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# The validity of patient- and clinician-rated measures of needs and the therapeutic relationship in psychosis: A pooled analysis

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## ABSTRACT

Measuring outcomes of treatments for psychosis such as needs and the quality of the therapeutic relationship is important in research and routine care. However, evidence on the validity of existing outcome measures is limited. We aimed to test the convergent, discriminant, and predictive validity of two widely used patient- and clinician-rated measures of needs and the therapeutic relationship. Multitrait-multimethod (MTMM) analysis was conducted on the Camberwell Assessment of Need Short Appraisal Schedule (CANSAS) and the Helping Alliance Scale (HAS), both the clinician (CANSAS-C, HAS-C) and patient (CANSAS-P, HAS-P) versions, in a pooled sample of 605 psychotic patients and their clinicians. CANSAS-C and CANSAS-P items loaded substantially into one common unmet needs factor. By comparison, substantial factor loadings were found for HAS-C and HAS-P items on two separate clinician- and patient-rated therapeutic relationship factors. Common unmet needs and clinician-rated therapeutic relationship factors significantly predicted reduced psychiatric in-patient days. Our findings support the convergent validity of the CANSAS, discriminant validity of the HAS, and predictive validity of CANSAS and HAS-C. The findings may inform the use of CANSAS and HAS as psychosis outcome measures in research and routine care.

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## 1. Introduction

Outcome measurement in psychosis is used clinically to assess improvement in the treatment of individual patients and in research to evaluate the efficacy of specific interventions (Burns, 2007; Slade, 2002a). It is now widely accepted that treatment outcomes are best assessed from both the patient and clinician perspective (Priebe and McCabe, 2006; Thornicroft and Tansella, 2005). The therapeutic relationship and needs are two historically rooted, commonly used, and important outcomes in the care of patients with psychosis (Reininghaus and Priebe, in press). The quality of the therapeutic relationship is an integral part of treatments for psychosis (McGuire-Snieckus et al., 2007; Priebe et al., 2005). It can be defined as “the psychological construct held by individuals participating in the therapeutic relationship on each other and their interaction” (Priebe and McCabe, 2006, p.70). The assessment of needs as “the ability to benefit in some way from health [and social] care” (Stevens and Gabbay, 1991, p. 21) is

widely used in the evaluation of care for patients with psychosis (Thornicroft and Tansella, 2005).

The association of patient and clinician ratings of the same treatment outcome has frequently been reported to be moderate at best (Hansson et al., 2001; Lasalvia et al., 2008; Ochoa et al., 2003; Priebe and Fakhoury, 2008; Slade et al., 1998). Numerous studies have found that patients and clinicians agree only to a limited extent in their assessment of needs (Hansson et al., 2001; Lasalvia et al., 2008; Ochoa et al., 2003; Slade et al., 1998). In addition, McGuire-Snieckus et al. (2007) have reported associations between patient and clinician ratings of the quality of the therapeutic relationship of trivial to moderate magnitude. These findings may be due to measurement problems (i.e. measures capture different concepts unintentionally) and, therefore, suggest that the convergent validity of existing measures of needs and the therapeutic relationship is limited. However, they may also suggest that patients and clinicians indeed hold different concepts based on different backgrounds, views, values, principles and priorities and, therefore, true associations between these different concepts are, in psychometric speak, ‘at the latent level’ trivial to moderate.

There is also evidence suggesting a considerable overlap across measures designed to assess different outcomes. Substantial

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correlations have been reported among measures of needs and the therapeutic relationship (Reininghaus et al., 2011). Further, previous reports found that a single general factor accounted for variance across measures intended to assess different treatment outcomes (Fakhoury et al., 2002; Hansson et al., 2007; Priebe et al., 1998; Reininghaus et al., 2011; Salvi et al., 2005) including needs and the therapeutic relationship. On the one hand, this may suggest that discriminant validity is limited due to measurement problems (i.e. measures capture both needs and the therapeutic relationship unintentionally) and, on the other, that needs and the therapeutic relationship are indeed very similar concepts and, therefore, true associations at the latent level are substantial (i.e. measures capture specific concepts that are truly correlated).

Some authors have noted that, if patient and clinician ratings are used in combination, they may predict better treatment outcomes (Lasalvia et al., 2008). Warner (1999) argued that the combination of emic (i.e. self-rated) and etic (i.e. observer-rated) data may lead more directly to service improvements. In the context of outcomes relevant to psychosis, Lehman (1999), in his outcomes-oriented framework, further emphasised the distinction between proximal and distal outcomes. This framework implies a temporal cascade of outcomes, in which success with proximal outcomes may lead to success with more distal outcomes (Lehman, 1999). One of the most important, distal treatment outcomes of psychosis is reduced hospitalisations (Burns, 2007). Priebe and Gruyters (1995) found that a better patient-rated therapeutic relationship was associated with reduced hospitalisations. Taken together, it is therefore attractive to hypothesise that patients' and clinicians' assessment of the therapeutic relationship and needs may not only reflect proximal outcomes, but also be predictive of more distal outcomes such as psychiatric in-patient admissions.

Using a pooled data set obtained from patients with psychosis and their clinicians, the current study aimed to examine: (1) the convergent validity of patient- and clinician-rated measures designed to assess the same treatment outcome (i.e. the Camberwell Assessment of Need Short Appraisal Schedule (CANSAS), patient (CANSAS-P) and clinician (CANSAS-C) version to assess needs, and the Helping Alliance Scale (HAS), the patient (HAS-P) and clinician (HAS-C) version to assess the therapeutic relationship); (2) the discriminant validity of measures designed to assess different treatment outcomes (i.e. the CANSAS to assess needs and the HAS to assess the therapeutic relationship) and (3) the predictive validity of patient- and clinician-rated outcome measures in terms of reduced psychiatric in-patient days as a treatment outcome.

## 2. Methods

### 2.1. Sample

We analysed data from the FOCUS (Slade et al., 2006) and DIALOG (Priebe et al., 2007) studies. The data presented here are the needs and therapeutic relationship assessments made at baseline. FOCUS was a randomized controlled trial to evaluate the effectiveness of standardized outcome assessments. Patients were recruited from eight community mental health teams (CMHTs) in London (United Kingdom) using the following inclusion criteria: (1) on the caseload of the CMHTs for at least 3 months on 1 May 2001; (2) aged between 16 and 64 years. During the study period, 160 patients were recruited from the eight CMHTs. Of these, 98 patients with psychosis were included into the current study.

The DIALOG study was a multi-centre randomized controlled trial to test a new computer-mediated intervention structuring patient-clinician dialogue in patients with schizophrenia. The study was conducted in community mental health services in London (UK), Granada (Spain), Groningen (The Netherlands), Lund (Sweden), Mannheim (Germany), and Zurich (Switzerland) between December, 2002, and May, 2005, using the following inclusion criteria for patients: (1) living in the community (not 24 h supported accommodation) and treated as out-patients by CMHTs; at least 3 months of continuous care in the current

service; (2) capable of giving informed consent; (3) having sufficient knowledge of the language of the host country; (4) having a primary diagnosis of schizophrenia or related psychotic disorder (ICD-10, F20–F29 (World Health Organisation, 1992)); (5) aged between 18 and 65 years; (6) having no severe organic psychiatric illness or primary substance misuse; (7) having routinely at least one meeting every 2 months with their keyworker; and (8) with the expectation that they would continue with the service for the next 12 months. The DIALOG sample comprised 507 patients with schizophrenia or related psychotic disorder, which were included into the current study. More detailed information on the studies is available in Slade et al. (2006) and Priebe et al. (2007).

