	0.211 [a]	0.833	−0.054	−0.360	0.251
SUMD (global)	5.89 (3.59)	5.33 (3.78)	−1.434 [a]	0.154	0.155	−0.175	0.484

Abbreviations: CI, Confidence Interval; GAF, Global Assessment of Functioning; LL, lower limit; NOS, not otherwise specified; PANSS, Positive and Negative Syndrome Scale; SUMD, Scale Unawareness of Mental Disorders; UL, upper limit. [a] Mann–Whitney U test; [b] Chi-square test; * Level of significance < 0.05.

As seen in Table 2, no significant gender differences were found in any variable of social cognition. We performed an ANCOVA to control for sociodemographic and clinical variables in which we found significant gender differences (Table 1). Follow-up ANCOVAS confirmed that there is no significant effect of gender on social cognitive measures after controlling for the effect of age, depression (PANSS depression Emsley factor), education level, and diagnosis.

Table 2. Gender differences in social cognition.

	Men (n = 129)	Women (n = 62)	Statistic (U-MW)	p-Value	Cohen's d	95% CI		ANCOVA (d.f. = 1)		
						LL	UL	F	p-Value	η^2
	Mean (SD)	Mean (SD)								
Faces Test	17.46 (2.05)	17.75 (1.65)	0.643	0.520	−0.154	−0.44	0.13	0.094	0.759	0.001
Hinting Task	1.56 (0.42)	1.67 (0.33)	1.450	0.147	−0.271	−0.56	0.02	0.799	0.373	0.004
IPSAQ										
Externalizing Bias	0.69 (3.46)	0.90 (4.39)	0.127	0.901	−0.056	−0.41	0.30	0.067	0.796	0.001
Personalizing Bias	0.70 (0.27)	0.66 (0.32)	−0.452	0.653	0.131	−0.23	0.49	0.015	0.902	0.000

Univariate analysis of variance with age, depression and education level as covariates, and diagnosis as a fixed factor. Abbreviations: CI, Confidence Interval; IPSAQ, Internal, Personal and Situational Attributions Questionnaire; LL, lower limit; UL, upper limit.

3. Discussion

In line with our hypothesis, we did not find gender differences in any social cognitive domain, even when controlling for variables such as age, depression, education level and diagnosis.

Women and men performed similarly in emotion processing. This finding is consistent with previous studies that report no significant gender differences in facial and prosodic emotion recognition in FEP [16,18,19]. Nevertheless, contrary to our findings, Navarra-Ventura et al. [19] reported a trend in emotion recognition scores, suggesting that an advantage of women over men with FEP should be considered. In accordance with previous studies, we did not observe significant gender differences in the theory of mind in FEP [17–19]. To our knowledge, this is the first study exploring gender differences in attributional style in people with FEP. We did not find significant gender differences in attributional style, either in externalizing or personalizing biases. Given the paucity of previous studies, further research is required to better establish these results.

Earlier studies report the presence of gender differences in social cognition in more advanced stages of psychosis. Some authors identified that women with established schizophrenia had a better emotion processing capacity [10,11] and theory of mind [15] than their male counterparts. Moreover, previous research shows that women in non-clinical samples have a significantly better ability in some social cognitive domains, such as emotion processing [12]. Considering the aforementioned evidence regarding the absence of gender differences in FEP [16–19], which is in line with our results, it could be suggested that the impairment in emotion processing and theory of mind may develop differently in men than in women, depending on the stage of the disorder. On the one hand, women with FEP may experience a greater impairment, losing the advantage they showed before the onset of the disorder. On the other hand, it could be that men undergo a more profound impairment as the disorder progresses to a more advanced stage. However, this should be interpreted with caution, given that other studies have not detected gender differences in emotion recognition [12–14] or theory of mind [13] in established schizophrenia. Longitudinal studies are needed to determine how the disorder develops over time regarding gender.

Although many studies do not reveal gender differences in social cognition in FEP, some authors have reported that men and women with FEP show distinct outcomes in interventions targeting social cognition. For instance, Salas-Sender et al. [27] showed a reduction in the personalizing bias scores in women with FEP, but not in men, after metacognitive training. A possible explanation for this might be that mediating factors exist between gender and social cognition. It has been reported that neurocognition [28,29], metacognition [30] or social functioning [31] are mediating factors of social cognition. Moreover, previous studies have found that gender differences are present in these variables [17,18,32–38]. Further research is required to better understand whether men and women with FEP have distinct pathways to social cognitive improvements after social cognitive treatments.

