

Complex Interaction Between Symptoms, Social Factors, and Gender in Social Functioning in a Community-Dwelling Sample of Schizophrenia

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Abstract Social functioning (SF) is the ultimate target aimed in treatment plans in schizophrenia, thus it is critical to know what are the factors that determine SF. Gender is a well-established variable influencing SF, yet it is not known how social variables and symptoms interact in schizophrenia patients. Furthermore, it remains unclear whether the interaction between social variables and symptoms is different in men compared to women. Our aim is to test whether social variables are better predictors of SF in community-dwelled individuals with schizophrenia, and whether men and women differ in how symptoms and social variables interact to impact SF. Community-dwelling individuals with schizophrenia ($N = 231$) were randomly selected from a register. Participants were assessed with symptom measures (PANSS), performance-based social scale (LSP), objective social and demographic variables. Stratification by gender and stepwise multivariate regression analyses by gender were used to find the best-fitting models that predict SF in both gender. Men had poorer SF than women in spite of showing similar symptom scores. On stepwise regression analyses, gender was the main variable explaining SF, with a significant contribution by disorganized and excitatory symptoms. Age of onset made a less marked, yet significant, contribution to explain SF. When the sample was stratified by

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gender, disorganized symptoms and 'Income' variable entered the model and accounted for a 30.8% of the SF variance in women. On the other hand, positive and disorganized symptoms entered the model and accounted for a 36.1% of the SF variance in men. Community-dwelling men and women with schizophrenia differ in the constellation of variables associated with SF. Symptom scores still account for most of the variance in SF in both genders.

Keywords Schizophrenia · Social functioning · Community · Gender differences · Psychopathology

Introduction

Social functioning (SF) in schizophrenia is defined as the patient's capacity to adjust to personal, family, social, and professional needs. In addition, SF includes the person's ability to take care of him/herself and perform socially defined roles in a particular culture [1, 2]. Such a combination of different high-order components makes SF a highly complex concept, which, in turn, is determined by a myriad variables belonging to different epistemological levels. Specifically, cognitive deficits and psychopathology, objective social variables such as marital status or living situation, or course variables such as age of onset or duration of untreated psychosis have been implicated in determining the level of functioning achieved by individuals afflicted by schizophrenia [3–7]. Being a multi-factorial determined concept, the search for determinants of SF in schizophrenia constitutes a challenging task where variables are better explored in context rather than in isolation.

Although there are current effective pharmacological treatments, psychological therapies, and rehabilitation strategies that achieve significant improvements in symptoms, individuals with schizophrenia still have severely impaired SF [8]. Moreover, SF is relevant because it is a measure closely related to the concept of everyday performance, and, therefore, is becoming the focus of any preventive, therapeutic, and rehabilitation plan [9]. Nonetheless, to ultimately pursue such a relevant goal, it is critical to elucidate which variables impact SF, how they interact with each other, and whether this interaction is different in women compared to men.

In this regard, gender is a well-known non-modifiable risk variable in schizophrenia. Specifically, women have better SF than men in spite of having the same levels of symptom [10–12]. There are a number of studies that point to biological differences such as hormonal differences [13], disrupted normal sexual brain dimorphisms in men [14], or preserved emotional prosodic processing in women to explain this difference in SF [15]. Nonetheless, the number of studies addressing questions regarding social variables is rather scarce; therefore, the question of whether men and women differ in their social profile set of risk factors remains unanswered.

We aim to explore the extent to which social variables play a role in determining SF in schizophrenia and the extent to which men and women differ in this regard. In other words, our primary hypothesis was that men's and women's profiles differ in the type and number of variables that explain their SF impairment. In addition, we hypothesized that social variables would have a more relevant role in explaining SF in a community-dwelling sample of individuals with schizophrenia.

Method

Participants

A total of 231 participants with schizophrenia were randomly selected from a register that included all patients under treatment in five mental health teams [ME2](MHT). The five catchment areas (Cerdanyola, Ciutat Vella, Cornellà, Gava, and El Prat) contain a estimated population of 440,000 adults from the city of Barcelona and its surroundings, and house people of different socio-demographic backgrounds. Inclusion criteria were as follows: (a) primary diagnosis of schizophrenia (DSM-IV criteria) [16]; (b) age between 18 and 65 years; (c) live in the catchments areas of the participating MHT; and (d) have made at least one outpatient visit during the 6 months prior to the beginning of the study. Patients with a diagnosis of mental retardation or neurological disorder were excluded.

