

The illness and everyday living: close interplay of psychopathological syndromes and psychosocial functioning in chronic schizophrenia

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Abstract The interaction of psychopathological states and psychosocial functioning determine the long-term course of schizophrenia and its treatment. To be able to achieve this interplay better, exact assessment of psychosocial functioning is needed besides measurement of psychopathology. Using the Personal and Social Performance (PSP) Scale, examination of the association between psychosocial functioning and psychopathology was conducted in a sample of 103 patients with chronic schizophrenia. Rating instruments were in addition Global Assessment of Functioning Scale and Social and Occupational Functioning Assessment Scale, as well as Positive and Negative Syndrome Scale (PANSS), Clinical Global Impression Scale, and Mini-ICF-APP-Rating for Mental Disorders (Mini-ICF-APP). Besides good psychometric properties for the PSP scale in this chronic sample, we found, as expected, significant associations between the two relevant outcome domains: results showed significant negative correlations between PSP and PANSS. Findings prove the close interplay between social functioning and psychopathology in the chronic course of schizophrenia.

Keywords PSP · Chronic Schizophrenia · Social functioning · Psychopathology

Introduction

Schizophrenia is consistently viewed as a disorder with a high relapse rate and risk of chronicity [3]. Especially in the course of long-term treatment, deficits in social functioning remain prominent and increase the risk of social exclusion and poverty as a consequence of poor social competence and unemployment. As patients with schizophrenia were questioned about their expectations for efficient treatment [6], they pointed out that beside mere reduction of symptoms, they want to experience improvement in social functioning, e.g. an increase in daily activities, social contacts, and working opportunities. Progress in psychosocial functioning means personal, social, and occupational reintegration based on the patient's personal abilities [1, 5, 11].

Thus, patient-relevant outcome parameters like social functioning and quality of life should be equally assessed independent of psychopathology as relevant indicators for treatment outcome [17, 20].

It has turned out that up to now neglected symptom areas in schizophrenia like the cognitive efficiency and depressive symptoms are quite decisively for reaching the treatment goal of increasing psychosocial functioning. The absence of sadness, hopelessness, impulse lack, and other psychopathological syndromes influences the life of the patients and their social functional level in a positive way concerning professional activity and private success. Occupation is closely associated with the patients in the absence of cognitive deficits. And also, the absence or successful treatment of the depressive symptomatology is a

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successful predictor for a subjectively positive professional and private life for people with schizophrenia.

Concerning the prevailing positive and negative symptoms in patients with schizophrenia, only very few studies have so far looked at the association of these symptoms with social functioning. Previous findings found a negative correlation between psychosocial functioning and negative symptoms of schizophrenia. For functioning in general, Ertugrul and Ulug [4] summarized nine studies and found some of them having an association with negative symptoms only, while others had associations with both positive and negative symptoms. Observations by Hofer et al. [8] showed that subjective and functional outcomes were mainly predicted by psychopathological symptoms and unchangeable sociodemographic variables. The association of psychosocial functioning measured by the Personal and Social Performance (PSP) Scale [16] with psychopathology or demographic data has not been examined in detail yet, nor has any study compared the PSP scale with the short version of the ICF Rating for Mental Disorders, the Mini-ICF-APP-P [13].

Besides a further validation of our German translation of the PSP scale in a large sample of chronically ill patients with schizophrenia, we therefore had a closer look at the association of both outcome domains psychopathology and social functioning. Hereby, we anticipated negative correlations between PSP and scores on psychopathology. Particularly, we expected significant negative associations between psychosocial functioning and negative or disorganization symptoms in accordance with the given literature [4, 14, 22]. In order to analyze the associations with the PSP scale in more depth, we used the revised five-factor model of the PANSS (Positive and Negative Syndrome Scale) with its subdivisions in the factors positive symptoms, negative symptoms, disorganization, excitement, and emotional distress [21]. Besides, in regard to construct validity, we expected significant associations between PSP and demographic indices.

