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Overestimated function in patients with schizophrenia: A possible risk factor for inadequate support?

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ABSTRACT

People with schizophrenia often demonstrate an impaired ability to assess and report aspects of their everyday functioning, and the aim of this study is to investigate how patients' self-rating ability regarding functional performance relates to neurocognitive performance and real-world functional performance. A total of 222 outpatients with a schizophrenia spectrum disorder participated in this study. They were divided into groups based on their self-rating ability (determined using self-rating questions) and their observed functional capacity (the UCSD Performance-Based Skills Assessment–Brief, UPSA-B). The results showed that patients with impaired functional capacity perform at a similar cognitive level, regardless of their self-rating ability. When comparing patients with unimpaired function to those with impaired function, we found differences in two cognitive domains; premorbid functioning and executive functioning. The results also reveal that clinicians seem to have greater difficulty assessing patients who over-estimate their functioning. Consequently, when clinicians assessed the patients with the Specific Levels of Functioning Scale (SLOF) no significant differences were found between the group with unimpaired function and the group of overestimators. Patients who overestimate their functioning risk receiving inadequate treatment and support.

1. Introduction

People with schizophrenia demonstrate deficits in insight and the ability to self-report aspects of their everyday functioning (Bowie et al., 2007; Durand et al., 2015; Sabbag et al., 2011). Research about patients' self-rating ability is established when it comes to symptom ratings, but recent findings have highlighted the need for further studies dealing with how patients perceive their level of functioning (Amador et al., 1993; Durand et al., 2015; Ermel et al., 2017; Gould et al., 2015; Olsson et al., 2016).

The term self-awareness is used in clinical settings to describe a person's ability to recognize the discrepancy between their skills, expected performance, and environmental demands. Due to the complex and multidimensional nature of self-awareness, a widely accepted definition has not yet been developed (Fragkiadaki et al., 2016). In social psychology it is related to the concepts of awareness and self-efficacy, within neuropsychology the term is related to executive functioning and in cognitive psychology it is related to metacognition (Toglia and Kirk, 2000). When self-awareness is associated with metacognition, aspects that integrate a variety of cognitive variables are highlighted, such as autobiographical memory, semantic knowledge, and self-monitoring of performance (Morris and Mograbi, 2013). In the Dynamic Comprehensive Model of Awareness, metacognitive knowledge exists prior to dealing with a task or a situation and is based on knowledge related to task characteristics, strategies, procedural knowledge and self-knowledge and beliefs in one's capabilities and limitations. Past experiences of similar tasks or situations shape our knowledge and beliefs about our abilities (Toglia and Kirk, 2000). The term introspective accuracy is also used to explain the impaired self-assessment ability in patients with schizophrenia. Introspective accuracy focuses on self-awareness of specific skills and abilities (Silberstein et al., 2018).

The methods most frequently used to measure patients' functioning are self-report questionnaires and reports from relatives and healthcare professionals (Moore et al., 2007; Patterson and Mausbach, 2010). It is unclear which method is most reliable to pick up on how patients view their own ability (Toglia and Kirk, 2000). The most common method of assessing self-awareness is to compare a patient's self-rating with either ratings made by a clinician or a relative, or by using performance-based tests. The discrepancy between these tests is considered to be a measure of the degree of awareness (Sherer et al., 1998). Experimental methods with questions asked, directly before or during the performance of a specific task, could also be used to evaluate different aspects of awareness (Keefe et al., 2006; Simons, 2013). In general, patients seem to self-report a lower level of impairment in their

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functional performance compared to reports from high-contact clinicians (Gould et al., 2013). The design of self-report questionnaires could also be important for the validity when measuring function. For instance, Olsson et al. (2015) used visual analogue self-rating scales in a study in which patients rated their mental health problems and their perceived quality of life. Their results showed no significant correlation with well-established nurse assessments often used to describe function (Olsson et al., 2015).

