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ORIGINAL PAPER

The relationships of personal resources with symptom severity and psychosocial functioning in persons with schizophrenia: results from the Italian Network for Research on Psychoses study

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Abstract The relationships of personal resources with symptom severity and psychosocial functioning have never been tested systematically in a large sample of people with schizophrenia. We applied structural equation models to a sample of 921 patients with schizophrenia collected in a nationwide Italian study, with the aim to identify, among a large set of personal resources, those that may have an association with symptom severity or psychosocial functioning.

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Several relevant demographic and clinical variables were considered concurrently. Poor service engagement and poor recovery style, as well as older age and younger age at onset, were related to greater symptom severity and poorer social functioning. Higher resilience and higher education were related to better social functioning only. Poor problem-focused coping and internalized stigma, as well as male gender and depression, were related to symptom severity only. The explored variables showed distinctive and partially independent associations with symptom severity and psychosocial functioning. A deeper understanding of these relationships may inform treatment decisions.

Keywords Schizophrenia · Personal resources · Symptom severity · Psychosocial functioning · Structural equation models

Introduction

Schizophrenia is a mental disorder often associated with poor functioning in several domains, including occupational and social functioning and independent living [1–4]. Symptom reduction and social functioning improvement are regarded as the two most important outcomes in schizophrenia [3, 5, 6], but variations in one domain do not necessarily correspond to a parallel variation in the other domain [7]. Studies investigating the relationship between psychopathology and psychosocial functioning reported stronger correlations for negative symptoms than for positive symptoms, with depressive symptoms having a non-trivial role [6, 8, 9]. Personal resources such as recovery styles, resilience, service engagement [10, 11], coping styles [11, 12], internalized stigma [13] and self-esteem [14] have been reported to interfere with both symptom reduction and social functioning.

Two distinct recovery styles, i.e., 'integration' and 'sealing over,' have been defined [15–17]. Patients who employ the 'sealing-over' recovery style make significantly more negative self-evaluations and perceive their parents as significantly less caring than those with the 'integration' style [11]. This latter style seems to favor recovery [16]. Resilience is a construct whose exploration in schizophrenia is relatively recent. It is possibly related to functioning and to the transition from an at-risk state to psychosis [18], because it encompasses several aspects of personal, family and social resources. It has been defined as a personal trait protecting against mental disorders and as a dynamic process of adaptation to challenging life conditions [19, 20]. Coping styles also influence the outcome of persons with severe mental illnesses, such as schizophrenia [21]. Emotion-focused coping is more strongly and directly associated with symptom severity and poor quality of life than problem-focused coping [12]. Internalized stigma and poor self-esteem have also been reported to exert an unfavorable influence on real-life functioning and quality of life [22, 23], with implications for treatment.

Aim of the study

The aim of our study was to identify, among a set of personal resources in a large sample of patients with schizophrenia, those that may have an association with symptom severity and/or with psychosocial functioning and that can inform and orient the treatment approach.

Materials and methods

Subjects

In the study of the Italian Network for Research on Psychoses [24], participants were recruited from patients living in the community and consecutively seen at the outpatient units of 26 Italian university psychiatric clinics and/or mental health departments. Inclusion criteria were a diagnosis of schizophrenia according to DSM-IV, confirmed with the Structured Clinical Interview for DSM-IV—Patient version (SCID-I-P), and an age between 18 and 66 years. Exclusion criteria were: a history of head trauma with loss of consciousness; a history of moderate to severe mental retardation or of neurological diseases; a history of alcohol and/or substance abuse in the last 6 months; current pregnancy or lactation; inability to provide an informed consent; and treatment modifications and/or hospitalization due to symptom exacerbation in the last 3 months.

All patients signed a written informed consent to participate after receiving a comprehensive explanation of the study procedures and goals. Approval of the study protocol was obtained from the local ethics committees of each participating center.

Procedures

Recruitment took place from March 2012 to September 2013. A clinical form was filled in with data on age of onset of the first psychotic episode, course of the disease and treatments, using all available sources of information (patient, family, medical records and mental health workers).

Study variables

Psychotic symptoms were assessed by means of the Positive and Negative Syndrome Scale (PANSS) 30-item rating scale [25]. Because several PANSS scores demonstrated a different pattern of correlation with measures of

functioning, we adopted a new measure of global symptom severity, derived from the PANSS items selected by the Remission in Schizophrenia Working Group (RSWG) to define remission in schizophrenia [26]. We obtained this measure by summing the scores of the following eight items: delusions (*P*1), conceptual disorganization (*P*2), hallucinatory behavior (*P*3), blunted affect (*N*1), social withdrawal (*N*4), lack of spontaneity (*N*6), mannering/posturing (*G*5) and unusual thought content (*G*9). These items were chosen by the RSWG because they represent the three dimensions of psychopathology identified by factor analyses and the five criteria for schizophrenia specified in DSM-IV [26]. This variable was named PANSS Severity score (PANSS-Ss) and was considered as a continuous proxy measure of remission/non-remission status. The original dichotomous formulation of RSWG symptomatic remission [26] was maintained only to analyze its relationship with psychosocial functioning and antipsychotic treatment.