Method

Participants

Hundred and three outpatients (70 men, 33 women) diagnosed with schizophrenia ($N = 91$) or schizoaffective disorder ($N = 12$) according to ICD-10 research diagnostic criteria were included. The diagnoses were verified with the international diagnoses checklist for ICD-10 (IDCL) [23].

The majority of 70 patients with chronic schizophrenia (F 20.5) were recruited in- and outpatients of the Center for Psychiatric Care and Rehabilitation, Dr. K. Fontheim's Hospital for Mental Health in Liebenburg, Germany. The remaining 33 participants were outpatients of the LWL University Hospital Bochum and the LWL Hospitals in Dortmund and Herten. They were also diagnosed with chronic-residual or chronic (non-remitted) schizophrenia or schizoaffective disorder. Patients' mean age was 45.6 years, ranging from 21 to 65 years, PANSS sum score was 70.3 (SD = 18.6). Overall, the sample was characterized by a low level of education, a high rate of unemployment, and the majority of patients were single (for further details, see Table 1).

Social functioning scales

The existing measures are not yet satisfactory. The ability of occupational rehabilitation can be assessed by the Mini-ICF-APP-P—a shortened version of the International Classification of Functioning, Disability and Health for Mental Disorders (ICF) [13]. With a differentiated profile of 12 dimensions of disabilities in functioning chosen from the ICF, the Mini-ICF-APP-P can show in which areas and to which extent limitations in health can lead to disabilities in functioning. This information reveals domains in which focused aid is necessary to help the patient with daily

Table 1 Demographic data of the sample of chronically ill patients with schizophrenia

	Sample of study
<i>N</i>	103
Sex ratio	$m = 70, w = 33$
Age (years)	$M = 45.6, \text{Min} = 21, \text{Max} = 65$
Diagnosis (F x.x)	F 20.x = 91, F 25.x = 12
Living situation	Own apartment = 12 (with home care = 5), residential facility = 21, Dr. Fontheim Hospital = 70 (clinic/residential facility)
Status of relationship	Singles = 75, in partnership = 8, married = 3, divorced = 14
Children	Yes = 12, no = 88
Education	No degree = 10, secondary school = 68, secondary modern school = 12, 11th class = 2, vocational diploma = 4, university-entrance diploma (the Abitur) = 7
Occupation	Unemployed = 5, on pension = 73, employed = 3, temporary job = 19

duties and occupational rehabilitation. For the evaluation of functioning in general, GAF (Global Assessment of Functioning Scale) is a simple and short instrument. However, the disadvantage of this scale lies in mixing psychopathological aspects with psychosocial factors. Upon this criticism, SOFAS (Social and Occupational Functioning Assessment Scale) was developed, which, nevertheless, includes no clear operational instructions for rating the severity of disability. On this background, Morosini [16] developed the Personal and Social Performance Scale (PSP scale) in a rehabilitation center for patients with schizophrenia. In comparison with GAF and SOFAS, the PSP scale does not mix psychopathological with psychosocial aspects.

So there is a more exact and specific operationalization of the occupational, social, and personal functioning domains. In addition, the rater can assess one global score and four subscores of the main areas ‘socially useful activities including; work and study’, ‘personal and social relationships’, ‘self-care’, and ‘disturbing and aggressive behaviors’. The categorization in four subdimensions creates a greater accuracy of the PSP scale in comparison with the GAF and SOFAS scales. Furthermore, its quick practicability with only 5–10 min ought to be mentioned.

Study measures

For patients’ assessment, we included the Clinical Global Impression Scale (CGI) [7], the Positive and Negative Syndrome Scale (PANSS) [10], the Personal and Social Performance Scale (PSP) [9, 16], the Global Assessment of Functioning Scale (GAF), and Social and Occupational Functioning Assessment Scale (SOFAS) [19], as well as the Mini-ICF-APP-Rating for Mental Disorders (Mini-ICF-APP-P) [13] (all German versions).