Sumiyoshi and Sumiyoshi (2015) describe functional outcomes as a continuum with three levels: neuropsychological performance, functional capacity, and real-world functional performance. The neuropsychological performance level refers to basic cognitive function, and functional capacity refers to an individual's ability, under controlled conditions, to perform tasks and activities necessary in everyday activities. The use of performance-based assessments measuring functional capacity has increased to avoid the influence of environmental factors, such as unemployment and availability of sheltered housing (Harvey et al., 2009; Helldin et al., 2012). Real-world functional performance refers to patients' ability to live independently; to engage in work, education, and housekeeping; and to be involved in social activities (Sumiyoshi and Sumiyoshi, 2015). Observation-based methods that assess functioning in patients with schizophrenia go beyond other methods but are sometimes criticized because the patients' capacity is not always consistent with their real-world functioning (Harvey et al., 2007; Mantovani et al., 2015; Olsson et al., 2016). Intrapersonal factors, such as motivation and self-awareness, probably play an important role in bridging the gap between functional capacity and real world functioning (Cardenas et al., 2013).

Impaired self-awareness of functioning, with impaired ability to self-report strengths and weaknesses, may make it difficult for persons with schizophrenia to correctly describe their level of function. If treatment decisions are based solely on their self-reports, the patients run the risk of not receiving appropriate treatment (Olsson et al., 2015; Siu et al., 2015). Thus, it is important to learn more about how observed functional capacity relates to self-awareness in patients with schizophrenia spectrum disorders. The aim of this study therefore is to investigate how patients' self-rating ability regarding functional performance relates to neurocognitive performance and real-world functional performance.

2. Materials and methods

This paper presents results from the study Clinical Long-term Investigation of Psychosis in Sweden (CLIPS). Since the start of CLIPS in year 2000, >500 patients with schizophrenia spectrum disorder, diagnosed using the DSM-IV criteria, have been assessed on at least one occasion. The study has been approved by the Ethical Research Committee in Gothenburg, Sweden. All participants provided their written informed consent, and the study was conducted in compliance with the latest version of the principles set out in the Helsinki Declaration.

2.1. Participants

The participant group consisted of 222 patients, 84 women and 138 men, with schizophrenia-spectrum disorders (46 with schizoaffective disorder, 148 with schizophrenia, 28 with delusional disorder). The mean age was 51.67 years ($SD = 11.50$, *range* = 25–75); 53.58 years ($SD = 12.60$) for the female patients, and 50.51 years ($SD = 10.65$) for the male patients. An independent *t*-test ($p = 0.06$) showed no significant difference between men and women with regard to age. Regarding marital status, 141 patients were single, 36 were married or cohabiting, and 45 were divorced or widow/widower. It was noted that 188 patients lived in independent housing and 34 in sheltered housing. In terms of financial status, 174 patients were on sickness benefit or had a disability pension, 22 were unemployed, 13 worked part-time, and 13 worked full-time or were students. The mean duration of illness was 23.89 years ($SD = 12.32$, *range* = 1–58). The symptomatic remission rate was 54% and the mean on the Global Assessment of Functioning Scale (GAF), as assessed by a case manager, was 45 points with a range of 30–70 points ($SD = 7.8$). The inclusion criterion for the patients was being in a stable phase of the illness. The exclusion criterion was the existence of co-morbid conditions, such as autism, mental retardation or dementia.

2.2. Instruments

2.2.1. The UCSD Performance-Based Skills Assessment–Brief

The UCSD Performance-Based Skills Assessment–Brief (UPSA-B; Mausbach et al., 2007) is a performance-based observational instrument designed to assess functional capacity among people with severe mental illness. A study of the Swedish version of the UPSA-B found that the instrument has good psychometric properties with regard to both validity and reliability (Olsson et al., 2012). The total UPSA-B score ranges from 0 to 19, where a higher score indicates better functional performance. In a study by Vella et al. (2017), healthy controls had a median total score of 16–17 on the UPSA-B. In the present study, the cut-off level for unimpaired function was set at 16 points. Hence, 16–19 points represents unimpaired functional capacity, and 0–15 points represents impaired functional capacity.

