



Review article

Meta-analysis of the Brief Psychiatric Rating Scale – Expanded (BPRS-E) structure and arguments for a new version

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ABSTRACT

The factor structure of the 24 item BPRS-E was examined to determine the effect of additional items on consensus scales derived primarily from the 18 item BPRS. A meta-analysis ($k = 32$, $n = 10,084$) of previous factor analyses of the BPRS-E was conducted using both a co-occurrence similarity matrix and reproduced correlations. Components generally supporting the consensus scales were found suggesting four relatively invariant subscales: Affect (defined by the core items: anxiety, guilt, depression, suicidality), Positive Symptoms (hallucinations, unusual thought content, suspiciousness, grandiosity), Negative Symptoms (blunted affect, emotional withdrawal, motor retardation) and Activation (excitement, motor hyperactivity, elevated mood, distractibility). The additional BPRS-E items primarily contribute directly to a clear Activation dimension which expands and clarifies the traditional 18 item BPRS structure. Though not statistically supported in this meta-analysis, a fifth factor describing disorganization (conceptual disorganization, disorientation, self-neglect, mannerisms-posturing) was present in some analyses and should be considered. The five factor solution including a disorganization factor has theoretical validity based on the pentagonal model of schizophrenia while also containing the same four primary dimensions that were statistically supported in this meta-analysis. A new version of the BPRS (BPRS-26) with modified and additional items is presented. BPRS-26 is supposed to enhance the stability and the comprehensiveness of the scale and to more closely measure this five factor model.

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1. Introduction

The Brief Psychiatric Rating Scale (BPRS) is a widely used clinician rating scale that was developed to assess treatment change across a comprehensive set of common symptom characteristics. The BPRS initially consisted of 16 items (Overall and Gorham, 1962) and the addition of two items created the standard 18 item version (Overall, 1974). The expanded 24 item version (BPRS-E; Lukoff et al., 1986) was introduced later to measure additional aspects of schizophrenia by adding items for bizarre behavior, self-neglect, suicidality, elevated mood, motor hyperactivity and distractibility. Later Ventura et al. (1993a; 1993b) proposed a training and quality assurance program and a manual of administration (BPRS 4.0) where a more detailed interview to gather information, rules for scoring and more defined anchor points were provided.

A meta-analysis of the factor structure of the original 18 items of the BPRS was conducted over ten years ago (Shafer, 2005). Since then over 20 new factor analyses of the 24 item BPRS-E have been conducted suggesting a meta-analysis of the BPRS-E studies alone would provide a useful summary for researchers and allow an examination of any changes in the factor structure due to the additional six items compared to the original 18 item BPRS. The BPRS-E factor structure, considered as reflecting major dimensions of psychopathology, is even more relevant in the current historical framework when categorical diagnostic models limitations have come under critical review in the last decades with dimensional models gaining in importance (Potuzak et al., 2012).

Considering only the total score as a measure of symptom severity loses considerable information compared to the details available among individual items. However, analyzing the items individually is likely to produce unstable results, so subscales provide a structure that maximizes the information available while minimizing unreliability and instability. Lachar et al. (2001) suggested that subscale symptom scores are important because they may indicate change for participants who otherwise appear unresponsive, that contrasting diagnostic groups may reveal different subscale scores, and that differences in subscale scores may more clearly indicate areas of change for groups or individuals than comparisons using differences in total scores.

There have been a variety of dimensional models based on factor analysis of the BPRS, either in its original or expanded version. Lachar et al. (2004) summarize a consensus model of four major BPRS subscales that have been consistently found in factor analyses of primarily the 18 item BPRS. The main consensus scales were Positive Symptoms, Negative Symptoms, Psychological Discomfort/Affect and a combined Resistance-Mania scale. A meta-analysis of the 18 item BPRS (Shafer, 2005) found support for the majority of these scales but items defining these major dimensions varied slightly from those specified in Lachar's consensus scales. Picardi et al. (2012) provide a summary of some of more recent analyses of the BPRS-E among schizophrenic patients. Their review of previous results shows strong evidence for similar well defined Affect,

Positive and Negative factors in analyses of the BPRS-E, in addition their review indicates the BPRS-E usually also contains a clear Mania or Activation type factor in most studies. They also found more limited evidence in some studies that also had a Disorientation-Disorganized factor which combines with Activation in some studies. Across these reviews and studies the items defining Activation vary substantially depending on whether 18 or 24 items are considered.

Neither the original 18 item BPRS nor the 24 item BPRS-E were designed with a specific scale structure in mind. The BPRS was designed to assess a wide variety of psychiatric symptoms and the items were selected for breadth of coverage rather than as indicators of specific scales so some items will probably be associated with several factors. The lack of commonly shared definitions for the dimensions of the BPRS-E is becoming problematic with Nicholson et al. (1995) finding four different definitions of the negative dimension and nine definitions of the positive dimension as assessed with the BPRS. This can cause difficulties when comparing the findings from studies which have used the BPRS. The primary goal of this meta-analysis is to establish a definitive factor structure for the BPRS-E that can be used by most researchers and clinicians.

A major unresolved measurement issue is that the addition of six new items in the BPRS-E compared to the original 18 item BPRS represents a large increase (33%) in the item content of the scale. Substantial changes in the underlying structure of the ratings are indeed possible given these additional items. Specifically the face content of three items (motor hyperactivity, distractibility and elevated mood) suggests that the BPRS-E should contain a larger more clearly defined Activation factor than the smaller intermittent Activation factor found in some analyses of the original 18 item BPRS. Another goal of this meta-analysis is to explore and clarify the Activation factor in the BPRS-E in addition to the traditional BPRS factors.

2. Method

2.1. Search strategy and inclusion criteria

Studies were identified by Pubmed and PsychINFO, using the search terms BPRS, BPRS-E and factor or factor analysis. This search yielded 255 initial articles from PubMed and 231 initial articles from PsychINFO, which contained an unduplicated total of 336 articles. The abstracts of all search results were independently pre-screened by the first and the second author who also coded the studies. Additional efforts were made by the first and the second author to retrieve all available studies, such as listservs queries, contacts with authors, and search through the reference list of each eligible study.

Inclusion criteria were: publication year from 1993 to 2015; reporting a BPRS-E exploratory factor analysis, regardless of the characteristics of the sample (any psychiatric disorder was

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