Procedures

Measurement was conducted in a cross-sectional design in the above-mentioned hospitals. In order to replicate previous findings regarding PSP in chronic outpatients with schizophrenia [16], our own German version of the Personal and Social Performance Scale (PSP) was validated in a large sample of patients with stable schizophrenia. Hence, the treating doctor rated the patients on PSP, SOFAS, GAF, CGI, and PANSS based on their clinical overall impression. The project psychologist evaluated the participants on PSP, SOFAS, GAF, and Mini-ICF-APP-P based on a semi-structured interview with emphasis on the occupational situation, family and friends, duties at home, activities (hobbies, interests), and daily routine. Interview duration ranges from 45 to 60 min.

All raters (one project psychologist and one treating doctor in each of the four participating hospitals) received 1-h training with regard to PSP, GAF, and SOFAS. After this, ratings for each patient took about 20 min for the project psychologist, and about 20–30 min for the treating doctor. Raters were blind to the ratings of the respective corater so to have an independent rating of psychopathology and psychosocial functioning. All patients gave written informed consent for participation, and the study was conducted in accordance with the Declaration of Helsinki.

Results

Reliability

For the large sample of 103 chronically ill patients with schizophrenia, the reliability of PSP with its four subdimensions can be considered as satisfactory with Cronbach’s Alpha of $\alpha = 0.79$.

Intra-class correlations revealed significant rater agreement for the ratings of the PSP subdimensions and the total score. Highly significant ($P < 0.001$) positive correlations of $r = 0.54$ – 0.82 proved acceptable to good inter-rater reliability (see Table 2); the rater agreement was shown to be clearly higher for the subdimensions ‘socially useful activities’ and ‘self-care’ than for ‘personal and social relationships’ and ‘disturbing and aggressive behavior’, and the highest intra-class correlations, and thus the best inter-rater reliability was found for the PSP total score.