2.2.2. Neuropsychological tests

Neuropsychological test scores were collected in nine cognitive domains. Vigilance was measured as the total d prime score for all trials in the Continuous Performance Test Identical Pairs (CPT-IP 450; Cornblatt et al., 1988; Rosvold et al., 1956). Processing speed was assessed using the Trail Making Test, Part A (TMT-A), and cognitive flexibility was assessed using the Trail Making Test, Part B (TMT-B). The test results are presented as time to completion, in seconds (Reitan, 1958). Immediate memory was measured using the Rey Auditory Verbal Learning Test (RAVLT), trial 1. Learning was measured using RAVLT, trials 1–5, and retention memory using RAVLT, trial 7. The number of words remembered for each condition constituted the test score (Rey, 1964; Schmidt, 1996). We measured working memory using the number of successful trials from the Letter Number Sequencing test (LNS; Wechsler, 1997). Premorbid functioning was assessed using the Wechsler Adult Intelligence Scale (WAIS) Vocabulary subtest. The sum of correct answers is presented in the results section (Lezak, 1995; Wechsler, 1997). Finally, executive functioning was measured using the Wisconsin Card Sorting Test (WCST), where the total number of completed categories made up the score (Heaton et al., 1993).

2.2.3. The Specific Level of Functioning Scale

The Specific Level of Functioning Scale (SLOF) is a multidimensional behavior assessment instrument used for examining real-world functional performance. The instrument consists of 43 statements within the following domains: physical functioning, ability to take care of oneself, interpersonal relations, social acceptance, activities, and capacity to work. The statements are assessed on a five-point scale, with higher scores indicating better functioning. This scale has high inter-rater reliability and factorial validity, and acceptable internal consistency (Schneider and Struening, 1983). The SLOF was assessed by a case manager who knew the patient well.

2.3. Design

The study was conducted in three steps. In the first step, we divided the 222 patients into four groups based on their self-rating ability—i.e., on their UPSA-B results and their self-rated functioning.

To investigate the patients' self-rating ability regarding functional performance, they answered four short questions before the UPSA-B was administered. The questions were based on tasks included in the UPSA-B: Do you manage everyday tasks such as 1) counting money,

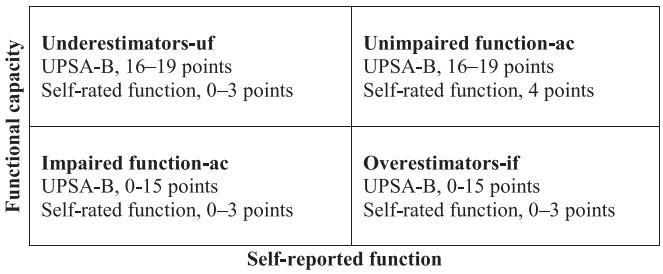

Fig. 1. A model of the study groups' of self-awareness, divided according to functional capacity and self-reported functioning. Note: uf = unimpaired function, if = impaired function, ae = accurate estimators.

2) paying bills, 3) making phone calls, and 4) rescheduling appointments? Each "yes" answer generated 1 point, and the total sum of self-rated function ranged from 0 to 4 points.

The four groups (see Fig. 1) were called Unimpaired function-ae (ae = accurate estimators; 16–19 points on the UPSA-B and 4 points on self-rated function), Underestimators-uf (uf = unimpaired function; 16–19 points on the UPSA-B and 0–3 points on self-rated function), Overestimators-if (if = impaired function; 0–15 points on the UPSA-B and 4 points on self-rated function) and Impaired function-ae (ae = accurate estimators; 0–15 points on UPSA-B and 0–3 points on self-rated function). The cut-off percentage for inclusion of a group for further analysis was set at a minimum of 10% of the 222 participants.

In the second step, the performance-based assessment of neurocognitive abilities was compared between the groups. Analyses were made between unimpaired and impaired function and between accurate and non-accurate estimators. In a third step, the groups' differences and similarities regarding real-world functional performance were examined using the SLOF scale.

2.4. Data analysis

A descriptive analysis of the variables included was made using mean (*M*) and standard deviation (*SD*) comparisons were conducted using the Kruskal-Wallis (*H*) test. Stepwise discriminant analyses were performed to test how well the cognitive domains and SLOF domains differentiated the functional groups. Significance was set at the 0.05 level.

3. Results

In the first step, we divided patients into groups based on their results for observed functional capacity and self-rated function, see Fig. 1. The patients' demographic details that are included are presented in Table 1.