Psychosocial functioning was measured using the Personal and Social Performance (PSP) scale [27]. Ratings are based on the assessment of four indicators: (1) socially useful activities, including work and study; (2) personal and social relationships; (3) self-care; and (4) disturbing and aggressive behaviors, rated on a six-point scale. The interviewer assigned a global score based upon information obtained during the interview regarding the four main areas of functioning and upon any additionally available source of information. The total score is usually divided into three levels: 71–100 (mild or no functioning difficulties); 31–70 (varying degrees of difficulties); and 0–30 (functioning so poor that the patient needs intensive support and supervision) [5, 28].

Resilience was assessed using the Resilience Scale for Adults (RSA) [29, 30]. This self-administered instrument includes 33 items that examine intra- and inter-personal protective factors thought to facilitate adaptation when facing psychosocial adversity. Items are organized into six factors: perception of self, perception of the future, structured style, social competence, family cohesion and social resources. RSA total score was used as a global index of resilience with higher scores reflecting higher resilience.

The Service Engagement Scale (SES) [10] was used to explore patients' relationship with mental health services. SES includes 14 items, rated on a 4-point Likert scale (with higher scores reflecting greater levels of difficulty engaging with services), which are grouped into four subscales: availability, cooperation, help seeking and adherence to treatment. In the present paper, we used the total score.

The Internalized Stigma of Mental Illness (ISMI) [31] was used to evaluate the experience of stigma and internalized self-rejection. It includes 29 items and 5 subscales for self-assessment of subjective experience of stigma. Each item is rated on a 4-level Likert scale, where higher scores indicate greater levels of internalized stigma.

Recovery style was measured with the Recovery Style Questionnaire (RSQ) [17] a 39-item self-report measure, designed to reflect categories consistent with those developed by McGlashan et al. [15]. Thirteen scales were computed, with higher scores representing 'integration', i.e., a recovery style associated with better outcome, less depression and better self-evaluation, as compared to a 'sealing-over' style [32].

The Self-Esteem Rating Scale (SERS) [14] was used to assess self-esteem. It consists of 40 items rated on a 7-point Likert scale, 20 scored positively and 20 negatively, with total scores ranging from −120 to +120. The SERS taps into multiple aspects of self-evaluation such as overall self-worth, social competence, problem-solving ability, intellectual ability, self-competence and worth compared with others. Higher scores represent higher self-esteem.

The extension of patients' social network was assessed with the Social Network Questionnaire (SNQ). The questionnaire consists of 15 items exploring different aspects of social interactions which may be grouped into four factors representing social contacts, practical support, affective support and supporting partner [33]. Higher scores represent larger networks.

The Brief Cope, an abridged version of the Cope [34], is a self-report 14-subscale/28-item questionnaire that demonstrated good psychometric properties in the assessment of dispositional as well as situational coping efforts. The 14 subscales are composed of two items each with a higher score indicating greater use of the specific coping strategy. Problem-focused versus emotion-focused coping strategies were considered [35, 36].

Depressive symptoms were evaluated using the Calgary Depression Scale for Schizophrenia (CDSS), a rating scale designed to assess the level of depression in people with schizophrenia [37]. Higher scores represent higher levels of depression.

Statistical analyses

Continuous variables were summarized using mean and standard deviation (SD) and categorical variables as relative frequencies. Bivariate associations were analyzed between PSP and PANSS-Ss and between PANSS-Ss and PANSS subscales using correlation. Chi-square tests were used to evaluate the association between remission, levels of psychosocial functioning and antipsychotic treatment.

The relationship of symptom severity (PANSS-Ss) and psychosocial functioning (PSP) with a set of independent variables was analyzed using a structural equation model (SEM). The SEM framework has several advantages over

the more traditional multiple linear regression: First, estimating a multivariate regression with two outcomes by a SEM instead than running two separate multiple regressions leads to estimates that are more accurate, because the correlation between the outcomes may be accounted for. Independent variables can easily be identified as associated with a single outcome or with both outcomes by examining the graphical representation of SEM. The accuracy of the estimates can be improved by defining PSP as a latent variable underlying the four PSP subscales, thus reducing the measurement error.

An initial full model including the relationships of all the independent variables with both outcomes was first tested. The final model was obtained by trimming one at a time, in decreasing order of p value, all nonsignificant relationships ($p > 0.05$) and removing variables which were unrelated to each of the outcomes. Removed variables may be either unrelated to the outcomes or highly correlated with at least another independent variable. Standardized coefficients were reported to allow the comparison of relationships pointing to the same dependent variable.

Stata 13.1 was used for descriptive statistics and Mplus 7.4 was used for SEM analysis.

Results

Out of 1691 screened patients, 1180 were eligible; of these, 202 refused to participate, 57 dropped out before completing the procedures, and 921 were included.

Descriptive statistics of demographic and clinical variables and of the outcomes are provided in Table 1.

Patients with symptomatic remission were 21.8 % of the study population. Of these patients, 11.8 % had no functioning difficulties, 78.3 % intermediate functioning and 9.9 % low functioning. Remission was significantly associated with no functioning difficulties ($\chi^2 = 101.1$; $p < 0.001$); 73.4 % of the samples were non-remitters with low functioning, 7.0 % were remitters with no functioning difficulties, 14.8 % remitters with low functioning and 4.8 % non-remitters with no functioning difficulties.