Correlational analysis

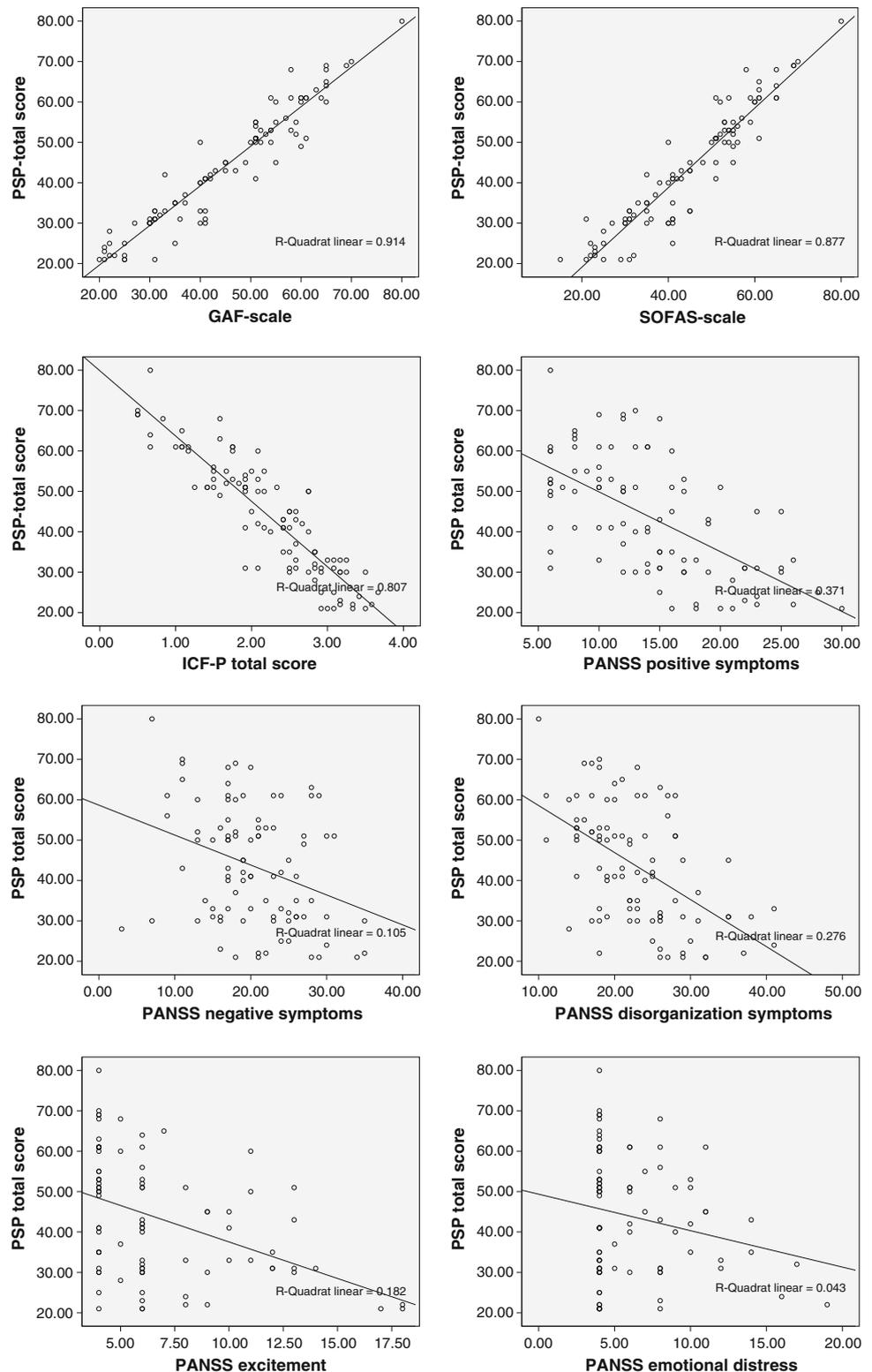
Social functioning scales

Further, PSP and the older versions, GAF and SOFAS, were highly correlated for every rater. The following results for GAF, SOFAS, and Mini-ICF-APP-APP are based on the psychologist’s rating: PSP total score showed significant positive correlations of $r = 0.96$ with GAF ($P < 0.01$) and $r = 0.94$ with SOFAS ($P < 0.01$) (see Fig. 1). The PSP subdimensions were significantly negatively correlated with GAF and SOFAS, ranging from $r = -0.59$ to $r = -0.81$ ($P < 0.01$), because of their

Table 2 Intra-class correlations of PSP scores for the two raters

	PSP subdimensions	<i>N</i>	ICC
PSP	Activities	92	0.70***
	Relationships	92	0.55***
	Self-care	92	0.74***
	Aggression	92	0.54***
	Total score	92	0.82***

Fig. 1 Relationships between PSP total score and the values of GAF, SOFAS, Mini-ICF-P total score, PANSS scores of positive and negative symptoms, disorganization, excitement and emotional distress in chronically ill patients with schizophrenia



opposite polarity in comparison with the PSP total score (see subitem correlations in Table 3).

Moreover, the total score of the Mini-ICF-APP-P was also significantly correlated with PSP ($r = -0.90$, $P < 0.01$) (see Fig. 1), GAF, and SOFAS as well as with

the PSP subdimensions, ranging from $r = 0.56$ to $r = 0.81$ ($P < 0.01$) (see further correlations in Table 3). Likewise, all of the 12 items of the Mini-ICF-APP-P revealed significant correlations with the PSP total score of $r = -0.71$ to $r = -0.82$ ($P < 0.01$).

Table 3 Correlations of PSP total score and its four subdimensions with GAF, SOFAS, and Mini-ICF-P

	Activities	Relationships	Self-care	Aggr. behavior	PSP total score	GAF	SOFAS	Mini-ICF-P
Activities	1	0.571**	0.577**	0.464**	−0.853**	−0.788**	−0.775**	0.797**
Relationships		1	0.588**	0.414**	−0.812**	−0.809**	−0.788**	0.814**
Self-care			1	0.426**	−0.771**	−0.750**	−0.736**	0.692**
Aggr. behavior				1	−0.574**	−0.611**	−0.593**	0.555**
PSP total score					1	0.956**	0.937**	−0.898**
GAF						1	0.978**	−0.894**
SOFAS							1	−0.886**
Mini-ICF-P								1