Diagnoses of all the selected individuals were reviewed by their treating psychiatrist; in case of discrepancy between the treating psychiatrist's diagnosis and the diagnosis of schizophrenia that was in the register, the case was evaluated by two psychiatrists to make a final decision regarding the inclusion of the patient.

The institutional review board and the clinical ethical committee approved the study protocol in accordance with the declaration of Helsinki [17]. Informed consent was obtained by the treating psychiatrist.

Evaluation

Outcome/Dependent Variables

Social Functioning The Life Skills Profile (LSP) is a specific instrument developed to evaluate SF in schizophrenia community samples and has been shown to have excellent psychometric properties in terms of reliability and validity for both the original English version and the Spanish one [18, 19]. A trained research staff administered the LSP to the person who was most familiar with the participant's functioning (e.g. relatives, friends, case manager). The LSP evaluates SF through a 39-item questionnaire that assesses specific areas of SF in a jargon-free language. Answers are codified in an ordinal scale from 1 to 4, with 1 being the least functional and 4 the most functional; therefore, the higher the score the better the SF. The scale has five domains: Self-Care (SC) assesses aspects related to ordinary duties (e.g., Does the patient usually do his/her laundry without a reminder required?); non-turbulence (NT) assesses the presence of disruptive behaviors (e.g., Does the patient destroy anyone else's belongings?); Socialization (S) assesses the extent to which the patient is able to fluently interact (e.g., Does the patient usually get offended?); Communication (C) assesses whether social communication skills are properly used and put in action (e.g., Does the patient have difficulties initiating or answering during a conversation?); and finally, Responsibility (R) assesses the extent to which the patient is able to develop an autonomous lifestyle (e.g., Is the patient able to usually cook his/her own meals?).

Predictive/Independent Variables

Demographic Variables Clinically related demographic variables such as age, age of onset, and duration of illness were obtained through a comprehensive review of several complementary sources of information to enforce maximum level of accuracy: the

patient's electronic clinical chart, the paper-based clinical chart, patient interview, family interview, and attending psychiatrist.

Objective Social Variables Marital status, income, education, occupation, and living situation were thoroughly assessed through questionnaires by interviewing patients as well as all other available collateral information sources (i.e., closest caregiver, staff, and family).

Psychopathology The Positive and Negative Syndrome Scale (PANSS), the Spanish version [20, 21], was administered by the treating psychiatrist. PANSS items were grouped according to a five-dimensional classification scheme with the domains of Positive, Negative, Excited, Disorganized, and Depression symptoms [22].

Data Analyses

χ^2 and Student *t* tests were used to compare the differences in objective social, demographic, and psychopathological variables by gender. Stepwise multiple regression analyses were employed to evaluate the association of subscales of LSP with demographic, objective social, and psychopathological variables. Total LSP score and LSP sub-scores were the dependent variables and gender, age, age of onset, duration of illness, income, marital status, living situation, occupation, education, PANSS total score, and PANSS sub-scores were the independent variables. To further explore and control for gender-related unbalance, we stratified the sample by gender and fitted a regression analysis for each gender.

All statistical analyses were calculated with SPSS for Windows 10.0.

Results

Descriptive Statistics

Demographic, social, and psychopathological variables are thoroughly presented in Table 1. Briefly, the majority of the 231 participants (63.6%) were men. Mean age of women was higher than that of men (44 vs. 37 years, respectively, $p < 0.001$). While men had a lower mean age of onset than women (22 vs. 24 years, $p = 0.02$), women had a longer mean duration of the disorder (24 vs. 20 years, $p < 0.001$).

In regards to subjective social indicators, women displayed a higher level of SF (LSP total 124.52 vs. 117.84, $p = 0.003$), scoring significantly higher on the SF scale in both total and sub-scale scores, with the exception of the NT sub-scale. On the other hand, we observed that women had better objective social indices for each of the variables assessed under this label.

Finally, no statistically significant differences in the PANSS scores were found for either total score or any of the five dimensions, reflecting a similar level of psychopathological severity in men and women.

