



# The relationships of positive and negative symptoms with neuropsychological functioning and their ability to predict verbal memory in psychotic major depression

Andrea M. Che<sup>a</sup>, Rowena G. Gomez<sup>a,b,\*</sup>, Jennifer Keller<sup>b</sup>, Anna Lembke<sup>b</sup>, Lakshika Tennakoon<sup>b</sup>, Gregory H. Cohen<sup>c</sup>, Alan F. Schatzberg<sup>b</sup>

<sup>a</sup> Pacific Graduate School of Psychology, Palo Alto University, 1791 Arastradero Road, Palo Alto, CA 94304, United States

<sup>b</sup> Department of Psychiatry and Behavioral Sciences, Stanford University School of Medicine, 401 Quarry Road, Stanford, CA 94305–5723, United States

<sup>c</sup> San Francisco VA Medical Center, 4150 Clement Street, San Francisco, CA 94121, United States

## ARTICLE INFO

### Article history:

Received 23 June 2011

Received in revised form 30 November 2011

Accepted 1 December 2011

### Keywords:

Mood disorders

Cognition

Neuropsychology

## ABSTRACT

Neuropsychological functioning, in relation to positive and negative symptoms in psychotic major depression (PMD), has not been as thoroughly studied as it has been in schizophrenia. Thus, the current study investigated the associations between positive and negative symptoms with cognitive functioning, with an emphasis on verbal memory in PMD. Attention, working memory, and the executive functioning domains were analyzed among 49 PMD participants. Positive symptoms did not correlate significantly with any measures of verbal memory but did correlate with one measure of attention, working memory, and executive functioning. Negative symptoms correlated significantly with two California Verbal Learning Test-II (CVLT-II) measures of verbal memory and three measures of executive function. Hierarchical regressions were conducted to determine if negative symptoms could predict verbal memory performance after controlling for depression. Of the two verbal memory measures, negative symptoms significantly explained additional variance for CVLT Recognition, but not for CVLT Trials 1–5 total score. Our results provide some evidence that, consistent with the schizophrenia literature, negative symptoms contributed more to verbal memory deficits in PMD than positive symptoms, regardless of depression severity.

© 2012 Elsevier Ireland Ltd. All rights reserved.

## 1. Introduction

Neuropsychological functioning as it relates to types of psychotic symptoms in psychotic major depression has not been as thoroughly studied as it has in schizophrenia. By definition, psychotic major depression (PMD) involves the presence of either delusions or hallucinations only during major depressive episodes. This restriction distinguishes it from schizoaffective disorder. Psychotic symptoms in depression can occur in any age group, starting from adolescence (Schatzberg et al., 1995). The contents of the delusions or hallucinations (usually auditory) are generally mood-congruent psychotic features since they are very commonly consistent with the individual's depressive themes (American Psychiatric Association, 2000). Delusional themes typically include guilt and nihilism (Schatzberg et al., 1995). Though less common, the psychotic features of PMD patients may be mood-incongruent, for example, delusions of persecution (without depressive themes that the individual deserves to be persecuted), thought insertion, thought broadcasting, or thought control (American Psychiatric Association, 2000).

The estimated prevalence of PMD is 0.4% (Ohayon and Schatzberg, 2002). It typically occurs in people who experience severe depression, though patients with mild to moderate depression also may report psychotic symptoms (Ohayon and Schatzberg, 2002). About 15% of major depressed patients have psychotic features, which can occur in any age group (Schatzberg et al., 1995). Studies have mainly focused on the unipolar subtype of psychotic depression since it is more prevalent than the bipolar subtype (Schatzberg et al., 1985). According to Ohayon and Schatzberg (2002), 2.4% of individuals surveyed across five European countries met criteria for unipolar major depression, of whom about 19% had major depression with psychotic features.

In general, research studies indicate neuropsychological impairment for PMD patients in the cognitive domains of attention, processing speed, working memory, language, verbal memory, visual memory, and executive function (Lesser et al., 1991; Jeste et al., 1996; Basso and Bornstein, 1999; Fleming et al., 2004; Gomez et al., 2006; Politis et al., 2004; Schatzberg et al., 2000; Simpson et al., 1999; Wang et al., 2008). Compared to healthy participants and those with nonpsychotic major depression (NPMD), PMD patients performed most poorly on the cognitive measures (Basso and Bornstein, 1999; Jeste et al., 1996; Politis et al., 2004). In addition, research has indicated that the cognitive profile of PMD patients is similar to that of schizophrenia, but the deficits appear to be milder (Hill et al., 2004).

\* Corresponding author at: Pacific Graduate School of Psychology, Palo Alto University, 1791 Arastradero Road, Palo Alto, CA 94304, United States. Tel.: +1 650 433 3823.