### 2.2. Measures

The Camberwell Assessment of Needs Short Appraisal Schedule (CANSAS), patient (CANSAS-P) and clinician (CANSAS-C) version (Phelan et al., 1995) was used to assess patient- and clinician-rated needs. CANSAS-P and CANSAS-C both comprise 22 items on health and social needs, which can be grouped into five domains (health, basic, social, service, and functioning) (Slade et al., 1998). Each item is rated on a 3-point scale distinguishing between 'no need' (rating of 0), 'met need' (rating of 1) and 'unmet need' (rating of 2).

The Helping Alliance Scale (HAS, Priebe and Gruyters, 1993), patient (HAS-P) and clinician (HAS-C) version was used to assess the therapeutic relationship. The HAS comprises five items rated on a visual analogue scale ranging from 0 ('not at all') to 10 ('extremely well'). While HAS-P includes items on 'right treatment', 'understood by therapist', 'criticised by therapist', 'committed therapist' and 'trust therapist', HAS-C items cover 'getting along with patient', 'understand patient', 'look forward to meeting patient', 'feel actively involved', and 'feel I can help patient' (McCabe et al., 1999; Priebe and Gruyters, 1993).

We focused on unmet needs, as reverse coding of unmet needs ensured equivalence in the direction of coding with the Helping Alliance Scale (HAS, Priebe and Gruyters, 1993). In addition, the unmet needs were also used as primary and secondary outcome in the FOCUS and DIALOG trial, respectively. All analyses were performed on individual items rather than total scores of HAS and CANSAS.

### 2.3. Statistical analysis

#### 2.3.1. Parameter estimation and model fit

Multitrait-multimethod (MTMM) analysis (Campbell and Fiske, 1959; Widaman, 1985) was performed in MPlus, Version 5.2 (Muthén and Muthén, 2009) to test whether unmet needs and the therapeutic relationship account for covariance among both patient and clinician ratings of measures intended to assess the same underlying concept. The MTMM framework is widely considered as the best method of construct validation. It evaluates the discriminant and convergent validity of at least two distinct concepts (i.e. unmet needs, the therapeutic relationship) measured by at least two measurement methods (i.e. patient ratings, clinician ratings) (Nosek and Smyth, 2007). Convergent validity is demonstrated by the convergence of different methods measuring the same concept through a single factor with high factor loadings. Discriminant validity is usually confirmed by low correlations between the different concepts (Nussbeck et al., 2006). Model estimation used the robust weighted least squares means and variance adjusted (WLSMV) estimator in MPlus, Version 5.2 (Muthén and Muthén, 2009). Data were assumed to be missing at random, which allowed for inclusion of the full sample using WLSMV.

The overall model fit of the latent variable models was assessed by computing the root mean square error of approximation (RMSEA; Steiger, 1990), Comparative Fit Index (CFI; Bentler, 1990), and Tucker Lewis Index (TLI; Tucker and Lewis, 1973). A good model fit is generally indicated by a low RMSEA (below 0.10 for acceptable and below 0.05 for very good fit; Browne and Cudeck, 1993) and a high Comparative Fit Index (CFI) and Tucker Lewis Index (TLI) (above 0.90 for acceptable and above 0.95 for very good fit; Bentler, 1990; Muthén, 1989).

#### 2.3.2. Model building

Following Widaman (1985), three alternative latent variable models were compared to examine the convergent and discriminant validity of the CANSAS and HAS. Path diagrams of the three latent variable models are shown in Fig. S1 (see Supplementary Material). Model 1 included two general factors, one each for patient ratings on CANSAS-P and HAS-P (i.e. GP) and clinician ratings on CANSAS-C and HAS-C (i.e. GC). In Model 2, common unmet needs (i.e. N) and therapeutic relationship (i.e. TR) factors were specified in addition to the two general factors to account for shared variance of the same concept across patient and clinician ratings. Model 3 included distinct but related concept factors one each for patient- ( $N_p$ ) and clinician-rated ( $N_c$ ) rated unmet needs as well as patient- ( $TR_p$ ) and clinician-rated ( $TR_c$ ) therapeutic relationship. In all three models, general and concept factors were correlated for purposes of model identification (Nussbeck et al., 2006). Factor loadings were computed to investigate the ability of items to discriminate between patients from lower and higher outcome levels (Reise et al., 2007).

### 2.3.3. Model comparison tests

The three alternative latent variable models were compared on the basis of model fit of each model to the sample data and magnitude of factor loadings (Widaman, 1985). Comparison of model fit indices and factor loadings across models was aimed at testing: first, whether CANSAS-P and CANSAS-C assess the same concept of unmet needs as well as whether HAS-P and HAS-C assess the same concept of the therapeutic relationship model 2 versus 1 (suggestive of favourable convergent validity); second, whether HAS and CANSAS measure distinct concepts of needs and the therapeutic relationship as indicated by the magnitude of correlations of unmet needs with therapeutic relationship factors (suggestive of favourable discriminant validity across concepts); and third, whether CANSAS-P and CANSAS-C assess distinct but related concepts of patient- and clinician-rated unmet needs as well as whether HAS-P and HAS-C assess distinct but related concepts of patient- and clinician-rated therapeutic relationship (model 3 versus 2) (suggestive of favourable discriminant validity across measurement methods).

These comparisons were probed further in a sensitivity analysis to assess the utility of the general factors by comparing Model 2 and 3 to reduced models, in which the two general factors ( $G_P$ ,  $G_C$ ) were omitted and  $\Delta\chi^2$ -tests used to assess whether Models 2 and 3 better matched the sample data than the reduced models. Moreover, to assess the extent to which CANSAS ratings of clinicians and patients converge on the five domains of health, basic, social, service, and functioning (Slade et al., 1998), analyses were repeated replacing concept factors for unmet needs with factors for each of the five domains.

Finally, the predictive validity of factor scores was examined using hospitalisation as outcome variable. The most commonly used method for deriving factor scores, i.e. the maximum a posteriori method (Bock and Aitkin, 1981), was used to compute factors scores. Fixed effects of the factor scores on days in in-patient care within the follow-up period were then computed in two-level models with random intercept. In this model, measurement occasions (level-1) were treated as nested within subjects (level-2). As hospitalisation data were non-normally distributed and heavily skewed, we performed bootstrap estimation to obtain bootstrap standard errors as well as bias-corrected an accelerated confidence intervals (Efron and Tibshirani, 1993).

## 3. Results

### 3.1. Basic sample characteristics

Basic socio-demographic and clinical characteristics of the pooled sample of 667 patients with psychosis are summarised

in Table 1. The mean age of patients was 42.1 years. Patients were predominantly male, had left full time education before the age of 17, had a diagnosis of schizophrenia, and a long history of illness.

### 3.2. Convergent validity

While model fit was acceptable in terms of RMSEA for model 1, a poor model fit was found in terms of CFI and TLI ( $\chi^2=503.48$  compared to baseline  $\chi^2=2085.40$ , CFI=0.80, TLI=0.80, RMSEA=0.08). This model included one general factor for patient ratings on CANSAS-P and HAS-P ( $G_P$ ) and one for clinician ratings on CANSAS-C and HAS-C ( $G_C$ ). By comparison, a good model fit was observed for model 2 including a common unmet needs factor ( $N$ ) for ratings of CANSAS-P and CANSAS-C as well as a common therapeutic relationship factor ( $TR$ ) for ratings on HAS-P and HAS-C in addition to general factors ( $\chi^2=204.99$  compared to baseline  $\chi^2=2085.40$ , CFI=0.95, TLI=0.95, RMSEA=0.04). A sensitivity analysis comparing this model to a model without the two general factors ( $G_P$ ,  $G_C$ ) indicated that general factors were strong enough to be included into model 2 ( $\Delta\chi^2=767.73$ , d.f.=28,  $P<0.001$ ).