Multivariate Stepwise Regression Models

Whole Sample

In the model with all the patients (Table 2), gender was the most important predictors of overall SF (i.e., LSP total score as a dependent variable) with a *b* coefficient of 6.59 in the

Table 1 Demographic, social, and psychopathological characteristics by gender

	Men <i>N</i> = 147 (63.6%)	Women <i>N</i> = 84 (36.4%)	<i>p</i> value
Demographic			
Age years, mean (SD)	36.9 (11.05)	44.7 (12.2)	***
Age at onset years, mean (SD)	22.27 (5.98)	24.63 (9.13)	*
Duration of illness years, mean (SD)	14.73 (9.4)	20.08 (10.71)	***
Objective social variables			
Education, <i>n</i> (%)			
Primary education incompleted	129 (87.8)	74 (88.1)	**
High school or higher degree, completed	17 (11.6)	10 (11.9)	NS
Missing	1(0.7)		
Living situation, <i>n</i> (%)			
Emancipated	43 (29.3)	46 (54.8)	***
Living with relatives	104 (70.7)	38 (45.2)	***
Income, mean (euro), (SD)	886.77 (471,38)	797.42 (464.33)	*
Occupation, <i>n</i> (%)			
Active	31 (21.1)	30 (35.7)	**
Non active	115 (78.2)	54 (64.3)	
Missing	1 (0.7)		
Marital status (single), <i>n</i> (%)	121 (82.6)	34 (40.5)	***
Subjective social variable, scores on LSP, mean (SD)			
Total	117.84 (15.38)	124.52 (11.06)	**
Responsibility	16.57 (4.88)	18.82 (4.04)	***
Non-turbulence	21.86 (2.84)	22.41 (1.77)	NS
Communication	17.24 (3.59)	18.31 (3.29)	*
Socialization	27.68 (3.82)	28.78 (2.19)	*
SC	34.49 (4.85)	36.19 (3.83)	**
Psychopathological scores, scores on PANSS, mean (SD)			
Total	80.58 (24.13)	82.81 (23.89)	NS
Positive	15.60 (6.44)	15.96 (6.25)	NS
Negative	24.80 (8.81)	25.00 (10.11)	NS
Disorganized	18.39 (7.31)	19.58 (6.98)	NS
Excited	10.21 (4.64)	10.46 (4.27)	NS
Depressive	11.58 (4.49)	11.81 (4.10)	NS

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

final equation model, thus indicating that being a woman was related to better SF. In addition, as detailed above, women had significantly better LSP scores compared to men both for total SF score and all the sub-scores, except for NT (Table 1). In addition, PANSS disorganized and excited dimensions showed negative *b* coefficients. Age of onset also entered the model with a positive *b* coefficient.

Since our sample is not evenly composed of the same proportion of male and female, and gender is a critical variable influencing SF, we further explore SF using a stratification strategy. Hence, stepwise regression models were computed separately for men and women.

Regression Models for Men

Regression models for men are detailed in Table 3. The best-fit model for overall SF (i.e. LSP total score) included the ‘Positive’ and ‘Disorganized’ PANSS scores, both with negative *b* coefficients of similar magnitude. The model accounted for a 36.1% of the variance in SF, with ‘Positive’ symptoms contributing a 82% of the total variance. Neither demographic variables nor objective social variables entered the model.

The regression model for the LSP ‘Responsibility’ sub-score, also showed negative *b* coefficients for the ‘Disorganized’ PANSS score. In addition, the variables ‘Income’ and ‘Living situation’ had also negative *b* coefficients of higher magnitude than the ‘Disorganized’ PANSS variable that entered the model. On the other hand, ‘Education’ had a positive *b* score of similar magnitude than the other objective social variables. These four independent variables explained the highest amount of variance on any LSP score with a 39.2% the variance of the ‘Responsibility’ sub-score.

The regression models for the LSP sub-scores of ‘NT’ and ‘SC’ included ‘Age of onset’ in the model with a positive *b* score. Also, two psychopathology domains entered the model with a negative score: ‘Positive’ and ‘Disorganized’ in ‘NT’ model; ‘Positive’ and ‘Disorganized’ in ‘SC’ model. In both models the amount of variance that independent variables explained was similar, being around 29% of variance.

‘Communication’ and ‘Sociability’ models of SF in men exclusively included psychopathological variables. Specifically, ‘Negative’ PANSS score entered the model for ‘Communication’, while ‘Positive’ and ‘Disorganized’ PANSS scores entered the ‘SC’ model. All of them had negative *b* coefficients, and the models accounted for a similar amount of variance in the 28% vicinity.