** $P < 0.01$ **Table 4** Correlations of PSP total score and its four subdimensions with PANSS five-factor model

PANSS	PSP				
	Activities	Relationships	Self-care	Aggr. behavior	Total score
Positive symptoms	0.429**	0.487**	0.499**	0.560**	−0.609**
Negative symptoms	0.238*	0.151	0.323**	0.208*	−0.324**
Disorganization	0.386**	0.303**	0.515**	0.388**	−0.526**
Excitement	0.314**	0.294**	0.381**	0.580**	−0.426**
Emotional distress	0.187	0.106	0.141	0.094	−0.207*

* $P < 0.05$, ** $P < 0.01$

Social functioning and psychopathology

Concerning the relation between psychopathology and psychosocial functioning, PSP scores of the psychologist were correlated with PANSS scores of the treating doctor so to have results of blind ratings and no confounding effects. Highly significant correlations between the PANSS and the total score of PSP were shown for the present sample of chronically ill patients with schizophrenia: The highest significant negative correlation of $r = -0.64$ ($P < 0.01$) was found between the positive symptom subscale of the PANSS and the total score of PSP. Further significant negative correlations were observed between the negative factor of PANSS and PSP total score with $r = -0.52$ ($P < 0.01$) as well as between the general factor of PANSS and PSP with $r = -0.49$ ($P < 0.01$). For further investigation, we correlated the five PANSS subscores according to the revised five-factor model as well as every single PANSS item with PSP total score and its subdimensions. According to PSP total score, the highest significant negative correlations were found with positive symptoms $r = -0.61$ ($P < 0.01$) and disorganization $r = -0.53$ ($P < 0.01$), lower but also significant correlations with excitement $r = -0.43$ ($P < 0.01$) and negative symptoms $r = -0.32$ ($P < 0.01$), and a significant but minor correlation with emotional distress $r = -0.21$ ($P < 0.05$) (see Fig. 1; Table 4).

In the following examination of the single items of the PANSS, only significant correlations for values of $r > 0.04$

are mentioned. The highest correlations with PSP total score ($r = -0.54$ to $r = -0.57$, $P < 0.01$) and its subdimensions ($r = 0.41$ to $r = 0.51$, $P < 0.01$) were revealed for delusions, conceptual disorganization, and unusual thought content. Concerning the positive subscale, significant correlations were found for delusions, hallucinations, and unusual thought content. In the negative subscale, emotional withdrawal and apathetic social withdrawal were significantly correlated with difficulties in self-care. Similarly, for the subscale disorganization, conceptual disorganization, difficulties in abstraction, stereotyped thinking, and mannerism were significantly correlated with difficulties in self-care and with PSP total score. In this subscale, the symptoms lack of judgment and insight were significantly associated with the PSP subdimension disturbing and aggressive behavior. New findings were revealed for the two factors excitement and emotional distress: Excitement, hostility, uncooperativeness, and poor impulse control also showed significant correlations with disturbing and aggressive behavior. The items of the PANSS subscale emotional distress did not correlate with PSP and its subdimensions.

Social functioning and medication

In a subsample of 21 patients of the LWL University Hospital Bochum, we collected medication information out of the patients' records to get an impression of the association of medication and social outcome. A significant correlation was

revealed between PSP and chlorpromazine equivalents (cpz, range from 0 to 1500) in the following manner: concerning the psychologist's rating, PSP total score correlated significantly positively with cpz with $r = 0.579$ ($P < 0.05$), i.e. the higher the medication dose, the better the patient's psychosocial functioning. Regarding the subdimension, for both psychologist's and doctor's rating, a significant negative correlation were found between PSP personal and social relationships and cpz with $r = -0.560$ ($P < 0.05$) and $r = -0.482$ ($P < 0.05$), respectively, meaning that higher doses of antipsychotics were associated with less severe problems in relationships. Beyond, the doctor's rating showed a significant correlation between self-care and medication with $r = -0.538$ ($P < 0.05$), i.e. the higher the medication dose, the better was the patient's self-care.