Among patients with 71–100 PSP score, 13.8 % were on second-generation antipsychotics (SGA), while 6.1 % were on first-generation antipsychotics (FGA). Patients with 0–30 PSP score were for 7.9 % on SGA and for 19.2 % on FGA.

The association between type of antipsychotics and PSP was statistically significant ($\chi^2 = 30.20$; $p < 0.0001$). Among remitters, 16.5 % were on SGA and 0.9 % on FGA, while non-remitters 59.1 % were on SGA and 13.3 % were on FGA. The remaining patients were on both SGA and FGA or off ($\chi^2 = 13.81$, $p = 0.003$).

Table 1 Characteristics of the study population

Variable	*n*	Mean (SD) or %
Education (years)	919	11.61 (3.43)
Age	921	40.17 (10.71)
Age at onset	918	24.02 (7.20)
Antipsychotics treatment		
First-generation antipsychotics	630	68.6 %
Second-generation antipsychotics	130	14.1 %
Both	13	14.1 %
None	29	3.2 %
Gender (% males)	921	69.6 %
Work[a] (% working)	893	29.2 %
PANSS positive[a]	920	16.12 (6.74)
PANSS negative[a]	920	21.93 (8.52)
PANSS general psychopathology[a]	920	37.44 (11.81)
PANSS total[a]	920	75.49 (23.05)
PANSS severity	921	21.94 (7.81)
RSA total	921	106.56 (21.30)
PSP total[a]	919	52.99 (16.55)
PSP activities	920	−2.43 (1.20)
PSP relationships	919	−2.46 (1.06)
PSP self-care	920	−1.07 (1.05)
PSP aggressive behavior	920	−0.54 (0.88)
Problem-focused coping	921	39.68 (10.51)
Emotion-focused coping	921	24.95 (6.16)
SES	921	12.89 (7.71)
RSQ	909	7.99 (2.23)
SERS	921	16.01 (40.65)
ISMI	910	2.20 (0.44)
SNQ	911	2.28 (0.50)
CDSS	920	3.99 (4.02)

PANSS Positive and Negative Syndrome Scale, *PSP* Personal and Social Performance Scale, *SES* Service Engagement Scale, *RSA* Resilience Scale for Adults, *RSQ* Recovery Style Questionnaire, *SERS* Self-Esteem Rating Scale, *ISMI* Internalized Stigma of Mental Health, *SNQ* Social Network Questionnaire, *CDSS* Calgary Depression Scale for Schizophrenia

[a] Not included in the SEM models

Correlations of PANSS-Ss with PANSS total score were $r = 0.923$, with PANSS positive $r = 0.774$; with PANSS negative $r = 0.800$.

PSP correlation with PANSS positive was $r = -0.391$, with PANSS negative $r = -0.485$ and with PANSS total $r = -0.515$.

Relationships of personal resources with psychosocial functioning and symptom severity

The initial SEM model, including all the relationships between the independent variables and the two dependent

variables, is depicted in Fig. 1. All the four PSP scales had significant loadings on the latent PSP factor ($p < 0.001$), ranging from 0.409 to 0.685. Significant correlations were found between the latent PSP and symptom severity ($r = -0.514$, $p < 0.001$) and between PSP activities and PSP relationships ($r = 0.311$, $p < 0.001$) and were added to the model. This model proved to have a satisfactory goodness of fit to the data: RMSEA = 0.043, CFI = 0.948, TLI = 0.909.

The final SEM model is shown in Fig. 2. Emotion-focused coping, SERS and SNQ were unrelated to both outcomes and were removed from the model.

Of the remaining variables, RSQ and SES, as well as age and age at onset, were related to both outcomes; problem-focused coping and ISMI, as well as gender and CDSS, were related only to symptom severity; and education and RSA were related only to PSP (Table 2). The variables with the strongest association with higher symptom severity were lower service engagement ($b = 0.202$, $p < 0.001$) and younger age at onset ($b = -0.180$, $p < 0.001$). Other significant associations were found with higher internalized stigma, less effective recovery style, less problem-focused coping, more severe depression, older age and male gender. A better psychosocial functioning was associated with lower service engagement ($b = -0.267$, $p < 0.001$), younger age ($b = -0.304$, $p < 0.001$), older age at onset ($b = 0.277$, $p < 0.001$), higher resilience, higher levels of education and a more effective recovery style. Three PSP scales, i.e., PSP activities, PSP relationships and PSP self-care, showed high loadings on the latent factor PSP (from 0.600 to 0.676), while PSP aggressive behavior scale loading was 0.418. Significant correlations were confirmed between symptom severity and PSP ($r = -0.517$, $p < 0.001$) and between PSP activities and PSP relationships ($r = 0.329$, $p < 0.001$). Only six estimated correlations between pairs of predictors were above 0.2, namely those between ISMI and RSA ($r = 0.499$), age and age at onset ($r = 0.349$), problem-focused coping and RSA ($r = 0.309$), ISMI and CDSS ($r = 0.296$), RSA and CDSS ($r = -0.285$) and problem-focused coping and RSQ ($r = 0.281$).