Findings on a better model fit of model 2 compared with model 1 held when we repeated the analysis for the five CANSAS domains of unmet health needs, basic needs, social needs, needs for services, and functioning ( $\chi^2=175.33$  compared to baseline  $\chi^2=2085.40$ , CFI=0.97, TLI=0.97, RMSEA=0.03). A model with two general factors ( $G_P$ ,  $G_C$ ), one therapeutic relationship factor ( $TR$ ), and five factors for the CANSAS domains of health (NH), basic (NB), social (NSO), services (NSE), and functioning (NF) had a very good model fit ( $\chi^2=175.33$  compared to baseline  $\chi^2=2085.40$ , CFI=0.97, TLI=0.97, RMSEA=0.03).

Standardized factor loadings of model 2 are shown in Table 2. Substantial factor loadings of CANSAS-P and CANSAS-C items ( $\lambda \geq 0.35$ ) on the common unmet needs factor ( $N$ ) were found in model 2. This indicated that CANSAS-P and CANSAS-C assess the same concepts of unmet needs (i.e. high convergent validity of CANSAS-P and CANSAS-C). By comparison, low factor loadings of

**Table 1**  
Basic socio-demographic and clinical characteristics at baseline.

	Pooled sample (n=605)	DIALOG (n=507)	FOCUS (n=98)
Age (years) <sup>a</sup> , mean (S.D.)	42.1 (11.3)	42.2 (11.4)	41.8 (11.0)
Gender, n (%)			
Male	389 (64.3)	336 (66.3)	53 (54.1)
Female	216 (35.7)	171 (33.7)	45 (45.9)
Centre, n (%)			
London (UK)	197 (32.6)	99 (19.5)	98 (100)
Granada (Spain)	88 (14.6)	88 (17.4)	–
Groningen (Netherlands)	99 (16.4)	99 (19.5)	–
Lund (Sweden)	61 (10.1)	61 (12.0)	–
Mannheim (Germany)	83 (13.7)	83 (16.4)	–
Zurich (Switzerland)	77 (12.7)	77 (15.2)	–
Age when leaving full time education <sup>b</sup> , n (%)			
< 17 years	276 (47.0)	217 (42.8)	59 (73.8)
17–18 years	70 (11.9)	62 (12.2)	8 (10.0)
19–22 years	140 (23.9)	128 (25.3)	12 (15.0)
> 23 years	101 (17.2)	100 (19.7)	1 (1.3)
Time since first contact with mental health services (years) <sup>c</sup> , mean (S.D.)	15.8 (10.5)	15.9 (10.3)	15.0 (12.4)
Diagnosis, n (%)			
Schizophrenia	414 (68.4)	354 (69.8)	60 (61.2)
Schizoaffective disorder	73 (12.1)	73 (14.4)	–
Delusional disorder	3 (0.50)	3 (0.59)	–
Bipolar affective disorder	17 (2.8)	–	17 (17.4)
Other non-organic psychotic disorder	98 (16.2)	77 (15.2)	21 (21.4)

<sup>a</sup> Missing value:1

<sup>b</sup> Missing value:18

<sup>c</sup> Missing value:42

**Table 2**  
Standardized factor loadings (standard error) of CANSAS and HAS items in Model 2<sup>a</sup>.

Items	General factor (clinician)	General factor (patient)	Unmet needs	Therapeutic relationship
<b>CANSAS-C</b>				
1 Accommodation	0.19 (0.09)*		0.57 (0.07)***	
2 Food	0.17 (0.09)*		0.62 (0.07)***	
3 Looking after the home	0.29 (0.07)***		0.56 (0.08)***	
4 Self care	0.20 (0.08)**		0.49 (0.08)***	
5 Daytime activities	0.26 (0.06)***		0.61 (0.06)***	
6 Physical health	0.01 (0.08)		0.47 (0.08)***	
7 Psychotic symptoms	0.23 (0.06)***		0.57 (0.06)***	
8 Information condition	0.34 (0.09)***		0.35 (0.11)**	
9 Psychological distress	0.23 (0.07)**		0.57 (0.06)***	
10 Safety to self	0.29 (0.09)**		0.72 (0.07)***	
11 Safety to others	0.55 (0.08)***		0.56 (0.10)***	
12 Alcohol	0.20 (0.08)*		0.58 (0.08)***	
13 Drugs	0.20 (0.10)*		0.50 (0.08)***	
14 Company	0.27 (0.06)***		0.72 (0.05)***	
15 Intimate relationships	0.16 (0.07)*		0.67 (0.05)***	
16 Sexual expression	0.19 (0.07)**		0.63 (0.05)***	
17 Childcare	0.03 (0.09)		0.31 (0.10)**	
18 Basic education	0.01 (0.11)		0.42 (0.10)***	
19 Telephone	0.08 (0.16)		0.68 (0.10)***	
20 Transport	0.12 (0.08)		0.68 (0.07)***	
21 Money	0.19 (0.08)*		0.53 (0.08)***	
22 Benefits	0.13 (0.10)		0.47 (0.08)***	
<b>CANSAS-P</b>				
1 Accommodation		0.39 (0.08)*	0.39 (0.08)***	
2 Food		0.55 (0.08)*	0.43 (0.08)***	
3 Looking after the home		0.45 (0.09)*	0.31 (0.09)**	
4 Self care		0.51 (0.10)*	0.36 (0.12)**	
5 Daytime activities		0.45 (0.07)*	0.35 (0.07)***	
6 Physical health		0.40 (0.07)*	0.23 (0.08)**	
7 Psychotic symptoms		0.67 (0.06)*	0.33 (0.07)***	
8 Information condition		0.43 (0.07)*	0.15 (0.08)*	
9 Psychological distress		0.67 (0.06)*	0.27 (0.07)***	
10 Safety to self		0.60 (0.08)*	0.39 (0.09)***	
11 Safety to others		0.63 (0.09)*	0.28 (0.10)**	
12 Alcohol		0.39 (0.11)*	0.31 (0.09)**	
13 Drugs		0.42 (0.11)*	0.27 (0.10)**	
14 Company		0.45 (0.06)*	0.39 (0.07)***	
15 Intimate relationships		0.11 (0.09)	0.69 (0.05)***	
16 Sexual expression		0.12 (0.09)	0.70 (0.05)***	
17 Childcare		0.09 (0.16)	0.32 (0.12)**	
18 Basic education		0.27 (0.10)**	0.36 (0.10)***	
19 Telephone		0.31 (0.14)*	0.48 (0.11)***	
20 Transport		0.56 (0.08)*	0.18 (0.10)	
21 Money		0.31 (0.08)*	0.37 (0.08)***	
22 Benefits		0.27 (0.08)*	0.24 (0.08)**	
<b>HAS-C</b>				
1 Get along with patient	0.86 (0.01)***			0.10 (0.04)*
2 Understand patient	0.79 (0.02)***			0.09 (0.04)*
3 Look forward to meeting patient	0.81 (0.01)***			0.13 (0.04)**
4 Feel actively involved	0.76 (0.02)***			0.11 (0.04)*
5 Feel I can help patient	0.76 (0.02)***			0.11 (0.04)***
<b>HAS-P</b>				
1 Right treatment		0.21 (0.05)***		0.79 (0.02)***
2 Understood by therapist		0.12 (0.06)*		0.87 (0.01)***
3 Criticised by therapist		−0.19 (0.004)***		0.54 (0.03)***
4 Committed therapist		0.02 (0.06)		0.83 (0.01)***
5 Trust therapist		−0.004 (0.06)		0.87 (0.01)***

Note: Model 2 includes two general factors one each for patient ratings on CANSAS-P and HAS-P ( $G_p$ ) and clinician ratings on CANSAS-C and HAS-C ( $G_c$ ) as well as one common unmet needs (N) and one common therapeutic relationship (TR) factor; CANSAS-P, Camberwell Assessment of Need Short Appraisal Schedule, patient; CANSAS-C, Camberwell Assessment of Need Short Appraisal Schedule, clinician; HAS-P, Helping Alliance Scale, patient; HAS-C, Helping Alliance Scale, clinician;  $G_p$ , general factor, patient report;  $G_c$ , general factor, clinician report; N, unmet needs factor; TR, therapeutic relationship factor.