Table 2 Stepwise regression analyses: LSP total, objective social, demographic, and psychopathological variables are independent variables

Independent variables	Living skills profile LSP total score; <i>b</i> (SE)
Female gender ^a	6.59 (1.7)***
Age	
Age at onset	0.25 (0.1)*
Duration illness	
Education ^b	
Living situation ^c	
Income	
Occupation ^d	
Marital status ^e	
PANSS	
Positive	
Negative	
Disorganized	−0.77 (0.1)***
Excited	−0.66 (0.2)**
Depressed	
<i>R</i> ²	0.368

Numbers are coefficients of model (unstandardized coefficients)

^a Men, ^b Primary studies incomplete, ^c never emancipated, ^d inactive, and ^e single are the reference categories

* $p < 0.05$; ** $p < 0.01$;

*** $p < 0.001$

Table 3 Stepwise regression analyses, stratified for men: LSP total and subscales dependent variables, objective social, demographic, and psychopathological variables are independent variables

Independent variables	Dependent variables					
	LSP total score; <i>b</i> (SE)	Responsibility sub-score; <i>b</i> (SE)	Non-turbulence sub-score; <i>b</i> (SE)	Communication sub-score; <i>b</i> (SE)	Sociability sub-score; <i>b</i> (SE)	Self-care sub-score; <i>b</i> (SE)
Age			0.11 (0.04)**			0.13 (0.1)*
Duration of Illness						
Education ^a		3.09 (1.3)*				
Living situation ^b		-2.67 (0.8)**				
Income						
Occupation ^c		-3.37 (1.0)**				
Marital status ^d						
PANSS						
Positive	-0.81 (0.2)**		-0.10 (0.05)*		-0.13 (0.1)*	-0.23 (0.1)**
Negative				-0.18 (0.03)***		
Disorganized	-0.65 (0.2)**	-0.25 (0.05)***				-0.17 (0.1)*
Excited			-0.23 (0.1)**		-0.29 (0.1)**	
Depressed						
R ²	0.361	0.392	0.298	0.275	0.281	0.285

Numbers are coefficients of model (unstandardized coefficients)

^a Primary studies incomplete, ^b never emancipated, ^c inactive, and ^d single are the reference categories

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Regression Models for Women

Regression models for women are detailed in Table 4. The best-fit model for overall SF (i.e. LSP total score) included ‘Disorganized’ PANSS and ‘Income’ variables. While ‘Disorganized’ variable entered the model with a negative b score, ‘Income’ variable entered the model with a positive b score. Both variables together accounted for a 30.8% of the variance in SF, being ‘Disorganized’ the variable that contributed the most part of the total variance with a 78%.

The regression model for the LSP sub-score of ‘Communication’ included the ‘Negative’ PANSS score and the ‘Age of onset’ variable in the model. Their b coefficients had and opposite sign: negative for the ‘Negative’ PANSS, and positive for ‘Age at onset’. The two variables accounted for the highest amount of variance in the regression models with a 35.6% of the variance of ‘Communication’.

On the other hand, the remainder four models for ‘Responsibility’, ‘NT’, ‘Sociability’, and ‘SC’ only included psychopathology variables. While ‘Positive’ PANSS score and ‘Disorganized’ PANSS score entered the model for ‘Responsibility’, and only the ‘Excited’ PANSS score entered the other three models. In these models, all independent variables but ‘Positive’ had a negative b score. The amount of variance explained was 26.1% in the ‘Responsibility’ mode. The remainder three models scarcely accounted for a variance around the 13% mark.

Discussion

Our results show that men and women with schizophrenia who live in the community differ in their profile of variables associated with SF. Although their symptomatic status is stable and they are responding to the treatment to be living in the community, the psychopathological variables still account for SF in both gender. On the other hand, objective social variables barely account for variance in SF.

We expected that social variables would explain differences in SF in a sample living in the community. This finding may be related to challenges related to the nature of the objective variables. Objective social variables are facts about the social situation (e.g. marital status or income) that can be measured unequivocally. However, they are distal outcome measures, are less susceptible to change, have floor and ceiling effects, and are susceptible to cultural background differences [2]. Therefore, it may be methodologically challenging to relate social outcome with objective variables. Alternatively, it could be that certain psychopathological domains are exquisitely sensitive to SF performance, and even small changes have an impact. Considering even small changes on excitable, disorganized, or positive symptoms as a source of decline in SF seems a very intuitive and plausible explanation. Figure 1 visually summarizes gender-related differences in the profile of variables that account for SF impairment in our sample (i) the impact of positive symptoms on SF is mostly relevant for men, (ii) objective social variables only have some impact on SF in women and (iii) disorganized symptoms have a relevant impact on SF mostly in women.