Three groups were included in further analyses (overestimators-if, impaired function-ae and unimpaired function-ae). The underestimators-uf group was excluded due to the low number of patients with this profile. To achieve two comparable impaired functional capacity groups (overestimators-if and impaired function-ae), the patients were matched according to UPSA-B scores, age, and gender. Hence, the two groups each consisted of 49 patients, 18 women and 31 men. There were no significant differences between the two matched groups in terms of age and functional capacity, as measured using the UPSA-B. The mean age was 53.39 years (*SD* = 11.46) in the overestimators-if group and 52.08 years (*SD* = 10.94) in the impaired function-ae group. The mean UPSA-B score was 11.51 (*SD* = 3.08) for the overestimators-if group and 11.47 (*SD* = 3.22) for the impaired function-ae group.

In the second step of the analysis, the differences in function and cognitive domains between the three groups were analyzed. The cognitive performance domains included in the study were vigilance, processing speed, cognitive flexibility, immediate memory, learning, retention memory, working memory, premorbid functioning, and executive functioning. The mean scores and the statistical analyses used to compare the three functioning groups are shown in Table 2. There were statistically significant differences in all cognitive domains, except for retention memory and working memory.

Stepwise discriminant analyses were performed using functional groups as the dependent variables and the cognitive domains, which in the second step showed significant results, were used as predictors. The stepwise discriminant analyses showed non-significant differences between the two groups with impaired functional capacity (overestimators-if and impaired function-ae). Table 3 shows statistically significant results when the overestimators-if group was compared with the unimpaired function-ae group. Two cognitive domains, premorbid functioning and executive functioning were the only two predictors. These variables correctly classified the outcome for 79.2% of cases, with accurate prediction made for 82.9% of the overestimators-if and 75.7% of the unimpaired-ae. There was also a significant difference between the impaired-ae group and the unimpaired function-ae group. The same cognitive domains; premorbid functioning and executive functioning correctly classified the outcome in 74.6% of the cases, with an

Table 1
Demographic characteristics of participating patients presented on a group basis.

Characters	Underestimators-uf (n = 14)	Unimpaired function-ae (n = 53)	Impaired function-ae (n = 73)	Overestimators-if (n = 82)
UPSA-B, mean (SD)	16.86 (1.17)	16.82 (0.94)	9.79 (3.70)	12.27 (2.65)
Self-rated function, mean (SD)	2.79 (0.43)	4.00 (0.00)	2.42 (0.93)	4.00 (0.00)
Age, mean (SD)	48.21 (9.07)	46.66 (10.70)	53.85 (10.86)	53.56 (11.94)
Gender, male, n (%)	10 (71)	35 (66)	44 (60)	49 (60)
Marital status, n (%)				
Single	7 (50)	36 (68)	45 (59)	53 (65)
Divorced, widow/widower	1 (7)	8 (15)	17 (27)	19 (23)
Married, cohabiting	6 (43)	9 (17)	11 (14)	10 (12)
Housing situation, n (%)				
Sheltered housing	4 (29)	2 (4)	19 (26)	9 (11)
Independent housing	10 (71)	51 (96)	54 (74)	73 (89)
Current work situation, n (%)				
Employed	2 (14)	6 (11)	3 (4)	15 (18)
Unemployed	2 (14)	8 (15)	6 (8)	6 (7)
Sickness benefit, disability pension	10 (72)	39 (74)	64 (88)	61 (75)
Level of education, n (%)				
Primary education	2 (14)	9 (17)	45 (62)	38 (46)
Secondary education	6 (43)	28 (53)	25 (34)	35 (43)
Higher education	6 (43)	16 (30)	3 (4)	9 (11)

Note: uf = unimpaired function, if = impaired function, ae = accurate estimators.

Table 2
Differences in cognitive domains between three function groups.