<sup>a</sup> N with TR,  $r=0.23$ ,  $SE=0.05$ ,  $P<0.001$ ;  $G_p$  with  $G_c$ ,  $r=0.25$ ,  $SE=0.06$ ,  $P<0.001$ .

\*  $P<0.05$ .

\*\*  $P<0.01$ .

\*\*\*  $P<0.001$ .

HAS-C items on a common therapeutic relationship (TR) in model 2. In this model, HAS-C items were strongly affected by the general factor.

When we probed findings on the convergence of patient and clinician ratings on CANSAS-P and CANSAS-C further by investigating whether this held for the five domains of unmet



**Table 3**  
Standardized factor loadings (standard error) of CANSAS domains (health, basic, social, services, functioning) and HAS<sup>a</sup>.

Items	G <sub>C</sub>	G <sub>P</sub>	NH	NB	NSO	NSE	NF	TR
<b>CANSAS-C</b>								
1 Accommodation	0.19 (0.09)*			0.64 (0.08)***				
2 Food	0.17 (0.09)*			0.69 (0.08)***				
3 Looking after the home	0.30 (0.08)**						0.67 (0.09)***	
4 Self care	0.21 (0.08)**						0.59 (0.10)***	
5 Daytime activities	0.27 (0.06)***			0.67 (0.06)***				
6 Physical health	-0.001 (0.08)		0.57 (0.08)***					
7 Psychotic symptoms	0.22 (0.06)***		0.67 (0.07)***					
8 Information condition	0.36 (0.09)***					0.41 (0.12)***		
9 Psychological distress	0.22 (0.07)**		0.68 (0.07)***					
10 Safety to self	0.28 (0.10)***		0.84 (0.08)***					
11 Safety to others	0.55 (0.08)***		0.64 (0.10)***					
12 Alcohol	0.19 (0.08)*		0.69 (0.08)***					
13 Drugs	0.19 (0.10)		0.58 (0.09)***					
14 Company	0.32 (0.06)***				0.81 (0.05)***			
15 Intimate relationships	0.18 (0.07)**				0.80 (0.04)***			
16 Sexual expression	0.20 (0.07)**				0.75 (0.05)***			
17 Childcare	0.03 (0.09)						0.39 (0.12)***	
18 Basic education	-0.03 (0.12)						0.59 (0.12)**	
19 Telephone	0.06 (0.17)					0.82 (0.13)***		
20 Transport	0.11 (0.08)					0.95 (0.09)***		
21 Money	0.20 (0.08)*						0.63 (0.09)***	
22 Benefits	0.13 (0.10)					0.64 (0.11)***		
<b>CANSAS-P</b>								
1 Accommodation		0.38 (0.08)***		0.44 (0.08)***				
2 Food		0.55 (0.09)***		0.47 (0.09)***				
3 Looking after the home		0.49 (0.09)***					0.32 (0.10)**	
4 Self care		0.47 (0.11)**					0.48 (0.13)***	
5 Daytime activities		0.49 (0.07)***		0.35 (0.08)***				
6 Physical health		0.31 (0.08)***	0.34 (0.08)***					
7 Psychotic symptoms		0.62 (0.06)***	0.43 (0.07)***					
8 Information condition		0.42 (0.08)***				0.24 (0.10)*		
9 Psychological distress		0.62 (0.06)***	0.36 (0.08)***					
10 Safety to self		0.56 (0.08)***	0.49 (0.10)***					
11 Safety to others		0.67 (0.09)***	0.28 (0.10)**					
12 Alcohol		0.29 (0.12)*	0.45 (0.09)***					
13 Drugs		0.18 (0.14)	0.54 (0.11)***					
14 Company		0.56 (0.06)***			0.41 (0.07)***			
15 Intimate relationships		0.26 (0.08)**			0.75 (0.05)***			
16 Sexual expression		0.27 (0.08)***			0.75 (0.05)***			
17 Childcare		0.03 (0.16)					0.45 (0.14)**	
18 Basic education		0.14 (0.12)					0.58 (0.11)***	
19 Telephone		0.28 (0.15)				0.68 (0.14)***		
20 Transport		0.48 (0.08)***				0.37 (0.10)***		
21 Money		0.29 (0.08)**					0.46 (0.09)***	
22 Benefits		0.16 (0.08)*				0.47 (0.09)***		
<b>HAS-C</b>								
1 Get along with patient	0.86 (0.01)***							0.09 (0.04)*
2 Understand patient	0.79 (0.02)***							0.08 (0.04)
3 Look forward to meeting patient	0.81 (0.01)***							0.12 (0.04)**
4 Feel actively involved	0.77 (0.02)***							0.10 (0.04)*
5 Feel I can help patient	0.77 (0.02)***							0.10 (0.04)*
<b>HAS-P</b>								
1 Right treatment		0.25 (0.06)***						0.77 (0.02)***
2 Understood by therapist		0.16 (0.06)**						0.86 (0.02)***
3 Criticised by therapist		-0.18 (0.07)*						0.56 (0.03)***
4 Committed therapist		0.05 (0.06)						0.83 (0.02)***
5 Trust therapist		0.03 (0.07)						0.87 (0.01)***

Note: CANSAS-P, Camberwell Assessment of Need Short Appraisal Schedule, patient; CANSAS-C, Camberwell Assessment of Need Short Appraisal Schedule, clinician; HAS-P, Helping Alliance Scale, patient; HAS-C, Helping Alliance Scale, clinician; G<sub>P</sub>, general factor, patient report; G<sub>C</sub>, general factor, clinician report; NH, unmet needs health factor; NB, unmet needs basic factor; NSO, unmet needs social factor; NSE, unmet needs services factor; NF, unmet needs functioning factor; TR, therapeutic relationship factor;

<sup>a</sup> N with TR,  $r=0.23$ ,  $SE=0.05$ ,  $P<0.001$ ; G<sub>P</sub> with G<sub>C</sub>,  $r=0.27$ ,  $SE=0.06$ ,  $P<0.001$ .

\*  $P<0.05$ .

\*\*  $P<0.01$ .

\*\*\*  $P<0.001$ .

health needs, basic needs, social needs, needs for services, and functioning, significant factor loadings were found for all CANSAS-P and CANSAS-C items on the five domain factors, most of which were of substantial magnitude ( $\lambda \geq 0.35$ ) (see

Table 3). As in model 2, HAS-C items still loaded weakly on the therapeutic relationship factor (TR). For most CANSAS and HAS items, significant factor loadings were observed on the general factor.