Our study replicates previous studies that showed that women do better in SF in spite of having a similar symptom severity [8, 11]. In this regard, several hypotheses have been proposed to explain gender differences in SF. While some authors highlight the protective role of estrogens [13] or disrupted normal sexual brain dimorphisms in men but not women [14], others focus on differential gender social expectations [23]. Another line of reasoning

Table 4 Stepwise regression analyses, stratified for women: LSP Total and subscales dependent variables, objective social, demographic, and psychopathological variables are independent variables

Independent variables	Dependent variables					
	LSP Total score; <i>b</i> (SE)	Responsibility sub-score; <i>b</i> (SE)	Non-turbulence sub-score; <i>b</i> (SE)	Communication sub-score; <i>b</i> (SE)	Sociability sub-score; <i>b</i> (SE)	Self-care sub-score; <i>b</i> (SE)
Age						
Age at onset				0.11 (0.03)**		
Duration of Illness						
Education ^a						
Living situation ^b						
Income	10 ⁻⁴ (10 ⁻⁶)*					
Occupation ^c						
Marital status ^d						
PANSS						
Positive		0.17 (0.1)*				
Negative				-0.18 (0.03)***		
Disorganized	-0.80 (0.2)***	-0.35 (0.1)***				
Excited			-0.16 (0.05)**		-0.19 (0.1)**	-0.33 (0.1)**
Depressed						
R ²	0.308	0.261	0.136	0.356	0.117	0.145

Numbers are coefficients of model (unstandardized coefficients)

^a Primary studies incomplete, ^b never emancipated, ^c inactive, and ^d single are the reference categories

* *p* < 0.05; ** *p* < 0.01; *** *p* < 0.001

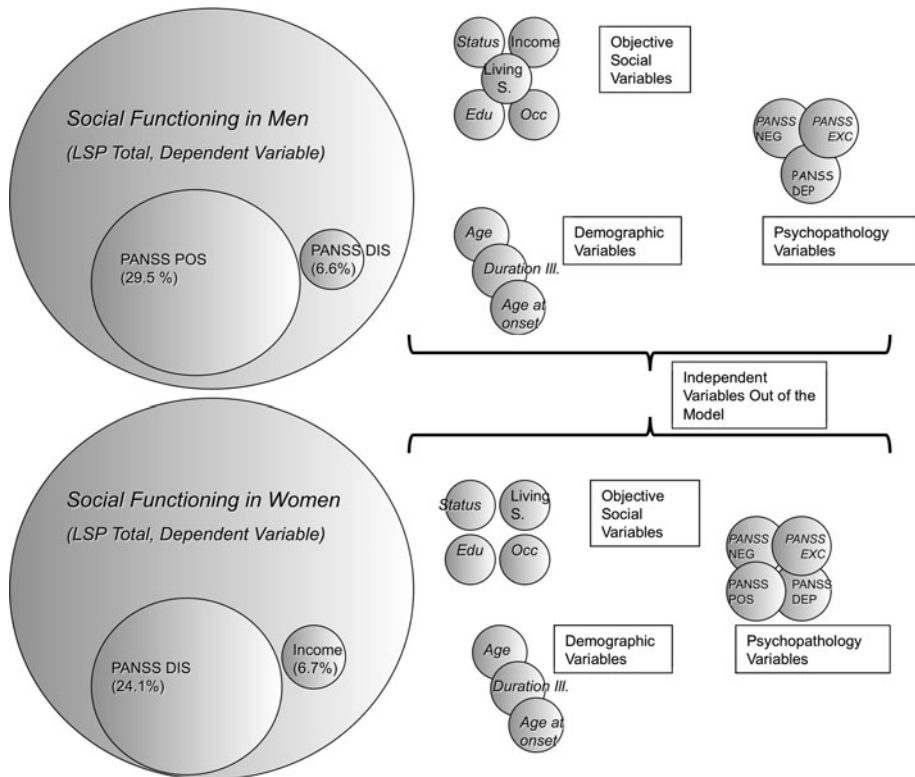


Fig. 1 Overall SF, diagram by gender. Dependent variable is represented by the *larger bubble*, independent variables that enter the model are represented within the *larger bubble*; dimension of the *bubble* are proportional to the amount of variance they explain. Variables not entering the model are represented on equal size out of the main *bubbles*