Cognitive domain, test (n)	Overestimators-if	Impaired function-ae	Unimpaired function-ae	Test statistic	*p*-Value
	Mean (SD)	Mean (SD)	Mean (SD)		
Vigilance, CPT-IP 450 (90)	0.36 (0.53)	0.38 (0.61)	0.59 (0.49)	H = 6.23	0.043
Processing speed, TMT-A (104)	49.89 (24.59)	52.87 (19.68)	41.22 (20.20)	H = 7.45	0.015
Cognitive flexibility, TMT-B (103)	132.83 (66.75)	159.42 (79.45)	90.14 (38.44)	H = 17.15	<0.001
Immediate memory, Ravlt 1 (104)	4.76 (1.96)	4.06 (1.93)	5.24 (2.13)	H = 8.79	0.009
Learning, Ravlt 1–5 (105)	39.11 (12.46)	34.61 (11.75)	42.83 (9.90)	H = 8.92	0.012
Retention memory, Ravlt 7 (104)	7.38 (3.28)	6.33 (3.65)	8.35 (3.38)	H = 5.40	n.s.
Working memory, LNS (104)	8.57 (2.46)	8.60 (2.34)	9.59 (2.36)	H = 3.41	n.s
Premorbid functioning, WAIS vocabulary (104)	37.86 (9.87)	35.37 (12.49)	48.30 (8.77)	H = 24.75	<0.001
Executive functioning, WCST, category complete (102)	2.49 (2.24)	1.94 (1.86)	4.27 (1.95)	H = 19.12	<0.001

Note: if = impaired function, ae = accurate estimators, H indicates that the analysis involved Kruskal-Wallis, n.s. = not significant.

accurate prediction made for 73.3% of the impaired-ae group and 75.7% of the unimpaired-ae group.

Finally, in the third step of the analysis, the relationships between the three groups in terms of function and real-world functional performance were examined. The domains (SLOF) included in the study were physical functioning, personal care skills, interpersonal relationships, social acceptability, activities, and work skills. The mean scores and the statistical analyses used to compare the three functioning groups are shown in Table 4. There were statistically significant differences across the three groups in all domains except social acceptability.

Stepwise discriminant analyses were performed with functional groups as the dependent variables, and with the SLOF domains, which in the second step showed significant results, were used as predictors. The stepwise discriminant analyses showed non-significant differences when the overestimators-if group was compared with the unimpaired function-ae group. Table 5 shows statistically significant results when the overestimators-if group was compared with the impaired function-ae group. The SLOF domain activities were the only predictor. The variable correctly classified outcome for 72.7% of cases, with accurate prediction made for 83.3% of the overestimators-if group and 60% of the impaired-ae group. There was also a significant difference between when the group impaired-ae and the group unimpaired function-ae. The SLOF domains; activities, physical functioning, and interpersonal relationships - correctly classified the outcome for 75.4% of cases, with accurate prediction made for 73.3% of the impaired-ae group and 76.9% of the unimpaired-ae group.

4. Discussion

The present study highlights the situation where patients with impaired functional capacity perform at a similar cognitive level, regardless of their self-rating ability of functioning. Our findings also show that clinicians seem to have greater difficulty assessing patients who overestimate their function.

When comparing the unimpaired function-ae group with the two impaired functional capacity groups (overestimators-if and impaired function-ae) we found differences in two cognitive domains; premorbid functioning and executive functioning (see Tables 2 and 3). The patients with unimpaired function-ae had higher premorbid functioning and better executive functioning. Differences found in premorbid functioning and executive functioning between unimpaired and impaired patients in the present study indicate that dividing patients into groups based on a UPSA-B cut-off level of 16 points, is useful. Premorbid function was measured using the vocabulary subtest from WAIS, which has been identified as the single best measure of both verbal and general mental abilities (Wechsler, 1981). Executive functions that encompass reasoning, problem-solving and mental flexibility are also commonly present and associated with poor functional outcomes (Green, 1996; Reichenberg, 2010).

In the present study there were no differences in cognitive domains between the two impaired functional capacity groups (overestimators-if and impaired function-ae) based on their self-rating ability. According to Pannu and Kaszniak (2005), the inaccurate self-rating of function could be linked to executive dysfunction by viewing this metacognitive function as one of the cognitive processes that are controlled by the prefrontal cortex. To measure executive functioning, the present study used the WCST (Heaton et al., 1993). Patients were required to solve the tasks of the test through performance feedback, and to retain the strategy when responses are correct and discard the strategy when the responses are incorrect. In the Dynamic Comprehensive Model of Awareness, they separate the online monitoring of performance during a task (as with the WCST) from the metacognitive knowledge of one's abilities, which is needed to answer questions such as those in the present study (Toglia and Kirk, 2000).