When covarying out the effect of medication on the association of psychopathology (as measured with PANSS) with psychosocial functioning (as measured with PSP), all correlations between the PANSS dimensions and PSP total score as well as the PSP subdimensions became even more highly significant.

Social functioning: comparison of ratings with real-world indices

To test the convergence of the PSP scale with real-world functioning, we connected the third-party PSP ratings with more formal objective data: we related the PSP ratings to the demographic variables 'age', 'family status', 'duration of relationship', 'residential status', 'education', and 'occupation' as objective indices to get an idea of which real-world facts are associated with the PSP third-party rating (in the following, the results refer to the psychologist's rating, the significant results coincide with the treating doctor). The PSP total score showed significant negative correlations with age ($r = -0.319$, $P < 0.01$), residential status ($r = -0.433$, $P < 0.01$), and occupation ($r = -0.474$, $P < 0.01$); i.e. the older the patients were, the poorer was their social functioning; low residential status (from own flat to homeless) and poor work performance (from full-time job to disability pension) were associated with poor psychosocial functioning.

Regression analyses: real-world indices as predictors of PSP ratings

As a further step, regression analyses were carried out with objective indices as possible predictors of psychosocial functioning (as measured by PSP, psychologist's rating). For the PSP total score, regression analyses revealed that occupation, residential status, and age were significant predictors of the PSP rating (occupation: $t = -4.477$, $df = 99$, $P < 0.001$; residential status: $t = -4.087$,

$df = 99$, $P < 0.001$; age: $t = -2.383$, $df = 99$, $P = 0.019$), whereas family status, duration of relationship, and education did not prove to be predictive for the PSP rating. Together, the three significant predictors accounted for 37% of the variance of the PSP total score rating ($R^2 = 0.384$, adjusted $R^2 = 0.365$).

For every PSP subdimension, a differentiated profile emerged, as significant predictors for 'socially useful activities, including work and study', occupation ($t = 5.268$, $df = 94$, $P < 0.001$), residential status ($t = 2.905$, $df = 94$, $P = 0.005$), and family status ($t = -2.408$, $df = 94$, $P = 0.018$) were found, which accounted for 40% of the variance ($R^2 = 0.438$, adjusted $R^2 = 0.400$). For 'personal and social relationships', significant predictors were residential status ($t = 2.305$, $df = 94$, $P = 0.023$), age ($t = 2.782$, $df = 94$, $P = 0.007$), and duration of relationship ($t = -2.944$, $df = 94$, $P = 0.004$), which declared a total variance of 25% ($R^2 = 0.299$, adjusted $R^2 = 0.251$). Regarding 'self-care', only age showed a significant predictive value ($t = 3.175$, $df = 94$, $P = 0.002$) and accounted for 14% of the variance of this PSP subdimension. Finally, none of the mentioned objective indices was found to be a significant predictor of 'disturbing and aggressive behavior'. A further regression analysis with the PANSS subscales as independent variables revealed that PANSS positive symptoms ($t = 3.385$, $df = 85$, $P = 0.001$) and PANSS excitement ($t = 3.257$, $df = 85$, $P = 0.002$) both were significantly predictive for the PSP subdimension rating of 'disturbing and aggressive behavior', and a total variance of 40% ($R^2 = 0.480$, adjusted $R^2 = 0.403$) could be accounted for. For the other three subdimensions, the reported findings remained significant when controlling for psychopathology in the regression analyses.

Discussion

The aim of the present study was to examine the association of the two outcome domains psychopathology and social functioning in chronically ill patients with schizophrenia. In accordance with our expectations, the results showed significant negative correlations between PSP and PANSS, proving a close connection between these two dimensions in the long-term treatment of schizophrenia. Besides, similarly to the original validation study [16], we found acceptable psychometric properties of the PSP scale suggesting that the PSP is a reliable and valid instrument for assessing social functioning of patients with chronic schizophrenia.

