



# Abbreviated quality of life scales for schizophrenia: Comparison and utility of two brief community functioning measures



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## ABSTRACT

**Background:** The Heinrichs-Carpenter Quality of Life Scale (QLS) is the most extensively used real-world community functioning scale in schizophrenia research. However, the extensive time required to administer it and the inclusion of items that overlap conceptually with negative symptoms limit its use across studies. The present study examined the validity and utility of two abbreviated QLS measures against the full QLS excluding negative symptom items.

**Method:** The sample included 1427 patients with schizophrenia who completed the baseline visit in the CATIE study. The validity of two abbreviated QLS measures (7-item and 4-item) were examined with the full QLS, excluding the intrapsychic foundations subscale, using correlation analysis. The utility of the abbreviated measures was explored by examining associations between the functioning scales and clinical variables and longitudinal change.

**Results:** Both abbreviated QLS measures were highly predictive of the full QLS (both  $r = 0.91, p < 0.001$ ), with no difference in predictive value between the abridged measures. Functional status was significantly associated with symptoms and cognition. Importantly, the strength of these associations was similar between the abbreviated and full QLS. Finally, multiple regression models examining the explanatory power of amotivation/apathy in predicting functioning scores after other symptoms and neurocognition had been accounted for were essentially identical irrespective of the QLS instrument used as the dependent measure. Longitudinal change was also similar across the three scales.

**Conclusions:** The 7-item abbreviated QLS is recommended as a brief measure of community functioning for individuals with schizophrenia, especially when assessment of functional outcome is not the focus.

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## 1. Introduction

Real-world community functioning is increasingly embraced as an important outcome for individuals with schizophrenia. While numerous instruments have been developed to assess functional outcomes in schizophrenia, the Heinrichs-Carpenter Quality of Life Scale (QLS; Heinrichs et al., 1984) has been the most extensively employed in schizophrenia research (Leifker et al., 2011), a feature highlighted by the inclusion of this scale in two large antipsychotic effectiveness trials (Lieberman et al., 2005; Jones et al., 2006).

The QLS is a rater-administered 21-item semi-structured interview instrument, which is comprised of four subscales: interpersonal relations, instrumental role functioning, intrapsychic foundations, and use

of common objects and activities. Though the QLS is a comprehensive instrument which assesses social, vocational and everyday living skills, it also includes items within the intrapsychic foundations subscale that overlap conceptually with negative symptoms and therefore may not assess community functioning per se (Harvey, 2013). Moreover, the extensive time required to administer the scale (approximately 45 minutes) limits its applicability in clinical practice and across research studies, especially when functioning is not the focus. To sidestep this latter issue, shortened versions of the QLS have been developed that take much less time to administer yet are able to validly estimate total scores (Bilker et al., 2003; Fervaha and Remington, 2013); however, the validity of this shortened scale has been established against the 21-item QLS which includes the intrapsychic foundations subscale.

Given recent recommendations to exclude this subscale from the QLS when assessing functional outcome (Harvey, 2013), as well as the need for shortened instruments in outcome research, we sought to examine the validity and utility of two abbreviated QLS' against the full QLS (excluding intrapsychic foundations). Specifically, the two

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abbreviated QLS measures evaluated included a 7-item scale that has been validated previously (Bilker et al., 2003; Fervaha and Remington, 2013), as well as a novel 4-item version that is derived from the 7-item measure by excluding negative symptom items. The present investigation therefore extends a previous validation of the abbreviated QLS measure which established validity against the full QLS (Fervaha and Remington, 2013), by examining validity and utility against the QLS excluding the intrapsychic foundations subscale, as well as exploring the validity and utility of a novel abbreviated QLS measure.

## 2. Method

### 2.1. Study design and participants

Data were drawn from the baseline visit of the Clinical Antipsychotic Trial of Intervention Effectiveness (CATIE) schizophrenia study. Details of the study design and rationale (Stroup et al., 2003), as well as primary findings (Lieberman et al., 2005), have been presented elsewhere. Though the complete study inclusion criteria have been reported previously (Stroup et al., 2003), it is noteworthy that all participants had a diagnosis of schizophrenia confirmed using the Structured Clinical Interview for DSM-IV Axis I Disorders (First, 1997).

The study was approved by the institutional ethics review board at each site, and written informed consent was obtained from the patients or their legal guardians.