**Table 4**  
Standardized factor loadings (standard error) of CANSAS and HAS items in Model 3<sup>a</sup>.

Items	General factor (clinician)	General factor (patient)	Therapeutic relationship (clinician)	Therapeutic relationship (patient)	Unmet needs (clinician)	Unmet needs (patient)
<b>CANSAS-C</b>						
1	Accommodation	0.57 (0.08)***			0.22 (0.14)	
2	Food	0.67 (0.08)***			0.03 (0.14)	
3	Looking after the home	0.64 (0.08)***			0.18 (0.12)	
4	Self care	0.56 (0.08)***			0.04 (0.15)	
5	Daytime activities	0.70 (0.05)***			0.04 (0.12)	
6	Physical health	0.35 (0.10)***			0.31 (0.11)**	
7	Psychotic symptoms	0.54 (0.08)***			0.39 (0.12)***	
8	Information condition	0.42 (0.13)**			0.29 (0.15)*	
9	Psychological distress	0.51 (0.09)***			0.46 (0.11)***	
10	Safety to self	0.58 (0.14)***			0.67 (0.15)***	
11	Safety to others	0.71 (0.13)***			0.46 (0.17)**	
12	Alcohol	0.55 (0.10)***			0.32 (0.12)**	
13	Drugs	0.53 (0.09)***			0.16 (0.13)	
14	Company	0.80 (0.04)***			0.07 (0.13)	
15	Intimate relationships	0.77 (0.07)***			−0.39 (0.13)**	
16	Sexual expression	0.75 (0.08)***			−0.44 (0.14)**	
17	Childcare	0.31 (0.11)**			0.02 (0.15)	
18	Basic education	0.28 (0.12)**			0.32 (0.15)*	
19	Telephone	0.40 (0.15)**			0.62 (0.21)**	
20	Transport	0.44 (0.14)**			0.71 (0.14)***	
21	Money	0.56 (0.08)***			0.12 (0.12)	
22	Benefits	0.43 (0.12)***			0.26 (0.14)	
<b>CANSAS-P</b>						
1	Accommodation		0.48 (0.08)***			0.30 (0.11)**
2	Food		0.62 (0.10)***			0.34 (0.14)*
3	Looking after the home		0.48 (0.09)***			0.24 (0.12)*
4	Self care		0.48 (0.12)***			0.42 (0.13)**
5	Daytime activities		0.58 (0.06)***			0.08 (0.11)
6	Physical health		0.29 (0.09)**			0.44 (0.08)***
7	Psychotic symptoms		0.57 (0.09)***			0.43 (0.12)***
8	Information condition		0.33 (0.08)***			0.25 (0.09)**
9	Psychological distress		0.53 (0.08)***			0.41 (0.11)***
10	Safety to self		0.56 (0.09)***			0.44 (0.12)***
11	Safety to others		0.56 (0.09)***			0.32 (0.14)*
12	Alcohol		0.35 (0.12)**			0.44 (0.11)***
13	Drugs		0.20 (0.16)			0.69 (0.13)***
14	Company		0.62 (0.05)***			0.06 (0.12)
15	Intimate relationships		0.79 (0.07)***			−0.37 (0.13)**
16	Sexual expression		0.76 (0.06)***			−0.29 (0.14)*
17	Childcare		0.25 (0.11)*			0.16 (0.14)
18	Basic education		0.28 (0.12)*			0.48 (0.11)***
19	Telephone		0.44 (0.13)**			0.42 (0.15)**
20	Transport		0.32 (0.11)**			0.53 (0.09)***
21	Money		0.41 (0.08)***			0.30 (0.10)**
22	Benefits		0.23 (0.09)*			0.41 (0.08)***
<b>HAS-C</b>						
1	Get along with patient	0.29 (0.05)***		0.81 (0.02)***		
2	Understand patient	0.24 (0.05)***		0.77 (0.02)***		
3	Look forward to meeting patient	0.26 (0.05)***		0.79 (0.02)***		
4	Feel actively involved	0.28 (0.05)***		0.72 (0.03)***		
5	Feel I can help patient	0.35 (0.05)***		0.68 (0.03)***		
<b>HAS-P</b>						
1	Right treatment		0.36 (0.05)***		0.73 (0.02)***	
2	Understood by therapist		0.29 (0.05)***		0.83 (0.02)***	
3	Criticised by therapist		−0.03 (0.06)		0.57 (0.03)***	
4	Committed therapist		0.20 (0.05)***		0.81 (0.02)***	
5	Trust therapist		0.17 (0.06)**		0.86 (0.02)***	

Note: Model 3 includes two general factors one each for patient ratings on CANSAS-P and HAS-P ( $G_p$ ) and clinician ratings on CANSAS-C and HAS-C ( $G_c$ ) as well as distinct but related concept factors one each for patient- ( $N_p$ ) and clinician-rated ( $N_c$ ) rated unmet needs and patient- ( $TR_p$ ) and clinician-rated ( $TR_c$ ) therapeutic relationship; CANSAS-P, Camberwell Assessment of Need Short Appraisal Schedule, patient; CANSAS-C, Camberwell Assessment of Need Short Appraisal Schedule, clinician; HAS-P, Helping Alliance Scale, patient; HAS-C, Helping Alliance Scale, clinician;  $G_p$ , general factor, patient report;  $G_c$ , general factor, clinician report;  $N_p$ , unmet needs factor, patient;  $N_c$ , unmet needs factor, clinician;  $TR_p$ , therapeutic relationship factor, patient;  $TR_c$ , therapeutic relationship factor, clinician.

<sup>a</sup>  $N_p$  with  $N_c$ ,  $r=0.82$ ,  $SE=0.13$ ,  $P<0.001$ ;  $N_p$  with  $TR_p$ ,  $r=-0.07$ ,  $SE=0.07$ ,  $P=0.318$ ;  $N_p$  with  $TR_c$ ,  $r=0.05$ ,  $SE=0.08$ ,  $P=0.501$ ;  $N_c$  with  $TR_p$ ,  $r=0.13$ ,  $SE=0.08$ ,  $P=0.119$ ;  $N_c$  with  $TR_c$ ,  $r=0.11$ ,  $SE=0.10$ ,  $P=0.284$ ;  $TR_p$  with  $TR_c$ ,  $r=0.10$ ,  $SE=0.04$ ,  $P=0.032$ ;  $G_p$  with  $G_c$ ,  $r=0.65$ ,  $SE=0.05$ ,  $P<0.001$ .

\*  $P<0.05$ .

\*\*  $P<0.01$ .

\*\*\*  $P<0.001$ .

### 3.3. Discriminant validity

Compared with model 2, model 3 including two general factors and four distinct concept factors, one each for patient-rated unmet needs ( $N_p$ ), clinician-rated unmet needs ( $N_c$ ), patient-rated therapeutic relationship ( $TR_p$ ), and clinician-rated therapeutic relationship ( $TR_c$ ), further improved model fit compared ( $\chi^2=178.76$  compared to baseline  $\chi^2=2085.40$ , CFI=0.97, TLI=0.97, RMSEA=0.03). Again, sensitivity analysis indicated that the two general factors ( $G_p$ ,  $G_c$ ) were strong enough to be included into Model 3 ( $\Delta\chi^2=131.35$ , d.f.=26,  $P<0.001$ ).

Table 4 displays standardized factor loadings of model 3. Low factor loadings ( $\lambda < 0.35$ ) were observed for most CANSAS-P and CANSAS-C items on the distinct but related patient-rated ( $N_p$ ) and clinician-rated ( $N_c$ ) unmet needs factors in model 3. These two unmet needs factors were strongly correlated (see Table 4). In addition, CANSAS ratings were much more affected by the influence of general factors in model 3 than in model 2. As can be seen in Table 4, this compared to substantial factor loadings ( $\lambda \geq 0.35$ ) for HAS-P and HAS-C items on patient-rated ( $TR_p$ ) and clinician-rated ( $TR_c$ ) therapeutic relationship factors, respectively, and low factor loadings on the general factors in model 3. In this model, patient-rated ( $TR_p$ ) and clinician-rated ( $TR_c$ ) therapeutic relationship factors were weakly correlated (see Table 4). This indicated that patient and clinician version of the HAS assess different but related concepts of the therapeutic relationship (i.e. high discriminant validity of HAS-P and HAS-C).

