

Determining empirically based self-reported cognitive change: Development of reliable change indices and standardized regression-based change norms for the multiple abilities self-report questionnaire in an epilepsy sample

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Abstract

Purpose. Reliable change indices (RCIs) and standardized regression-based (SRB) change score norms were calculated for a measure of self-reported cognitive function, the Multiple Abilities Self-Report Questionnaire (MASQ), in patients with complex partial seizures. Establishment of such standardized change scores could be useful in determining the magnitude and direction of self-appraised cognitive change after epilepsy surgery or other treatment interventions. The primary study objective was to calculate RCI and SRB values for the MASQ. A secondary objective was to report SRB change scores in patients who had undergone anterior temporal lobectomy (ATL) and to assess relationships between self-reported cognitive change, seizure outcome, objective memory test performance, and mood.

Methods. The MASQ was administered to 36 patients with complex partial seizures on two occasions (mean test–retest interval, 6 months). This group did not have major psychopathology and were on stable antiepileptic drugs. RCI and SRB change scores were calculated. Adjustments for baseline ratings, age, education, gender, age at seizure onset, and seizure duration were made with the SRB method. A confidence interval cutoff score (90% level) was calculated for the five MASQ cognitive domains (Language, Visual Perception, Verbal Memory, Visual–Spatial Memory, Attention/Concentration). MASQ SRB scores were computed for a second sample of 50 patients who had undergone ATL.

Results. Test–retest reliabilities for the MASQ domains ranged from a low of 0.63 (Attention/Concentration) to a high of 0.87 (total score). Baseline MASQ score was the single largest contributor to the regression equations. Left and right ATL groups demonstrated similar magnitudes of self-reported cognitive change across all five MASQ domains. Individual base rate change distributions were similar across four of the five domains, with a higher proportion of right ATL patients reporting worsening attention function. Both post-operative mood and SRB-based verbal memory outcome were significantly correlated to self-reported cognitive change in the patients who had undergone ATL.

Conclusions. SRB methodology provides a standardized technique with which to establish patient perception of cognitive change and may be of use when examining change across individual- and group-level ratings of cognitive functioning in clinical and research settings. These techniques also provide a common metric for direct comparison between subjective self-report ratings of cognitive function and objective cognitive test instruments.

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1. Introduction

The ability to estimate the magnitude of self-perceived changes in cognitive function after epilepsy surgery and other epilepsy-related treatment interventions is an impor-

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tant topic for behavioral researchers. Considerable attention has been devoted to this topic within the epilepsy literature over the past several years [1,2]. However, cognitive self-appraisal has frequently focused on the examination of only self-reported memory function [3,4]. Seidenberg et al. [5], in turn, developed a 38-item self-report questionnaire assessing multiple domains of cognitive functioning. Their initial report detailed item selection/content validation success, and reported normative values and validity within a sample of patients with temporal lobe epilepsy (TLE) [5]. These authors reported that the MASQ was a reliable and stable measure demonstrating discriminative value in clinical versus healthy samples. However, Seidenberg et al. [5] included reliability data only for healthy control participants, and no data were presented establishing the test–retest reliability within an epilepsy population. This issue is of importance when trying to characterize the clinical significance of self-reported cognitive change following surgery or other types of treatment intervention (i.e., antiepileptic drug clinical trial) within an epilepsy population, as illness-related factors could affect the reliability of the MASQ.

Limited attention has been given to what constitutes reliable and meaningful self-reported cognitive change within the context of epilepsy treatment. Recent studies have begun to address these issues by using standardized statistical methods that provide a means to establish empirically determined methods for estimating change, whether on neuropsychological measures [6–8] or health-related quality-of-life instruments [9,10]. These studies have found that on measures of health-related quality of life (HRQOL), individual reported change can vary substantially across measures, and that overall instrument reliability may be rather low, which in turn impacts the magnitude of change needed to be considered statistically meaningful. Thus, it is important to determine patient reliability and use statistical methods to derive means of determining reliable change.

The present study sought to obtain epilepsy patient-based test–retest data on the MASQ to develop reliable change indices and standardized regression-based norms. Establishment of such standardized change scores may be useful when trying to determine the magnitude and direction of self-appraised cognitive change. This aim was similar to that of our prior study presenting reliable change indices (RCIs) and standardized regression-based (SRB) normative data on the Wechsler Adult Intelligence Scale III (WAIS-III) and Wechsler Memory Scale III (WMS-III) instruments [11]. Overall, these standardized change score methods could help provide an empirically based procedure for controlling methodological confounds such as practice and regression to the mean, as well as the potential influence of demographic variables such as education, gender, and age. These empirically based methods also provide means by which a common metric can be established for the examination of both group- and individual-level cognitive change.

We also provide SRB change score data for a sample of patients who had undergone unilateral anterior temporal lobectomy to illustrate the potential utility of a regression-based method in evaluating change within the context of a particular and prevalent treatment intervention for intractable epilepsy.

2. Methods

2.1. Normative sample participants

Thirty-six unoperated adult patients with complex partial seizures (primarily temporal lobe epilepsy, TLE) were administered the MASQ on two occasions (mean test–retest interval, 6 months). All patients completed University Institutional Review Board-approved informed consent before participation. The MASQ data for this patient group were collected within the context of a broader study examining establishment of cognitive change scores for the WAIS-III and WMS-III [11]. The patients from this study were included in that prior study with a larger sample of 42 patients. Six of the original 42 patients did not complete the MASQ at the return testing session. This was due primarily to time constraints on the returning patients.

Selection criteria for the study sample included age between 18 and 54, EEG-confirmed TLE or frontotemporal involvement, at least 1 year of confirmed diagnosis, no history of progressive neurological disease or psychotic disorder, maintenance on a stable AED regimen on both testing occasions, 10 or more years of education, no alcohol/drug abuse history, no brain surgery history, and no prior neuropsychological testing. Three patients had histories of mild depression and two of them were receiving antidepressant medication at the time of both tests.

Of the 36 patients, 14 were diagnosed with left TLE, 9 with right TLE, 6 with bilateral TLE, and 7 with nonlocalizing temporal–extratemporal involvement according to EEG findings.

2.2. Surgery patient sample

The surgery sample consisted of 25 patients with left ATL and 25 with right ATL. These patients were selected from our neuropsychological outcome database based on their having completed the MASQ at both preoperative and postoperative testing. There were no significant demographic or clinical differences between the two groups

Table 1
Demographic and clinical data for right and left ATL groups

	Right ATL group (<i>N</i> = 25)	Left ATL group (<i>N</i> = 25)	<i>t</i>	<i>P</i>
Age	37.6 (10.4)	35.7 (9.7)	0.69	0.49
Education	13.3 (2.4)	12.3 (2.6)	1.4	0.16
Full Scale IQ	88.9 (14.1)	84.8 (10.1)	1.2	0.25
Age at seizure onset	10.9 (10.9)	14.2 (12.7)	−0.96	0.34
Seizure-free outcome	17 (68%)	17 (68%)		

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