links women having a later age of onset with the fact that early age of onset is one of the most strongly associated factors with worse overall prognosis and functioning [24–27]. However, our results show that ‘Age of onset’ enters the models for ‘NT’ and ‘SC’ in men, and for ‘Communication’ in women. Thus pointing to an effect of age at onset on SF regardless of gender. Furthermore, Häfner and colleagues suggest that gender differences in SF are already apparent before onset, thus reducing the likelihood of those differences being a result of just an earlier age of disease onset [28]. Nevertheless, our study was not designed to explore the role of biological variables such as hormonal differences and, therefore, we are not able to rule out the possibility that age of onset is an intermediate variable reflecting the effect of other biological factors.

Slight differences in variable profile occurred regarding psychopathology as a function of gender. SF in men was affected by positive symptoms in overall performance and in three out of five domains: NT, socialization, and SC. On the other hand, for women, PANSS positive entered the model just for the domain of responsibility; more intriguingly, the *b* coefficient positively indicated that the higher the score in positive symptoms, the higher the score in SF. Beyond this particular counterintuitive relationship, which might be explained by the presence of a confounding effect by a third variable not included in the analyses, the observed trend shows that SF is affected by the presence of residual positive

symptoms in men, but not so much in women. Given that both genders have an equal and stable level of positive symptoms, and these interfere with SF mostly in men, we hypothesize that coping strategies and/or service use differences might account for positive symptoms interfering more in men (i.e., either men cope less efficiently and/or do not use provided treatment services as much as women do), an idea that has support in the literature [29, 30].

Finally, it is noteworthy that, in contrast to what had been reported before by some authors, our results showed that neither mood nor negative symptoms play a significant role in explaining overall social impairment (i.e., LSP total) [31, 32]. This could be due to the fact that some of those previous studies, such as Aki et al. [33] for instance, used a three-domain scale and some aspects related to excited or disorganized symptoms could be taken into account under negative. In this regard, as Salokangas et al. [34] point out, we are of the view that a five dimension psychopathological scale sorts out meaningfully the psychopathological domains, showing that presence of either disorganized or excitatory symptoms impairs SF.

There are several limitations to this study. The sample consists of a middle aged community-dwelling cohort who were stable, and perhaps had lower psychopathology scores compared to inpatient groups of individuals. Therefore, the external validity and generalization of the results to a different groups age or an inpatient sample may be limited. In addition, the cross-sectional design of the study does not allow us to consider the models from a longitudinal perspective, thus limiting the study's inferential capacity.

In addition, other variables might have been useful to explore in our study. According to Ochoa et al. [35, 36], the number of unmet needs is positively and highly correlated with symptom severity: the more unmet needs, the higher the psychopathological severity. Moreover, such a correlation is particularly strong with disorganized and excited symptoms. Thus, it would have been interesting to include this variable in our study.

Given that SF is the ultimate therapeutic target, it would be very exciting to explore whether different types of treatment are associated to better SF (e.g. intramuscular vs. oral antipsychotics, or typical vs. atypical antipsychotics). Indeed, there are increasing numbers of drug clinical trials that are starting to assess SF as the main outcome [37]. Furthermore, since our data not only shows that men and women have different SF impairments, but also that the impairment is related to a different set of variables, it would be interesting to see whether there is any relationship between SF and therapeutic response in women compared to men, a question that is under current scrutiny [38].

In summary, our findings indicate that in spite of being symptomatically stable, variations in critical psychopathological domains impair SF. Further, these critical psychopathological domains differ in men and women. While men's SF is affected by positive symptoms, women's SF is impaired by disorganized symptoms. Our study also shows that objective social variables may be too distal as an outcome measure or may have ceiling effects that make it difficult to capture change. Alternative intermediate variables may be considered in better predicting SF as an outcome variable [39, 40]. Finally, this study supports and furthers the notion that men and women with schizophrenia differ in the variables that impair their SF, thereby prompting for tailoring in treatment plans as a function of gender. Also, it has potential critical implications for measuring outcome in clinical trials.