When inspecting correlations among latent factors, low associations were found for unmet needs ( $N$ ) and therapeutic relationship ( $TR$ ) factors in model 2 ( $r=0.23$ ,  $SE=0.05$ ,  $P<0.001$ ). Similarly, low correlations were observed among unmet needs ( $N_p$ ,  $N_c$ ) and therapeutic relationship ( $TR_p$ ,  $TR_c$ ) factors in model 3 ( $N_p$  with  $TR_p$ ,  $r=-0.07$ ,  $SE=0.07$ ,  $P=0.318$ ;  $N_p$  with  $TR_c$ ,  $r=0.05$ ,  $SE=0.08$ ,  $P=0.501$ ;  $N_c$  with  $TR_p$ ,  $r=0.13$ ,  $SE=0.08$ ,  $P=0.119$ ;  $N_c$  with  $TR_c$ ,  $r=0.11$ ,  $SE=0.10$ ,  $P=0.284$ ). This indicated that CANSAS and HAS assess distinct concepts of needs and the therapeutic relationship (favourable discriminant validity).

### 3.4. Predictive validity

When factor scores were entered into a random intercept model, factor scores indicating less common unmet needs on the common unmet needs factor ( $N$ ) in model 2 significantly predicted reduced psychiatric in-patient days in in-patient care (see Table 5). This indicated favourable predictive validity of the CANSAS. Further, factor scores derived from the clinician-rated therapeutic

relationship factor ( $TR_c$ ) in model 3 were significantly associated with psychiatric in-patient days. Higher factor scores predicted a lower number of days in in-patient care, suggesting favourable predictive validity of HAS-C. However, associations between patient-rated therapeutic relationship and general factor scores and psychiatric in-patient days were not significant. A similar amount of variance was explained in the model including common unmet needs factor scores ( $R^2=0.0493$ ) and clinician-rated therapeutic relationship factor scores ( $R^2=0.0504$ ). When we probed these findings further and entered all significant predictors (i.e. common unmet needs, clinician-rated therapeutic relationship, and clinician-rated general factors) in one model, the amount of variance explained increased to a limited extent ( $R^2=0.0604$ ).

## 4. Discussion

### 4.1. Main findings

Using a large pooled sample of patients with psychosis and their clinicians, we found evidence that CANSAS-P and CANSAS-C items substantively loaded on a common factor, suggesting high convergent validity across measurement methods for CANSAS-P and CANSAS-C. These findings held for the individual CANSAS domains of unmet health needs, basic needs, social needs, needs for services, and functioning. By comparison, there was evidence of favourable discriminant validity of HAS-P and HAS-C, as items of the patient- and clinician-rated version measured distinct but correlated concepts of the therapeutic relationship. In addition, weak associations of unmet needs and therapeutic relationship factors provided evidence suggestive of favourable discriminant validity across unmet needs and therapeutic relationship concepts for both HAS and CANSAS. Finally, lower factors scores of the common unmet needs factor and higher factor scores of the clinician-rated therapeutic relationship factor significantly predicted reduced psychiatric in-patient days. This indicated favourable predictive validity of CANSAS and HAS-C.

### 4.2. Methodological considerations

The DIALOG and FOCUS studies recruited patients from community-based settings in the context of an RCT. Therefore, caution is required in generalising the findings.

The current study applied MTMM analysis to two concepts and two measurement methods. This permits distinguishing variance that is common to the measurement methods from variance that

**Table 5**

Association of factors scores with rehospitalisation (days of in-patient care) within follow-up in random-intercept model.

	Duration of in-patient care (days)					
	Beta	B (95% BCa CI) <sup>a</sup>	P	Beta	B (95% BCa CI) <sup>b</sup>	P
N (Model 2)	-0.11	-11.12 (-20.47 to -5.99)	0.004	-0.10	-9.37 (-16.31 to -2.43)	0.008
$TR_p$ (Model 3)	-0.05	-2.17 (-4.90 to 0.25)	0.079	0.03	1.56 (-0.80 to 4.20)	0.224
$TR_c$ (Model 3)	-0.11	-4.48 (-6.91 to -2.04)	<0.001	-0.10	-3.99 (-6.40 to -1.95)	0.001
$G_p$ (Model 3)	-0.04	-4.22 (-11.76 to 1.52)	0.225	-0.04	-4.62 (-11.90 to 1.64)	0.195
$G_c$ (Model 3)	-0.18	-25.33 (-41.69 to -13.60)	0.002	-0.17	-23.94 (-37.72 to -11.68)	0.002

Note: N, unmet needs factor;  $TR_p$ , therapeutic relationship factor, patient;  $TR_c$ , therapeutic relationship;

$G_p$ , general factor, patient report;  $G_c$ , general factor, clinician report;

Model 2 includes two general factors one each for patient ratings on CANSAS-P and HAS-P ( $G_p$ ) and clinician ratings on CANSAS-C and HAS-C ( $G_c$ ) as well as one common unmet needs ( $N$ ) and one common therapeutic relationship ( $TR$ ) factor;

Model 3 includes two general factors one each for patient ratings on CANSAS-P and HAS-P ( $G_p$ ) and clinician ratings on CANSAS-C and HAS-C ( $G_c$ ) as well as distinct but related concept factors one each for patient- ( $N_p$ ) and clinician-rated ( $N_c$ ) rated unmet needs and patient- ( $TR_p$ ) and clinician-rated ( $TR_c$ ) therapeutic relationship;

BCa CI: bias-corrected and accelerated confidence intervals.

<sup>a</sup> Adjusted for: allocation status and time.

<sup>b</sup> Adjusted for: allocation status, time, country, age, sex, time since first contact, and diagnosis.

is driven by specific concepts. It cannot finally be determined whether general factors account for variance due to substantive concepts or merely method variance common to the measurement techniques of patient and clinician reports. Future MTMM studies are required that assess a greater number of concepts and measurement methods to further disentangle common method from substantive conceptual variance.

The measures of needs and the therapeutic relationship differed in length. It is possible that findings on a common unmet needs factor and distinct therapeutic relationship factors may be a result of CANSAS being the longer measure. However, our findings held when examining individual CANSAS domains each of which is measured with a smaller number of items.

#### 4.3. Comparisons with previous research

Numerous studies have examined the relationship between patient and clinician ratings of outcome in mental health service research. Findings have consistently suggested that the relationship between the ratings is moderate at best. Previous research did not, however, account for overlap in patient and clinician ratings across measures designed to assess different outcomes. The current study moves beyond previous research by distinguishing variance due to such overlap from variance solely driven by patients' and clinicians' views about the concept of interest.

The MTMM analysis found that patient and clinician ratings of the therapeutic relationship tap distinct but correlated concepts. This is consistent with correlational research which reports only weak to moderate associations between patient and clinician ratings of their relationship both in psychotherapy and psychiatric settings (Bale et al., 2006; Couture et al., 2006; Junghan et al., 2007; McGuire-Snieckus et al., 2007). It has been previously proposed by these and other authors (Horvath and Greenberg, 1989; Marmar et al., 1986; Priebe and McCabe, 2006) that patients and clinicians have a different understanding of their relationship. For instance, qualitative research has found that family interference, patient's trust, and shared realistic expectations of progress were of importance to clinicians, whereas patients emphasised clinician's reliability, support, and open communication (McGuire-Snieckus et al., 2007). Findings may be also viewed as supporting the definition of the therapeutic relationship by Priebe and McCabe (2006), p. 70 as "...the psychological construct held by individuals participating in the therapeutic relationship on each other and their interaction". Echoing previous reports, the clinician-rated therapeutic relationship factor significantly predicted rehospitalisation within the follow-up period (Priebe et al., 2007).

As for the therapeutic relationship, previous research has reported at most moderate correlations for patient and clinician ratings of unmet needs (Slade et al., 1998; Hansson et al., 2001; Ochoa et al., 2003; Lasalvia et al., 2008). By contrast, after adjustment for overlap across measures, we found evidence that patient and clinician ratings of unmet needs do converge (Macpherson et al., 2003). They measure the same underlying concept with high predictive value in terms of reduced psychiatric in-patient days. These findings suggest that clinicians and patients may establish a shared understanding. However, this shared understanding may only be achieved if the tendency to routinely rate outcomes more positively or negatively is addressed.