Overall, the unimpaired functioning-ae group performed better cognitively, as could be expected, compared to the two impaired functional capacity groups. Strong correlations between cognition and functional capacity have been found consistently in previous reports. A review by Green et al. (2011) concluded that the UPSA-B correlated highly (r = 0.53) with neurocognitive performance. The present findings thus highlight the need for healthcare providers to assess patients' neurocognition and function as early as possible in their illness to address risk factors associated with hidden impaired self-rating ability among patients.

Moreover, clinicians tend to consider patients who overestimate their performance to have a higher function in assessments of real-world functional performance (the SLOF-test). This was found despite the fact that clinicians had good knowledge of their patients. As our patients had an average illness duration of more than twenty years, their documented function ought to be known by their clinicians (see Tables 4 and 5). This finding indicates that the clinicians' assessments were largely based on patient self-reports. The patients who overestimate their function when answering the

Table 3
Statistically significant results from stepwise discriminant analyses, predicting the functioning groups using the cognitive tests.

Predictor variables	Overestimators-if (n = 29) vs. unimpaired function-ae (n = 34)	Impaired function-ae (n = 25) vs. unimpaired function-ae (n = 34)
Premorbid functioning, WAIS vocabulary	Wilks' $\lambda = 0.728$, $F(1,61) = 22.74$ $p < 0.001$	Wilks' $\lambda = 0.729$, $F(1,57) = 21.20$ $p < 0.001$
Executive functioning, WCST, category complete	Wilks' $\lambda = 0.657$, $F(2,60) = 15.66$ $p < 0.001$	Wilks' $\lambda = 0.632$, $F(2,56) = 16.31$ $p < 0.001$

Note: if = impaired function, ae = accurate estimators, Wilks' λ = Wilks' Lambda, exact F-value.

Table 4
Differences in scores on the Specific Level of Functioning Scale (SLOF) between three functioning groups.

Domain (n)	Overestimators-if	Impaired function-ae	Unimpaired function-ae	Test statistic	*p*-Value
	Mean (SD)	Mean (SD)	Mean (SD)		
Physical functioning (104)	24.36 (1.07)	23.03 (2.21)	24.38 (1.28)	H = 11.98	0.003
Personal care skills (104)	32.94 (2.87)	30.90 (4.78)	33.65 (2.11)	H = 7.44	0.024
Interpersonal relationships (103)	24.39 (6.42)	20.68 (5.22)	24.77 (5.69)	H = 9.37	0.014
Social acceptability (104)	34.14 (1.42)	33.97 (1.47)	33.20 (3.14)	H = 1.97	n.s.
Activities (103)	51.44 (3.94)	44.63 (6.66)	51.45 (5.41)	H = 28.17	<0.001
Work skills (105)	20.53 (4.36)	18.13 (5.27)	22.53 (4.64)	H = 11.40	0.003

Note: if = impaired function, ae = accurate estimators, H indicates that the analysis involved Kruskal-Wallis, n.s. = not significant.

questions before the UPSA-B test have probably also told the clinicians that they do not have any problems performing other activities. SLOF was constructed to measure more directly observable functional and daily living skills. The psychometric properties of SLOF are better when the clients' skills and behavior are well known and when the assessors have interacted with the patient on a number of occasions and situations (Schneider and Struening, 1983). Previous studies have highlighted the advantage of clinicians using several sources to measure functioning, e.g. incorporating observations when judging the patients' function (Sabbag et al., 2011; Gould et al., 2015). It is perhaps easier for clinicians to incorporate their observations when judging a patient's symptoms, using the Positive and Negative Symptom Scale (Kay et al., 1987) for example, compared to judging the patient's functioning.

However, our findings about patients' difficulties in self-rating are in line with previous works (Gould et al., 2015; Bowie et al., 2007). Gould et al. (2015) found that impaired introspective accuracy emerged as the strongest predictor of real-world functional performance when cognitive performance and functional capacity performance were inconsistent with real-world functional performance. Further studies are needed to clarify whether, patients who overestimate their function are perceived as having a higher functioning by the clinicians assessing them, — or whether it is the patients' sense of capacity that actually makes them perform better.