Model fit was good and improved over the initial model, with RMSEA = 0.039, CFI = 0.958 and TLI = 0.937. The explained variances of the outcomes were 0.170 for PANSS-Ss and 0.297 for PSP. Due to some sparse missing data on the independent variables, the model was tested on 902 patients with complete data (missing data proportion was 19/921 = 2.1 %). This sample size was more than

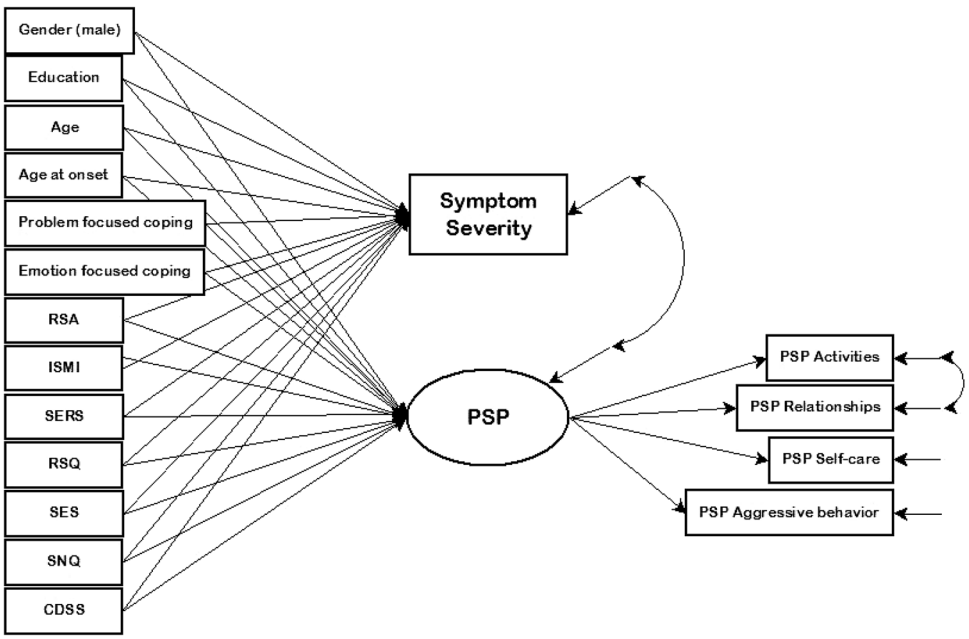

Fig. 1 Diagram of the initial SEM. *Rectangles* indicate observed variables; the *ellipsis* indicates that PSP is a latent variable with *arrows pointing* to its indicators. *Straight arrows* from the independent observed variables on the *left* to symptom severity and to PSP indicate regressions; *small straight arrows* on the dependent variables indicate the presence of residuals; *curved arrows* linking residuals indicate correlations. *RSA* Resilience Scale for Adults, *ISMI* Internalized Stigma of Mental Health, *SERS* Self-Esteem Rating Scale, *RSQ* Recovery Style Questionnaire, *SES* Service Engagement Scale, *SNQ* Social Network Questionnaire, *CDSS* Calgary Depression Scale for Schizophrenia, *PSP* Personal and Social Performance Scale