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Conflict of interest None of the authors have any conflict of interest regarding the present research.

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Author Biographies

F. Vila-Rodriguez, MD trained in medicine in the University Autònoma of Barcelona in Barcelona, Spain and received his MD in 2000. He was a resident in psychiatry at Saint John of God Mental Health Services (SJD-MHS)/Universitat de Barcelona for 4 years. After graduation, he was an attending psychiatrist at the El Prat Mental Health Team as well as a Clinical Research Fellow in Schizophrenia research. Dr. Vila received his Master of Advance Studies in Neuroscience in 2007, by the Universitat de Barcelona (diplôme d'études approfondies). Dr. Vila moved to Vancouver in 2006 where he gain admission to the UBC Graduate Program in Neuroscience focusing on translational research in Schizophrenia and severe psychotic disorders. He completed a 2-year clinical research fellowship in September 2009, focused on complex and co-occurring disorders in Vancouver. He is currently a Psychiatry resident at the UBC program.

S. Ochoa, PhD obtained her major in psychology at the University Autònoma of Barcelona in Barcelona, Spain in 1996. She further pursued graduate studies in the University of Barcelona where she obtained her PhD in 2004, her dissertation focused on the study of met and unmet needs of patients with schizophrenia living in the community. Currently, she is the Research and Developmental Unit coordinator at Parc Sanitari

Sant Joan the Deu, where she has been working since 1997. Dr. Susana Ochoa has published more than 30 papers in peer-reviewed journals, and is the principal investigator and co-investigator in multiple research projects funded by the Ministry of Health of Spain, and other public and private funding agencies. Her work encompasses multiple areas of research on schizophrenia and first episode psychoses such as neuropsychological deficits, social impairments and functioning, and outcome measuring.

J. Autonell, MD is a psychiatrist and Director of the Psychiatry Residency Program at Parc Sanitari Sant Joan of God in St. Boi de Llobregat, Barcelona, Spain. He has combined his studies as a clinician with his pursue in understanding epidemiological aspects in severe mental disorders. Specifically, his interest has focused on measuring outcome variables, family burden, and unmet needs in individuals with schizophrenia. Also, he has been involved in research regarding adequacy treatment of depression and anxiety in primary care and epidemiological studies aimed to assess the prevalence and incidence in the general population. He has published more than twenty scientific papers in peer-reviewed journals. An has received multiple grants through competitive funding from public and private agencies. Dr. Autonell is an active member of several scientific and professional organizations in the field of psychiatry. He is also a member of the redIDIAPP network, for research in prevention in Primary Care.

J. Usall, MD trained in medicine in the University of Barcelona and received his MD in 1988. In 2003 she received his Ph.D. degree. Her doctoral dissertation was: “Gender and schizophrenia: Symptomatological and social functional differences between women and men”. Since 2003 her professional activity is: Cornellà Mental Health Care Center, Parc Sanitari Sant Joan de Déu (Professional activity as a psychiatrist) Research Unity Sant Joan de Déu-S.S.M. (Professional activity as a researcher).

J. M. Haro, MD, PhD is a psychiatrist and Ph.D. in Public Health, is the Director of the Saint John of God Research Foundation in Barcelona, Spain. The Foundation promotes and coordinates the research of three hospitals. After his medical studies, he was trained in Epidemiology and Public Health at the Johns Hopkins School of Hygiene and Public Health (Baltimore, MD, USA). Later he got his specialization in psychiatry at the Clinic Hospital of Barcelona. During the past 15 years he has worked both in clinical medicine and in public health research and has published more than one hundred scientific papers. His areas of investigation have been epidemiology of mental disorders and schizophrenia. In schizophrenia, he has been interested in the consequences of the disorder in patient functioning and quality of life and the impact on society overall. He has also conducted research on treatment outcomes, both in observational and randomized studies. Lately, he has focused on the role of observational research in the assessment of the effects of new treatments and has participated in the development of new methodologies to improve the designs of these studies. As a researcher in the epidemiology of mental disorders, he has conducted studies on the prevalence of disorders in the general population and the treatment of mental disorders in primary care. Dr. Haro is an active member of several scientific and professional organizations in the field of psychiatry and public health. He is one of the founding members of the PSICOST group, a group of researchers in the field of mental health care costs. He is also a member of the Spanish Public Health Society and principal investigator of one of the members of the CIBERSam network.