Psychometric properties of PSP

The good reliability of the PSP scale can be seen as evidence that the four domains, "socially useful activities",

“personal and social relationships”, “self-care”, and “aggressive and disturbing behavior”, reflect the construct “psychosocial functioning” sufficiently well. As S Morosini et al. [16] found similar results for the English version of the PSP scale. Thus, the present study confirms former findings and strengthens the argument to use the PSP scale as a quick instrument for assessment of personal and social functioning across cultures.

Specifically, the variable degree of inter-rater agreement critically depended on the availability of contextual information. For example, whereas high rater agreements were found regarding “self-care” and “socially useful activities”, lower ratings were obtained for the domains “relationships” and “aggressive behavior”. Arguably, the former can be more reliably rated, because self-grooming can easily be recognized. Moreover, the raters had access to detailed information about the occupational situation. On the contrary, details about patients’ relationships were not comparably obvious, and information provided by the patient also depended on the presence or absence of a reliable therapeutic relationship. In addition, aggressive behavior strongly depended on the momentary situation during the interview that in turn made the rating difficult. Accordingly, the knowledge concerning the patients obviously differed between the raters. Moreover, Burns and Patrick [2] maintain that the subdimensions capture the different phases of schizophrenia in which, for example, “disturbing and aggressive behavior” is more relevant for acute patients, while “social useful activities” is more relevant for stable patients. For future research, it may be advisable for the two independent raters to parallelize the time of rating and the standard of knowledge as regards the patient.

Correlational analyses

PSP and other social functioning scales

The very high correlation coefficients between PSP, GAF, and SOFAS affirm that similar to identical constructs are assessed with PSP, GAF, and SOFAS. This result emphasizes the high validity of the PSP scale in operationalizing psychosocial functioning for patients with schizophrenia. In eliminating several disadvantages of the GAF and SOFAS scales, PSP constitutes advancement over the previously existing scales. The expansion of the PSP scale by its four subdimensions is an advantage in content and specificity over GAF and SOFAS with only one total score. In their recent metaanalysis on the large number of existing measures for social functioning, Burns & Patrick [2] propose the PSP scale “as a useful tool in future research”.

The high correlation coefficients between PSP and Mini-ICF-APP-P total scores and subitems can be attributed to

the overlapping of topics. Both scales estimate functioning, especially occupational functioning [13]. Given this, it is probably useful to use the Mini-ICF-APP-P to address the specific question of occupational functioning, whereas the PSP scale generally offers a broader assessment of social functioning. Both scales emphasize the importance of assessing the concept of disabilities in functioning as an additional dimension in the evaluation of mental disorders besides psychopathological findings. Hereby, sociomedical judgments for ability of rehabilitation and occupation increase in importance as the necessity of early retirement grows. With the Mini-ICF-APP-P as a rather quick and practical instrument, the theoretical concept of the ICF becomes clinically realizable.

PSP and psychopathology

Not only did we find the expected negative correlation coefficients between the PSP scale and negative symptoms of schizophrenia, but the results overall showed more associations between psychopathology and social functioning. In spite of the fact that we assessed a sample of patients with chronic schizophrenia that was characterized by a relatively low amount of positive symptoms, we detected—somewhat contrary to expectations—a highly inverse correlation of PANSS positive score with the PSP total score. Beyond, the third factor general symptoms were also significantly associated with PSP. For functioning in general, Ertugrul and Ulug [4] summarized nine studies and found some of them having an association with negative symptoms only, while others had associations with both positive and negative symptoms.