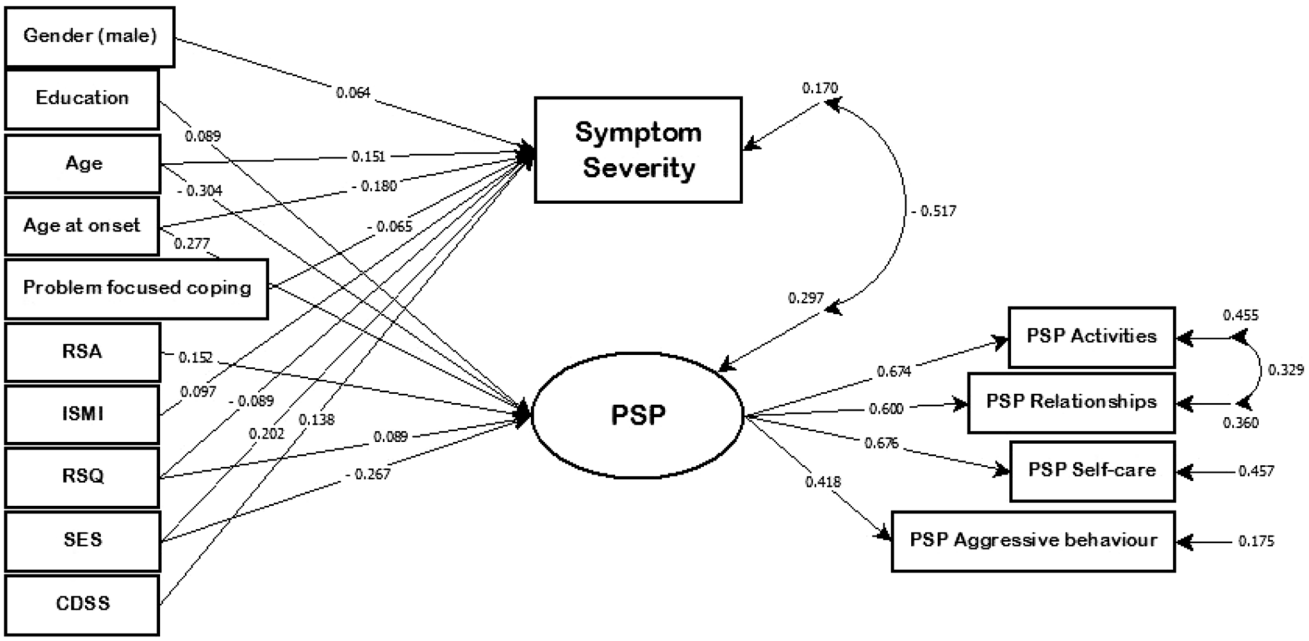

Fig. 2 Diagram of the final SEM. *Rectangles* indicate observed variables; the *ellipsis* indicates that PSP is a latent variable with *arrows* pointing to its indicators. *Straight arrows* from the independent observed variables on the left to symptom severity and to PSP indicate regressions, with *numbers* showing the estimated standardized regression coefficients; *small straight arrows* on the dependent variables indicate the presence of variance residuals, with *numbers* showing the explained variance; *curved arrows* linking residuals indicate correlations, with *numbers* showing the estimated coefficients. *RSA* Resilience Scale for Adults, *ISMI* Internalized Stigma of Mental Health, *RSQ* Recovery Style Questionnaire, *SES* Service Engagement Scale, *CDSS* Calgary Depression Scale for Schizophrenia, *PSP* Personal and Social Performance Scale

adequate to estimate the 30 free parameters of the final model.

Discussion

To our knowledge, this is the first study examining the relationships of personal resources with symptom severity and psychosocial functioning in a large sample of patients with schizophrenia.

Despite the wide literature on PANSS factors, no single model achieved broad consensus [38]. To have a more global index of core symptom severity, we decided to use a new PANSS measurement obtained by summing all item scores selected by Andreasen et al. [26] in the Remission in Schizophrenia Working Group (RSWG). These items were chosen because they reflect the three dimensions of psychopathology in schizophrenia, overcoming the factor-analytic debate.

PSP has been used as a measure of social functioning in patients with stable schizophrenia with well-reported reliability and validity [5].

We found that some variables were associated with both PANSS-Ss and PSP (i.e., age, age at onset, service engagement and recovery style); some were associated with PSP only (i.e., resilience and educational level); and others were associated with PANSS-Ss only (i.e., gender, problem focus coping, internalized stigma and depression).

As expected, correlations between PANSS scores and PSP were negative [6, 28, 39, 40]. The strongest one was the correlation between PANSS-Ss and PSP. This was even higher than the widely reported correlations of PSP with the PANSS negative factor and the PANSS total score [6], suggesting that the PANSS-Ss may have a strong face validity.

The significant association of service engagement with the severity of symptom and with psychosocial functioning is a new finding. Service engagement is a useful tool for research and clinical purposes [10]. Individuals who are experiencing difficulties in engaging with services have poorer outcomes (i.e., higher severity of symptoms and poorer psychosocial functioning). This domain could be a target of further attention.

An interesting difference was found between the two outcomes with regard to their association with the symptoms of depression, which were related to PANSS-Ss but not to PSP. Depression could represent a nonspecific symptom limiting psychosocial functioning improvement [24, 41, 42], and several studies reported persisting symptoms of depression associated with reduced quality of life and

Table 2 Results of the final SEM

Dependent and independent variables	*b*	*p* value
Measurement model (PSP on PSP subscales)		
PSP activities	0.674	<0.001
PSP relationships	0.600	<0.001
PSP self-care	0.676	<0.001
PSP aggressive behavior	0.418	<0.001
Outcome PANSS-Ss		
Gender	0.064	0.023
Age	0.151	<0.001
Age at onset	−0.180	<0.001
Problem-focused coping	−0.065	0.026
ISMI	0.097	0.002
CDSS	0.138	<0.001
RSQ	−0.089	0.005
SES	0.202	<0.001
Outcome PSP		
Education	0.089	0.010
Age	−0.304	<0.001
Age at onset	0.277	<0.001
RSA	0.152	<0.001
RSQ	0.089	0.015
SES	−0.267	<0.001

PANSS Positive and Negative Syndrome Scale, *PSP* Personal and Social Performance Scale, *SES* Service Engagement Scale, *RSA* Resilience Scale for Adults, *RSQ* Recovery Style Questionnaire, *ISMI* Internalized Stigma of Mental Health, *CDSS* Calgary Depression Scale for Schizophrenia

b = standardized regression coefficient

functioning [43, 44]. However, most of the studies that investigated the relationship between depression and psychosocial functioning utilized bivariate instruments, not considering other factors that could be associated with psychosocial functioning and related to depression.

The association of depression with severity of symptoms could also be the consequence of more severe symptoms inducing a demoralizing effect. Unfortunately, the cross-sectional design of the study cannot clarify the meaning of the reported association.

Either depression or low self-esteem could interact with stigma, as reported by Lysaker et al. [22], limiting symptom improvement. Our results indicate that internalized stigma is significantly associated with symptom severity but not with PSP. As recently reviewed by Gerlinger et al. [45], personal stigma (i.e., self- stigma) is well characterized, but stigma correlates differ remarkably. Social functioning was reported to show ambiguous associations with personal stigma that otherwise shows a significant correlation with positive symptoms and general psychopathology [45, 46]. Our findings confirm the latter observations.

The association between stigma and more severe symptoms [22, 46, 47] addresses the issue of possible strategies aimed at stigma reduction. van Zelst et al. [48] reported that enhancing psychological resources, by increasing self-esteem and the ability to cope with symptoms, could improve stigma resilience.