In addition, the finding on a shared understanding of unmet needs is supported by evidence from the original development of the CANSAS, which suggested a consensus across patients and clinicians on how to measure needs (Phelan et al., 1995). This consensus resulted in the two parallel versions for clinicians and patients comprising identical items. By comparison, only two items are identical in patient and clinician versions of the HAS.

Hence, our findings on common unmet needs and distinct therapeutic relationship factors may be viewed as an adequate reflection of the item content of the patient and clinician version of CANSAS and HAS. Our findings are also in line with similarities and differences in the perceptions of patients and clinicians about unmet needs and the therapeutic relationship reported in the literature (Horvath and Greenberg, 1989; Marmar et al., 1986; Phelan et al., 1995; McGuire-Snieckus et al., 2007).

The current study further identified general factors to account for variance common to patient and clinician ratings of different concepts. These may merely reflect systematic influences of the measurement techniques of patient and clinician report. They may also indicate a general tendency of patients and clinicians for positive or negative ratings (Priebe et al., 1998; Fakhoury et al., 2002; Hansson et al., 2007; Reininghaus et al., 2011; Salvi et al., 2005). However, they may be driven, at least partially, by substantive concepts. That is, findings on the predictive value of general factors may be viewed as supporting the conceptually substantive nature of these factors. For instance, Salvi et al. (2005) suggested that general factors may also reflect patients' global severity or outcome. In line with this, one can argue for using general factors as an aggregate outcome measure (Leese et al., 2008; Reininghaus et al., 2011; Speechley et al., 2009).

#### 4.4. Implications

The validity of patient- and clinician-rated measures to assess treatment outcomes in patients with psychosis is of relevance for research and routine care. It provides the basis on which value is assigned to treatments and recommendations are made whether these likely offer benefits for patients (Reininghaus et al., 2011, 2012). Our findings on favourable convergent validity of CANSAS-P and CANSAS-C, favourable discriminant validity of HAS-P and HAS-C, and favourable predictive validity of CANSAS-P, CANSAS-C and HAS-C may inform the use of these measures in the evaluation of treatments for psychosis. Specifically, the CANSAS may be recommended for use in treatment evaluations that conceptualise needs as rated by clinicians and patients as the same underlying concept. This requires assessing needs from both the patient and clinician perspective and adjusting analyses for overlap across measures. If used in clinical consultations, tendencies to routinely rate outcomes more positively or negatively may be overcome if ratings of needs by clinicians and patients on the CAN involve a negotiation process (Lasalvia et al., 2008) and shared decision making (Hamann et al., 2007). This may help establishing a shared understanding, achieving a consensus on ratings and, in turn, reduce psychiatric in-patient admissions.

By comparison, the HAS may be suitable for evaluations that conceptualise the clinician- and patient-rated therapeutic relationship as distinct but related concepts. Our findings suggested that a better clinician-rated therapeutic relationship was associated with reduced psychiatric in-patient admissions. One explanation of this finding may be that clinician-rated therapeutic relationship is a proxy of symptom severity. Assuming that this is not the case for patient-rated therapeutic relationship would also explain that there was no significant association between patient-rated therapeutic relationship and in-patient admissions. In fact, we did not control for severity in our analysis. Hence, it remains to be established whether better clinician-rated therapeutic relationship predicts reduced psychiatric in-patient admissions independent of this variable. Future research should focus on improving patient-rated measures of the therapeutic relationship and their predictive validity with regard to psychiatric in-patient admissions.

Over the past decade, there has been increasing evidence on the effectiveness of interventions that use standardized outcome measures routinely to structure patient-clinician communication (Priebe et al., 2007; Knaup et al., 2009; Slade, 2002a, 2002b; Slade et al., 2006). However, the magnitude of effects in these studies



remained, overall, small and even trivial with regard to long-term clinical outcomes (Knaup et al., 2009; Slade et al., 2006). Previous studies on routine outcome measurement interventions largely focused on patient ratings alone or assessed clinicians' views separately (Knaup et al., 2009). Findings from the current study tentatively suggest that a shared understanding of patients and clinicians of needs may help reduce psychiatric in-patient admissions. Therefore, future work on routine outcome measurement interventions should involve the modelling and testing of components that relate patient and clinician ratings to each other. Such components may involve an iterative process that identifies differences in scores, concerted efforts to reduce unmet needs in the understanding of both the patient and clinician, followed by re-assessments of unmet needs. This may enhance the effectiveness of interventions that use standardized measures routinely to structure patient-clinician communication and, ultimately, improve treatment outcomes of psychosis.

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### Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at <http://dx.doi.org/10.1016/j.psychres.2013.01.013>.