Some limitations to this study need to be acknowledged. First, we did not have a control group, so we could not compare our findings with those of a healthy population. Therefore, further studies may include a sample of matched controls, to explore whether people with FEP are more impaired than healthy controls, and to explore if there are gender differences in social cognition in a healthy population. Second, the cross-sectional design did not provide information about how gender differences in social cognition may evolve over time. Despite its exploratory nature, this study offers some insight into the mixed results found to date. Given the paucity of evidence on this matter, further research is needed to clarify the role of gender in social cognition in FEP.

A relevant clinical implication can be identified in the current study. Previous research has shown that impairment in social cognition is greater in people with FEP than in a healthy population [6–8]. This clearly indicates the importance of including social cognition in early interventions for psychosis. Given that men and women with FEP seem to have a similar level of impairment in social cognition, interventions tailored by gender may not

be necessary in early stages of the disorder. In addition, future studies should take into consideration the presence of higher depressive symptoms in women with FEP, in order to better adapt the interventions on this matter.

4. Materials and Methods

A descriptive study was performed based on the baseline data of two multicentric clinical trials registered under NCT02340559 and NCT04429412.

The sample consisted of 191 participants with FEP, that is, participants less than 5 years from the onset of psychotic symptoms [39]. Referent mental health professionals recruited patients from one of the following mental health centers: Hospital Clínic de Valencia, Servicio Andaluz de Salud de Jaén, Servicio Andaluz de Salud de Granada, Servicio Andaluz de Salud de Málaga, Institut Pere Mata (Reus), Institut d'Assistència Sanitària (Girona), Associació Centre d'Higiene Mental Les Corts (Barcelona), Hospital de la Santa Creu i Sant Pau (Barcelona), Hospital del Mar (Barcelona), Corporació Sanitària Parc Taulí, and Parc Sanitari Sant Joan de Déu (Sant Boi, coordinating center).

Inclusion criteria were: (1) a diagnosis of schizophrenia, psychotic disorder not otherwise specified, delusional disorder, schizoaffective disorder, brief psychotic disorder, or schizophreniform disorder, according to DSM-IV-TR; (2) <5 years from the onset of symptoms; (3) PANSS scores of $\geq$3 in items Delusions, Grandiosity, or Suspiciousness, in the last year; (4) age between 16 and 50. Exclusion criteria included: (1) traumatic brain injury, dementia, or intellectual disability (premorbid IQ $\leq$ 70); (2) substance dependence, according to DSM-IV-TR; (3) PANSS scores of $\geq$5 in Hostility and Uncooperativeness items, and of $\geq$6 in Suspiciousness.

Experienced researchers received the required training to assess the participants of the study, and the agreement in the assessment was satisfactory [40].

Sociodemographic questionnaire: We included a sociodemographic questionnaire to collect descriptive information of the sample. We transformed data from antipsychotic treatment to olanzapine defined daily dose [41].

Social cognition: Emotional processing was assessed using the Faces Test [42,43], in which higher scores indicate a better emotional recognition capacity (scores 0–20). The Cronbach's alpha of the Faces Test was 0.75 [43]. Theory of mind was assessed using the Hinting Task [44,45], in which lower scores indicate worse performance. The Cronbach's alpha of the Hinting Task was 0.69 [45]. Attributional style was assessed using the Internal, Personal and Situational Attributions Questionnaire (IPSAQ) [46,47], including the externalizing and personalizing bias subscales. Positive scores in externalizing bias indicate a stronger self-serving bias. Scores higher than 0.5 in personalizing bias denote a bigger proportion of external personal attributions for negative events, compared to situational attributions. The Cronbach's alpha was 0.719 for the externalizing bias and 0.761 for the personalizing bias [46].

Clinical measures: Psychopathology was assessed using the Positive and Negative Syndrome Scale (PANSS) [48,49]. Higher scores indicate greater severity of symptoms. We used the Emsley 7-factor solution [50] to evaluate negative, positive, disorganized, excited, motor symptoms, depression, and anxiety. Clinical insight was assessed using the Spanish version of the Scale to Assess Unawareness in Mental Disorders (SUMD) [51,52], in which higher scores indicate more unawareness (scores 3–15).

Functional outcomes: Global and clinical functioning were assessed using the Global Assessment of Functioning (GAF) [53]. Higher scores indicate better functioning (scores 1–100).

We used the SPSS Statistics Program (v22). We used the Kolmogorov–Smirnov test to verify the normal distribution of the data. We used the non-parametric Mann–Whitney U test to analyze continuous variables. Categorical variables were analyzed using Chi-square test. The Effect sizes of the comparison between genders were analyzed using the Cohen's *d*. We performed an ANCOVA, adjusting for age, depression (PANSS depression Emsley factor) and education level as covariates, and diagnosis as a fixed factor. Due

to the exploratory nature of the present study, we did not include multiple comparison corrections [54,55].

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