Research into recovery in psychosis has shown that people with a diagnosis of schizophrenia often use avoidance coping strategies rather than problem-focused ones [11, 16, 17, 49]. We report that problem-focused but not emotion-focused coping strategies were associated with a lower severity of symptoms. Although there is no consensus regarding which coping strategies are most effective in reducing psychopathological and distress symptoms [50], researchers have found that patients with schizophrenia tend to use ineffective emotionally oriented or non-problem-focused coping styles [22, 49, 51]. Our findings suggest that treatment strategies aiming to enhance the coping of individuals with psychosis could ultimately reduce the severity of symptoms [49].

This study builds on previous work [17] examining the hypothesis that recovery styles could predict outcomes. Interestingly, recovery styles (i.e., integration) are associated with both psychosocial functioning and symptom severity.

A relatively new finding is the relationship of resilience with psychosocial functioning. Torgalsbøen [20] reported a significant correlation between resilience and present psychosocial functioning and a significant difference between fully recovered individuals and those in remission regarding their resilience score. Mirroring the problem-focused coping, we found an association of resilience with social functioning but not with severity of symptoms, suggesting that slight but meaningful differences between coping, resilience and recovery styles exist. This finding could help to further refine these constructs in the broad area of remission/recovery/functioning in schizophrenia.

Our results indicate that some demographic and clinical variables, such as age and age at onset, were associated with both the severity of symptoms and psychosocial functioning, while gender was related to severity of symptoms only. The association between symptom severity and older age, as well as the relationship of older age at onset and female gender with lower symptom severity, confirms findings from previous reports [43, 52–54]. The association of poorer functioning with younger age and lower age at onset is a well-established finding [55] and is in line with our results.

Educational level has been historically considered a predictor of social and work functioning [40, 56–58], and we confirm this finding.

For social and everyday living outcomes, variance accounted for by the entire array of predictive variables

was less than 30 %, suggesting that other factors, such as social and cultural influences, are involved as well [9, 24].

The issue of differences between first- versus second-generation antipsychotics on measure of functioning is still open for debate [59, 60] so that the differences in the association between psychosocial function and antipsychotic treatment that we reported deserve further investigations either for the considerable pharmacologic heterogeneity within and between the FGA and SGA groups or for the cross-sectional design of the study that impedes any causal interpretation of the findings. The cross-sectional nature of this study constitutes important limitation and prevents conclusions regarding the causality of findings. The major strengths of the study are the large size of the sample and the wide array of state-of the-art instruments, which allowed the use of a multivariate model in a SEM framework to test the associations among a large number of variables with high reliability.

In conclusion, our results indicate that personal resources, clinically relevant demographic features (i.e., age at onset and gender) and non-core symptoms, such as depression, are significantly associated with either severity of symptoms or psychosocial functioning or with both outcomes, but with different loadings.

The results of the current study might inform psychosocial treatments aimed to reduce stigma, improve coping strategies and shape recovery styles. Some of these factors are potentially modifiable by specific therapeutic interventions, which can produce considerable clinical and functional improvements.

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Compliance with ethical standards

Conflict of interest None.

References

1. Brissos S, Balanzá-Martinez V, Dias VV, Carita AI, Figueira ML (2011) Is personal and social functioning associated with subjective quality of life in schizophrenia patients living in the community? Eur Arch Psychiatry Clin Neurosci 261(7):509–517
2. Schaub D, Brüne M, Jaspen E, Pajonk FG, Bierhoff HW, Juckel G (2011) The illness and everyday living: close interplay of psychopathological syndromes and psychosocial functioning in chronic schizophrenia. Eur Arch Psychiatry Clin Neurosci 261(2):85–93
3. Gorwood P, Burns T, Juckel G, Rossi A, San L, Hargarter L et al (2013) Psychiatrists' perceptions of the clinical importance, assessment and management of patient functioning in schizophrenia in Europe, the Middle East and Africa. Ann Gen Psychiatry 12:8
4. Burns T, Patrick D (2007) Social functioning as an outcome measure in schizophrenia studies. Acta Psychiatr Scand 116:403–418
5. Nasrallah H, Morosini P, Gagnon DD (2008) Reliability, validity and ability to detect change of the Personal and Social Performance scale in patients with stable schizophrenia. Psychiatry Res 161:213–224
6. Juckel G, Schaub D, Fuchs N, Naumann U, Uhl I, Witthaus H et al (2008) Validation of the Personal and Social Performance (PSP) Scale in a German sample of acutely ill patients with schizophrenia. Schizophr Res 104:287–293
7. Oorschot M, Lataster T, Thewissen V, Lardinois M, van Os J, Delespaul PAEG et al (2012) Symptomatic remission in psychosis and real-life functioning. Br J Psychiatry 201:215–220
8. Brissos S, Dias VV, Balanzá-Martinez V, Carita AI, Figueira ML (2011) Symptomatic remission in schizophrenia patients: relationship with social functioning, quality of life, and neurocognitive performance. Schizophr Res 129:133–136
9. Leifker FR, Bowie CR, Harvey PD (2009) Determinants of everyday outcomes in schizophrenia: the influences of cognitive impairment, functional capacity, and symptoms. Schizophr Res 115:82–87
10. Tait L, Birchwood M, Trower P (2002) A new scale (SES) to measure engagement with community mental health services. J Ment Health 11:191–198
11. Tait L, Birchwood M, Trower P (2004) Adapting to the challenge of psychosis: personal resilience and the use of sealing-over (avoidant) coping strategies. Br J Psychiatry 185:410–415
12. Rudnick A, Martins J (2009) Coping and schizophrenia: a reanalysis. Arch Psychiatr Nurs 23:11–15
13. Livingston JD, Boyd JE (2010) Correlates and consequences of internalized stigma for people living with mental illness: a systematic review and meta-analysis. Soc Sci Med 71:2150–2161
14. Nugent WR, Thomas JW (1993) Validation of a clinical measure of self-esteem. Res Soc Work Pract 3:191–207
15. McGlashan TH, Levy ST, Carpenter WT (1975) Integration and sealing over. Clinically distinct recovery styles from schizophrenia. Arch Gen Psychiatry 32:1269–1272