### References

- Bale, R., Catty, J., Watt, H., Greenwood, N., Burns, T., 2006. Measures of the therapeutic relationship in severe psychotic illness: a comparison of two scales. *International Journal of Social Psychiatry* 52, 256–266.
- Bentler, P., 1990. Comparative fit indexes in structural models. *Psychological Bulletin* 107, 238–246.
- Bock, R., Aitkin, M., 1981. Marginal maximum likelihood estimation of item parameters: application of an EM algorithm. *Psychometrika* 46, 443–459.
- Browne, M., Cudeck, R., 1993. Alternative ways of assessing model fit. In: Bollen, K., Long, J. (Eds.), *Testing Structural Equation Models*. Sage, Beverly Hills, CA, pp. 136–162.
- Burns, T., 2007. Evolution of outcome measures in schizophrenia. *British Journal of Psychiatry* 191, s1–s6.
- Campbell, D., Fiske, D., 1959. Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin* 56, 81–105.
- Couture, S., Roberts, D., Penn, D., Cather, C., Otto, M., Goff, D., 2006. Do baseline client characteristics predict the therapeutic alliance in the treatment of schizophrenia? *Journal of Nervous & Mental Disease* 194, 10–14.
- Efron, B., Tibshirani, R., 1993. *An Introduction to the Bootstrap*. Chapman & Hall/CRC, London.
- Fakhoury, W., Kaiser, W., Roeder-Wanner, U., Priebe, S., 2002. Subjective evaluation: is there more than one criterion? *Schizophrenia Bulletin* 28, 319–327.
- Hamann, J., Cohen, R., Leucht, S., Busch, R., Kissling, W., 2007. Shared decision making and long-term outcome in schizophrenia treatment. *Journal of Clinical Psychiatry* 68, 992–997.
- Hansson, L., Vinding, H., Mackeprang, T., Sourander, A., Werdelin, G., Bengtsson-Tops, A., Bjarnason, O., Dybbro, J., Nilsson, L., Sandlund, M., Sorgaard, K., Middelboe, T., 2001. Comparison of key worker and patient assessment of needs in schizophrenic patients living in the community: a Nordic multicentre study. *Acta Psychiatrica Scandinavica* 103, 45–51.
- Hansson, L., Bjorkman, T., Priebe, S., 2007. Are important patient-rated outcomes in community mental health care explained by only one factor? *Acta Psychiatrica Scandinavica* 116, 113–118.
- Horvath, A., Greenberg, L., 1989. Development and validation of the Working Alliance Inventory. *Journal of Counseling Psychology* 36, 223–233.
- Junghan, U., Leese, M., Priebe, S., Slade, M., 2007. Staff and patient perspectives on unmet need and therapeutic alliance in community services. *British Journal of Psychiatry* 191, 543–547.
- Knaup, C., Koesters, M., Schoefer, D., Becker, T., Puschner, B., 2009. Effect of feedback of treatment outcome in specialist mental healthcare: meta-analysis. *British Journal of Psychiatry* 195, 15–22.
- Lasalvia, A., Bonetto, C., Tansella, M., Stefani, B., Ruggeri, M., 2008. Does staff-patient agreement on needs for care predict a better mental health outcome? A 4-year follow-up in a community service. *Psychological Medicine* 38, 123–133.
- Leese, M., Schene, A., Koeter, M., Meijer, K., Bindman, J., Mazzi, M., 2008. SF-36 scales, and simple sums of scales, were reliable quality-of-life summaries for patients with schizophrenia. *Journal of Clinical Epidemiology* 61, 588–596.
- Lehman, A., 1999. Developing an outcomes-oriented approach for the treatment of schizophrenia. *Journal of Clinical Psychiatry* 60, 30–35.
- Macpherson, R., Varah, M., Summerfield, L., Foy, C., Slade, M., 2003. Staff and patient assessments of need in an epidemiologically representative sample of patients with psychosis. *Social Psychiatry & Psychiatric Epidemiology* 38, 662–667.
- Marmar, C., Horowitz, M., Weiss, D., Marziali, E., 1986. The Development of the Therapeutic Alliance Rating System. In: Greenberg, L., Pinsoff, W. (Eds.), *Psychotherapeutic Processes: A Research Handbook*. Sage, New York, pp. 285–324.
- McCabe, R., Roder-Wanner, U., Hoffmann, K., Priebe, S., 1999. Therapeutic relationships and quality of life: association of two subjective constructs in schizophrenia patients. *International Journal of Social Psychiatry* 45, 276–283.
- McGuire-Snieckus, R., McCabe, R., Catty, J., Hansson, L., Priebe, S., 2007. The development of a new Scale to Assess the Therapeutic Relationship (STAR) in community mental health care. *Psychological Medicine* 37, 85–96.
- Muthén, B., 1989. Latent variable modeling in heterogeneous populations. *Meetings of Psychometric Society* (1989, Los Angeles, California and Leuven, Belgium). *Psychometrika* 54, 557–585.
- Muthén, L., Muthén, B., 2009. *Mplus Version 5.2*. Muthén and Muthén: Los Angeles.
- Nosek, B., Smyth, F., 2007. A multitrait-multimethod validation of the implicit association test—implicit and explicit attitudes are related but distinct constructs. *Experimental Psychology* 54, 14–29.
- Nussbeck, F., Eid, M., Lischetzke, T., 2006. Analysing multitrait-multimethod data with structural equation models for ordinal variables applying the WLSMV estimator: what sample size is needed for valid results? *British Journal of Mathematical and Statistical Psychology* 59, 195–213.
- Ochoa, S., Haro, J., Autonell, J., Pendas, A., Teba, F., Marquez, M., 2003. Met and unmet needs of schizophrenia patients in a Spanish sample. *Schizophrenia Bulletin* 29, 201–210.
- Phelan, M., Slade, S., Thornicroft, G., Dunn, G., Holloway, F., Wykes, T., Strathdee, G., Loftus, L., McCrone, P., Hayward, P., 1995. The Camberwell Assessment of Need: the validity and reliability of an instrument to assess the needs of people with severe mental illness. *British Journal of Psychiatry* 167, 589–595.
- Priebe, S., Gruyters, T., 1993. The role of the helping alliance in psychiatric community care. A prospective study. *Journal of Nervous & Mental Disease* 181, 552–557.
- Priebe, S., Gruyters, T., 1995. Patients' assessment of treatment predicting outcome. *Schizophrenia Bulletin* 21, 87–94.
- Priebe, S., Kaiser, W., Huxley, P., Roder-Wanner, U., Rudolf, H., 1998. Do different subjective evaluation criteria reflect distinct constructs? *Journal of Nervous & Mental Disease* 186, 385–392.
- Priebe, S., Watts, J., Chase, M., Matanov, A., 2005. Processes of disengagement and engagement in assertive outreach patients: qualitative study. *British Journal of Psychiatry* 187, 438–443.
- Priebe, S., McCabe, R., 2006. The therapeutic relationship in psychiatric settings. *Acta Psychiatrica Scandinavica* 113, 69–72.
- Priebe, S., McCabe, R., Bullenkamp, J., Hansson, L., Lauber, C., Martinez-Leal, R., Rossler, W., Salize, H., Svensson, B., Torres-Gonzales, F., van den Brink, R., Wiersma, D., Wright, D., 2007. Structured patient-clinician communication and 1-year outcome in community mental healthcare: cluster randomised controlled trial. *British Journal of Psychiatry* 191, 420–426.
- Priebe, S., Fakhoury, W., 2008. Quality of life. In: Mueser, K., Jeste, D. (Eds.), *The clinical handbook of schizophrenia*. Guilford, New York, pp. 581–591.
- Reininghaus, U., McCabe, R., Burns, T., Croudace, T., Priebe, S., 2011. Measuring patients' views: a bifactor model of distinct patient-reported outcomes in psychosis. *Psychological Medicine* 41, 277–289.
- Reininghaus, U., McCabe, R., Burns, T., Croudace, T., Priebe, S., 2012. The validity of subjective quality of life measures in psychotic patients with severe psychopathology and cognitive deficits: an item response model analysis. *Quality of Life Research* 21, 237–246.
- Reininghaus, U., Priebe, S., 2007. Measuring patient-reported outcomes in psychosis: a conceptual and methodological review. *British Journal of Psychiatry*, in press.
- Reise, S., Morizot, J., Hays, R., 2007. The role of the bifactor model in resolving dimensionality issues in health outcomes measures. *Quality of Life Research* 16, 19–31.
- Salvi, G., Leese, M., Slade, M., 2005. Routine use of mental health outcome assessments: choosing the measure. *British Journal of Psychiatry* 186, 146–152.
- Slade, M., Phelan, M., Thornicroft, G., 1998. A comparison of needs assessed by staff and by an epidemiologically representative sample of patients with psychosis. *Psychological Medicine* 28, 543–550.
- Slade, M., 2002a. Routine outcome assessment in mental health services. *Psychological Medicine* 32, 1339–1344.
- Slade, M., 2002b. What outcomes to measure in routine mental health services, and how to assess them—a systematic review. *Australian & New Zealand Journal of Psychiatry* 36, 743–753.

- Slade, M., McCrone, P., Kuipers, E., Leese, M., Cahill, S., Parabiaghi, A., Priebe, S., Thornicroft, G., 2006. Use of standardised outcome measures in adult mental health services: randomized controlled trial. *British Journal of Psychiatry* 189, 330–336.
- Speechley, M., Forchuk, C., Hoch, J., Jensen, E., Wagg, J., 2009. Deriving a mental health outcome measure using the pooled index: an application to psychiatric consumer survivors in different housing types. *Health Services and Outcomes Research Methodology* 9, 133–143.
- Steiger, J., 1990. Structural model evaluation and modification: an interval estimation approach. *Multivariate Behavioral Research* 25, 173–180.
- Stevens, A., Gabbay, J., 1991. Needs assessment needs assessment. *Health Trends* 23, 20–23.
- Thornicroft, G., Tansella, M., 2005. Growing recognition of the importance of service user involvement in mental health service planning and evaluation. *Epidemiologia e Psichiatria Sociale* 14, 1–3.
- Tucker, L., Lewis, C., 1973. A reliability coefficient for maximum likelihood factor analysis. *Psychometrika* 38, 1–10.
- Warner, R., 1999. The emics and etics of quality of life assessment. *Social Psychiatry & Psychiatric Epidemiology* 34, 117–121.
- Widaman, K., 1985. Hierarchically nested covariance structure models for multi-traitmultimethod data. *Applied Psychological Measurement* 9, 1–26.
- World Health Organisation, 1992. The ICD-10 classification of mental and behavioural disorders: clinical descriptions and diagnostic guidelines. World Health Organisation, Geneva.