The findings in the present study do not suggest that self-assessments are unusable, but rather point out that only certain domains could be self-rated with suitable accuracy. Overestimation, for instance, may result in a false high function when an instrument such as the SLOF scale is used. Previous findings also add that limited life experience in performing different activities may have a negative effect the accuracy of self-assessments a (Harvey and Pinkham, 2015). It is important to ensure that the assessment information is valid, and in cases where patients have impairments in introspective abilities, clinicians need to seek other data sources as a basis for their decisions regarding treatment and support.

Our findings also show that our patients have a high level of self-rating ability (56% accurate estimators) with regard to their functional performance. Some other studies report a similar result with about 50 percent accurate estimators (Gould et al., 2015; Silberstein et al., 2018). Other studies show low or non-existing correlations between the patients' reports of their everyday functioning and the clinicians' performance-based measures (Sabbag et al., 2011). Although more than half the patients in the present study could be classified as accurate assessors, they may have displayed more problems had we used another data collection method to capture their self-rating ability. In order to find which patients can rate their function accurately, and in which areas, the construction of instruments needs to be taken in consideration. In a previous study, SLOF was used as a self-assessment instrument, where 43 items are assessed on a 5-point Likert scale (Bowie et al., 2006). This is probably more demanding for the patients compared with the short interview used in the present study, where they were only asked to answer “yes” or “no” to four short questions. The results in the present study could probably have been more refined if more questions were added about the patients' introspective accuracy. However, the procedure of asking questions before assessing the same tasks successfully differentiated accurate estimators from overestimators and seems to be an appropriate method.

A limitation of this study could be the decision regarding the UPSA-B cut-off levels (0–15 and 16–19 points, respectively). The choice was based on earlier studies, where normal samples managed the test with fewer than 3–4 failures out of the 19 tasks (Vella et al., 2017). Sumiyoshi et al. (2014) pointed out that 89% of the patients scored below 15–16 points (around 80 points when the scores were converted into the standard score rating from 0 to 100). As the study design is naturalistic, it is difficult to know how representative this specific sample is for the patient population in general. In this study, 54% of the population was in symptomatic remission, which is high compared to other naturalistic studies where about 30% is a more common finding (Lasser et al., 2005). This may also explain why as many as 30% displayed unimpaired function in the UPSA-B assessment.

The results from the present study support the importance and difficulty of producing objective and valid reports in the field of functional outcomes. We have highlighted a variation in the patient group, where some patients are better than others at describing their function in everyday activities. To capture the complexity of functional outcomes, multiple measures may be required. Accurate measures of function require systematic observation, such as a performance-based assessment together with a concrete and simplified interview, to capture the patient's insight into their level of functioning. Clinicians may perceive patients who overestimate their function as unimpaired and thus, less restricted by their illness. How the information about a patient's functioning is used when deciding on treatment and support is a question that ought to be examined in future studies.

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Table 5
Statistically significant results from stepwise discriminant analyses, predicting the functioning groups using the SLOF domains.

Predictor variables	Overestimators-if (n = 34) vs. impaired function-ae (n = 30)	Impaired function-ae (n = 39) vs. unimpaired function-ae (n = 30)
Activities	1. Wilks' λ = 0.721, $F(1,62) = 24.01$ $p < 0.001$	1. Wilks' λ = 0.758, $F(1,67) = 21.38$, $p < 0.001$
Physical functioning		2. Wilks' λ = 0.713, $F(2,66) = 13.29$, $p < 0.001$
Interpersonal relationships		3. Wilks' λ = 0.670, $F(3,65) = 10.67$, $p < 0.001$

Note: if = impaired function, ae = accurate estimators, Wilks' λ = Wilks' Lambda, exact F-value.

Conflict of interest

All authors declare that they have no conflict of interest.

CRediT authorship contribution statement

Anna-Karin Olsson: Writing - original draft, Formal analysis. **Fredrik Hjärthag:** Supervision, Methodology, Writing - review & editing. **Lars Helldin:** Supervision, Writing - review & editing.

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