16. McGlashan TH (1987) Recovery style from mental illness and long-term outcome. J Nerv Ment Dis 175:681–685
17. Drayton M, Birchwood M, Trower P (1998) Early attachment experience and recovery from psychosis. Br J Clin Psychol 37:269–284
18. Kim KR, Song YY, Park JY, Lee EH, Lee M, Lee SY et al (2013) The relationship between psychosocial functioning and resilience and negative symptoms in individuals at ultra-high risk for psychosis. Aust N Z J Psychiatry 47:762–771
19. Zauszniewski JA, Bekhet AK, Suresky MJ (2010) Resilience in family members of persons with serious mental illness. Nurs Clin North Am 45:613–626
20. Torgalsbøen A-K (2012) Sustaining full recovery in schizophrenia after 15 years: does resilience matter? Clin Schizophr Relat Psychoses 5:193–200
21. Roe D, Yanos PT, Lysaker PH (2006) Coping with psychosis: an integrative developmental framework. J Nerv Ment Dis 194:917–924
22. Lysaker PH, Roe D, Yanos PT (2007) Toward understanding the insight paradox: internalized stigma moderates the association between insight and social functioning, hope, and self-esteem among people with schizophrenia spectrum disorders. Schizophr Bull 33:192–199
23. Mashiach-Eizenberg M, Hasson-Ohayon I, Yanos PT, Lysaker PH, Roe D (2013) Internalized stigma and quality of life among persons with severe mental illness: the mediating roles of self-esteem and hope. Psychiatry Res 208:15–20
24. Galderisi S, Rossi A, Rocca P, Bertolino A, Mucci A, Bucci P et al (2014) The influence of illness-related variables, personal resources and context-related factors on real-life functioning of people with schizophrenia. World Psychiatry 13:275–287
25. Kay SR, Fiszbein A, Opler LA (1987) The positive and negative syndrome scale (PANSS) for schizophrenia. Schizophr Bull 13:261–276
26. Andreasen NC, Carpenter WT, Kane JM, Lasser RA, Marder SR, Weinberger DR (2005) Remission in schizophrenia: proposed criteria and rationale for consensus. Am J Psychiatry 162:441–449
27. Morosini PL, Magliano L, Brambilla L, Ugolini S, Pioli R (2000) Development, reliability and acceptability of a new version of the DSM-IV Social and Occupational Functioning Assessment Scale (SOFAS) to assess routine social functioning. Acta Psychiatr Scand 101:323–329
28. Patrick DL, Burns T, Morosini P, Rothman M, Gagnon DD, Wild D et al (2009) Reliability, validity and ability to detect change of the clinician-rated Personal and Social Performance scale in patients with acute symptoms of schizophrenia. Curr Med Res Opin 25:325–338
29. Friborg O, Hjemdal O, Martinussen M, Rosenvinge JH (2009) Empirical support for resilience as more than the counterpart and absence of vulnerability and symptoms of mental disorder. J Individ Differ 30:138–151
30. Friborg O, Barlaug D, Martinussen M, Rosenvinge JH, Hjemdal O (2005) Resilience in relation to personality and intelligence. Int J Methods Psychiatr Res 14:29–42
31. Ritsher JB, Otilingam PG, Grajales M (2003) Internalized stigma of mental illness: psychometric properties of a new measure. Psychiatry Res 121:31–49
32. Poloni N, Callegari C, Buzzi A, Aletti F, Baranzini F, Vecchi F et al (2010) The Italian version of ISOS and RSQ, two suitable scales for investigating recovery style from psychosis. Epidemiol Psichiatr Soc 19:352–359
33. Magliano L, Fadden G, Madianos M, de Almeida JM, Held T, Guarneri M et al (1998) Burden on the families of patients with schizophrenia: results of the BIOMED I study. Soc Psychiatry Psychiatr Epidemiol 33:405–412
34. Carver CS, Scheier MF, Weintraub JK (1989) Assessing coping strategies: a theoretically based approach. J Personal Soc Psychol 56:267–283
35. Tuncay T, Musabak I, Gok DE, Kutlu M (2008) The relationship between anxiety, coping strategies and characteristics of patients with diabetes. Health Qual Life Outcomes 6:79
36. Stratta P, Capanna C, Carmassi C, Patriarca S, Di Emidio G, Riccardi I et al (2014) The adolescent emotional coping after an earthquake: a risk factor for suicidal ideation. J Adolesc 37:605–611
37. Addington D, Addington J, Maticka-Tyndale E (1993) Assessing depression in schizophrenia: the Calgary Depression Scale. Br J Psychiatry Suppl 163:39–44
38. Wallwork RS, Fortgang R, Hashimoto R, Weinberger DR, Dickinson D (2012) Searching for a consensus five-factor model of the Positive and Negative Syndrome Scale for schizophrenia. Schizophr Res 137:246–250
39. Rabinowitz J, Levine SZ, Garibaldi G, Bugarski-Kirola D, Berardo CG, Kapur S (2012) Negative symptoms have greater impact on functioning than positive symptoms in schizophrenia: analysis of CATIE data. Schizophr Res 137:147–150
40. Llorca P-M, Blanc O, Samalin L, Bosia M, Cavallaro R (2012) Factors involved in the level of functioning of patients with schizophrenia according to latent variable modeling. Eur Psychiatry 27:396–400
41. Bowie CR, Depp C, McGrath JA, Wolyniec P, Mausbach BT, Thornquist MH et al (2010) Prediction of real-world functional disability in chronic mental disorders: a comparison of schizophrenia and bipolar disorder. Am J Psychiatry 167:1116–1124
42. Iosifescu DV (2012) The relation between mood, cognition and psychosocial functioning in psychiatric disorders. Eur Neuropsychopharmacol 22(Suppl 3):S499–S504
43. Karow A, Moritz S, Lambert M, Schöttle D, Naber D (2012) Remitted but still impaired? Symptomatic versus functional remission in patients with schizophrenia. Eur Psychiatry 27:401–405
44. Karow A, Wittmann L, Schöttle D, Schäfer I, Lambert M (2014) The assessment of quality of life in clinical practice in patients with schizophrenia. Dialogues Clin Neurosci 16:185–195
45. Gerlinger G, Hauser M, De Hert M, Lacluyse K, Wampers M, Correll CU (2013) Personal stigma in schizophrenia spectrum disorders: a systematic review of prevalence rates, correlates, impact and interventions. World Psychiatry 12:155–164
46. Boyd JE, Adler EP, Otilingam PG, Peters T (2014) Internalized Stigma of Mental Illness (ISMI) Scale : a multinational review. Compr Psychiatry 55:221–231
47. Lysaker PH, Davis LW, Warman DM, Strasburger A, Beattie N (2007) Stigma, social function and symptoms in schizophrenia and schizoaffective disorder: associations across 6 months. Psychiatry Res 149:89–95
48. van Zelst C, van Nierop M, Oorschot M, Myin-Germeys I, van Os J, Delespaul P (2014) Stereotype awareness, self-esteem and psychopathology in people with psychosis. PLoS ONE 9:e88586
49. Phillips LJ, Francey SM, Edwards J, McMurray N (2009) Strategies used by psychotic individuals to cope with life stress and symptoms of illness: a systematic review. Anxiety Stress Coping 22:371–410
50. Aldwin CM, Revenson TA (1987) Does coping help? A reexamination of the relation between coping and mental health. J Personal Soc Psychol 53:337–348
51. Ritsner M, Ben-Avi I, Ponizovsky A, Timinsky I, Bistrov E, Modai I (2003) Quality of life and coping with schizophrenia symptoms. Qual Life Res 12:1–9
52. Lambert M, Schimmelmann BG, Naber D, Schacht A, Karow A, Wagner T et al (2006) Prediction of remission as a combination of symptomatic and functional remission and adequate