To examine the special results for the PSP scale in more depth, we expanded our analysis with the three-factor model of the PANSS using the new five-factor model for correlational analysis [21]. Results showed significant negative correlations of PSP total score with all five factors, the highest correlations found for positive symptoms and disorganization, followed by excitement, negative symptoms, and finally a significant but minor correlation for emotional distress. It seems well conceivable that the high correlations of positive symptoms and excitement with PSP scores were due to the high association of these two factors with patients’ disturbing and aggressive behavior. Further, the significant negative correlations between the negative and the disorganization factors of PANSS and PSP are comparable to Patrick et al.’s results which confirmed that negative symptoms reflecting social function parameters such as social withdrawal or less self-care were more highly correlated with PSP than other PANSS items [18]. McGurk and Meltzer [14] reported that negative symptoms are significantly associated with unemployment in schizophrenia. In accordance with this

result, van Os et al. [22] found that reduction in negative symptoms was particularly associated with less time in hospital and more time living independently. As the disorganization factor includes several items to cognitive difficulties, the highly significant association with PSP is in line with several studies that found an association between cognitive deficits and adaptive functioning [4]. Of high interest is the significant correlation between PSP disturbing and aggressive behavior and PANSS lack of judgment and insight. This result strengthens the concern that the patients without insight into their problems have multiple difficulties in fulfilling their daily duties as they fail in adapting their behavior to their disorder.

No studies have looked at the relationship between social functioning and excitement or emotional distress yet. Our results revealed that—plausible to content—the items hostility, uncooperativeness, and poor impulse control of the factor excitement had the highest significant correlations with the PSP subscale disturbing and aggressive behavior. Interestingly, the factor emotional distress did not correlate at all with the PSP scale. Probably, dimensions like anxiety or depression are independent of the patient's degree of social functioning, e.g. self-care can be highly appropriate even though the person suffers from an anxiety disorder.

In general, these findings prove the PSP scale to be able to differentiate between patients with severe psychopathological state, implicating also low psychosocial functioning, and those with low degree of symptoms. Nevertheless, further analysis of the association between the PSP scale and the PANSS five-factor model seems promising in order to get clearer explanations for the connection of social functioning and psychopathology.

Patient-relevant dimensions such as personal, social, and occupational reintegration have become an important second outcome domain besides psychopathology which is to be used for the evaluation of medication and treatment response [12].

PSP and medication

As clinicians would expect, the findings of the subsample support a widespread view that antipsychotic treatment does have an effect on psychosocial function in a way that a higher dose strengthens patients' psychosocial functioning. However, the results are very preliminary and limited on this specific subsample and thus need revision in a bigger sample.

Regression analyses

Findings revealed that objective facts such as the given demographic variables accounted for a remarkable

percentage of variance of the third-party PSP ratings on patient's psychosocial functioning. Thus, the results proved good evidence for the differentiated construct validity of the PSP scale as it becomes clear that the mentioned objective variables were mostly taken into account by psychologist or doctor when rating social functioning on the different subdimensions. Beyond the correlations, the regression analyses revealed that various demographic items are significant predictors of the PSP score. Findings for the subdimension 'disturbing and aggressive behavior' are in line with Wittorf et al. [24] who found a potential predictive value of positive symptoms besides negative symptoms and cognitive dysfunction for functional outcome measures like the GAF scale. Our findings now provide strong evidence of the general convergence of the PSP scale rating with real-world functioning.

Future directions

As the given design only permits a cross-sectional analysis, further studies need to have a closer look on the question what impact clinical change in psychopathological symptoms has on psychosocial functioning or social outcomes in general in the course of treatment. Moreover, in a longitudinal report, it would be very interesting to examine the possible effects of medication on changes in psychosocial functioning.

For subsequent studies, a PSP instrument for patient's self-assessment is under examination. Likewise, work on PSP ratings for relatives is in progress since the primary social network has a high influence on schizophrenia therapy [15].

We demonstrated a close intertwining of the two relevant outcome parameters psychosocial functioning and psychopathology during the long-term treatment of chronic schizophrenia. Given this, it becomes obvious that exact assessment for both outcome domains is necessary to achieve best interventions for patients with schizophrenia. With the PSP scale, a reliable and valid instrument is given to assess psychosocial functioning in patients with chronic schizophrenia. As a short instrument, the PSP scale is well suited for everyday clinical practice. We have, therefore, presented a useful tool for the documentation of changes in social functioning during long-term treatment of schizophrenia.

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Conflict of interest The authors declare that they have no conflict of interest.

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