### 2.2. Instruments

The primary measure of interest in the present study was the QLS, excluding the intrapsychic foundations domain (Heinrichs et al., 1984). The total score was calculated as the mean of the remaining 14 items. The abbreviated QLS includes the following items: active acquaintances, social initiative, occupational functioning, motivation, anhedonia, commonplace objects, and empathy (Bilker et al., 2003), and was scored as the mean of these 7 items (Fervaha and Remington, 2013). These 7 items were selected as they demonstrated the largest correlation with the complete 21-item QLS compared to all other possible combinations of 7 items (Bilker et al., 2003), a finding that was extended in two independent samples (Bilker et al., 2003; Fervaha and Remington, 2013). A novel modified abbreviated QLS was also examined that excluded items within the intrapsychic foundations domain (i.e., motivation, anhedonia and empathy), and was scored as the mean of the remaining 4 items.

Other assessment measures included the Positive and Negative Syndrome Scale (PANSS) to assess psychopathology (Kay et al., 1987) and the Calgary Depression Scale for Schizophrenia (CDSS) to assess depressive symptoms (Addington et al., 1990). Neurocognition was also assessed using a battery of tests as outlined elsewhere (Keefe et al., 2003, 2006).

### 2.3. Statistical analyses

Bivariate Pearson's product-moment correlation coefficients were computed to examine the linear relationship between the three QLS measures. Next, the relationship between each of the QLS measures and clinical variables was examined using correlation analysis. The difference in magnitude of association between the QLS total score and clinical variables versus an abbreviated QLS score and clinical variables was determined using Fisher's *r*-to-*z* transformations. Multivariate hierarchical regression modeling was used to examine the independent predictive value of various demographic and clinical variables in predicting QLS scores. Finally, longitudinal change was examined using paired samples *t*-tests in a subsample of 866 patients with both baseline and 6-month follow-up data.

**Table 1**

Sociodemographic and clinical characteristics for study sample (*n* = 1427).

Variable	Mean (S.D.) or %	Range (min–max)
Age (years)	40.6 (11.1)	18–67
Sex (males)	74.2	–
Race (white)	61.3	–
Employment status (unemployed)	84.1	–
Patient's education (years)	12.1 (2.2)	1–21
Illness duration (years since first prescribed antipsychotic medication)	14.4 (10.7)	0–56
PANSS (total score)	75.5 (17.5)	31–140
PANSS—positive subscale	18.4 (5.6)	7–38
PANSS—negative subscale	20.1 (6.4)	7–41
PANSS—general psychopathology subscale	36.9 (9.3)	16–70
CDSS (total score)	4.6 (4.4)	0–22
QLS (total score excluding the intrapsychic foundations domain)	2.5 (1.1)	0.1–5.9

Abbreviations: PANSS: Positive and Negative Syndrome Scale; CDSS: Calgary Depression Scale for Schizophrenia; QLS: Quality of Life Scale; S.D.: Standard Deviation; Min: Minimum value; Max: Maximum value.

All statistical analyses were carried out using SPSS version 20 (IBM Corporation, Armonk, NY) and statistical significance was set at  $\alpha < 0.05$  (two-sided).

## 3. Results

### 3.1. Patient characteristics

Baseline demographic and clinical characteristics of the sample are presented in Table 1. The study sample includes 1427 individuals with schizophrenia for whom QLS, PANSS and CDSS data were available.

### 3.2. Bivariate correlations with QLS

Bivariate correlations between the modified QLS and the two abbreviated QLS are presented in Table 2. Both abbreviated versions of the QLS were highly predictive of the QLS total score, and were indistinguishable in their estimates ( $z = 0.30, p = 0.76$ ).

Next, the utility of the various versions of the QLS were explored by examining relationships with clinical variables. Both versions of the abbreviated QLS and the total score were significantly related to clinical symptoms and neurocognition, with no difference in strength of association between each of the abbreviated QLS versions and the total score (Table 3).

### 3.3. Multivariate modeling with QLS as dependent measure

As much empirical research has examined predictors of functional outcome in schizophrenia, we sought to examine whether the use of the abbreviated QLS measures and QLS total score as dependent measures in multivariate regression models would produce similar results. Specifically, previous analyses examining the impact of apathy above and beyond that of other symptoms was replicated and extended using separate regression models for the different QLS measures (Faerden et al., 2009; Konstantakopoulos et al., 2011; Evensen et al.,

**Table 2**

Bivariate correlations between QLS scores.

Measure	1	2
1. QLS total score	–	
2. QLS-A	0.91	–
3. QLS-A modified	0.91	0.92

Abbreviations: QLS: modified Quality of Life Scale (excluding the intrapsychic foundations domain); QLS-A: Abbreviated version of the QLS.

\*All correlations are significant at the  $p < 0.001$  level.

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