subjective well-being in 2960 patients with schizophrenia. J Clin Psychiatry 67:1690–1697
53. Carpiniello B, Pinna F, Tusconi M, Zaccheddu E, Fatteri F (2012) Gender differences in remission and recovery of schizophrenic and schizoaffective patients: preliminary results of a prospective cohort study. Schizophr Res Treat 2012:576369
54. Karow A, Naber D, Lambert M, Moritz S (2012) Remission as perceived by people with schizophrenia, family members and psychiatrists. Eur Psychiatry 27:426–431
55. Suttajit S, Arunpongpaisal S, Srisurapanont M, Thavichachart N, Kongsakon R, Chantakarn S et al (2015) Psychosocial functioning in schizophrenia: are some symptoms or demographic characteristics predictors across the functioning domains? Neuropsychiatr Dis Treat 11:2471–2477
56. McGurk SR, Meltzer HY (2000) The role of cognition in vocational functioning in schizophrenia. Schizophr Res 45:175–184
57. Mueser KT, Salyers MP, Mueser PR (2001) A prospective analysis of work in schizophrenia. Schizophr Bull 27:281–296
58. Macpherson R, Jerrom B, Hughes A (1996) Relationship between insight, educational background and cognition in schizophrenia. Br J Psychiatry 168:718–722
59. Jones PB, Barnes TRE, Davies L, Dunn G, Lloyd H, Hayhurst KP et al (2006) Randomized controlled trial of the effect on quality of life of second-vs first-generation antipsychotic drugs in schizophrenia. Arch Gen Psychiatry 63(10):1079–1087
60. Leucht S, Corves C, Arbter D, Engel RR, Li C, Davis JM (2009) Second-generation versus first-generation antipsychotic drugs for schizophrenia: a meta-analysis. Lancet 373:31–41