E-mail address: [rgomez@palou.edu](mailto:rgomez@palou.edu) (R.G. Gomez).

In contrast to schizophrenia, there are very few studies to date that investigate whether specific types of psychotic symptoms, such as positive and negative symptoms, relate to cognitive functioning in PMD. In the schizophrenia literature, positive symptoms involve an excess or distortion of the patient's normal functioning that includes hallucinations, delusions, disorganized speech or positive thought disorder. Negative symptoms involve the absence or significant decline of normal functioning such as apathy, avolition, and poverty of speech. Several studies suggest that positive and negative symptoms are associated with different patterns of performance deficits on cognitive tests (e.g., Addington et al., 1991; Hill et al., 2004; Kuperberg and Heckers, 2000). Addington and Addington (2002) found that negative, but not positive, symptoms correlated with cognitive functioning in schizophrenia. Hill et al. (2004) reported no significant relationships between positive symptoms and cognitive measures in schizophrenic patients, but they did find that negative symptoms correlated with executive functioning tasks in their sample. Negative symptoms appear to correlate more with verbal memory deficits than positive symptoms in schizophrenia (Addington and Addington, 2002; Aleman et al., 1999; Hughes et al., 2003).

Very few studies have compared PMD and schizophrenia directly on both psychotic symptoms and neuropsychological functioning. Hill et al. (2004) found similarities between the cognitive profiles of schizophrenia and psychotic major depression, although patients with schizophrenia had greater deficits in executive functioning and attention. Clinically, they also found that positive, but not negative symptoms were more severe in the schizophrenia group as compared to the PMD group. Notably, significant relationships were not observed between positive symptoms and neuropsychological variables in either the schizophrenia or PMD group. Notably, they did not comment on the relationship of negative symptoms to cognitive functioning in the PMD group. One limitation of that study was the relatively small sample size of the PMD group ( $n = 20$ ) which may hinder the ability to find such relationships. This article attempts to clarify this issue using a larger PMD sample.

In sum, many previous investigations have demonstrated the presence of cognitive deficits in PMD based on neuropsychological test performance, but very few studies have investigated the relationships between positive and negative symptoms of PMD and cognitive performance. Therefore, the current study investigated the associations between positive and negative symptoms with cognitive functioning, with a particular focus on verbal memory. We predicted that as both positive and negative psychotic symptoms increased, cognitive performance would worsen. We also examined the predictive roles of positive and negative symptoms on cognition after controlling for depression severity to obtain a clearer understanding of verbal memory deficits in PMD patients and to determine if the patterns of relationship between positive and negative symptoms to memory functions were similar to those seen in patients with schizophrenia.

## 2. Methods

The data for this study were collected between 2002 and 2011 in studies on the function of the hypothalamus–pituitary–adrenal (HPA) axis in depression at the Stanford University Medical Center. For further details about the broader HPA study, please see Flores et al. (2006), Keller et al. (2006), and Gomez et al. (2006). Only the baseline (pretreatment) neuropsychological and psychiatric assessments were used for this study.

### 2.1. Participants

Forty-nine (21 males and 28 female) PMD participants were recruited by inpatient and outpatient facilities at Stanford or were self-referred by online and community advertisements (Flores et al., 2006). Inclusion criteria included an eligibility screening of the Structured Clinical Interview for the DSM-IV (SCID; First et al., 1997), a score of at least 21 or higher on the 21-item Hamilton Depression Rating Scale (Hamilton, 1960), and at least a score of 5 on the Brief Psychiatric Rating Scale Positive Symptom Subscale (BPRS PSS; Overall and Gorham, 1962). The BPRS PSS included the following four items: hallucinations, delusions, thought disorganization, and suspiciousness (Flores

et al., 2006). Inclusion/exclusion criteria were also based on clinical laboratory tests such as for pregnancy (for women) and recent substance abuse. The final diagnosis of PMD was determined by the research psychiatrist, after evaluation of SCID and BPRS data. Individuals who were pregnant or lactating, had serious medical illnesses, had history of neurological disorders or head injury, had abnormal clinical laboratory tests, were taking system steroids, or were not within the age range 18–75 were excluded from the study. Further exclusions included history of reading or learning disabilities, obsessive compulsive disorder, and history of substance abuse within the last 6 months. The demographics of the PMD patients are depicted in Table 1. The mean age of the patients is 37.71, S.D. = 12.23, and their mean level of education is 15.04 years, S.D. = 2.71.

### 2.2. Measures

#### 2.2.1. Psychiatric rating scales

The positive, negative, and affective symptoms of the PMD patients were measured using the Brief Psychiatric Rating Scale (BPRS). The positive symptoms in the current study included hallucinatory behavior, conceptual disorganization, and unusual thought content. The negative symptoms included blunted affect, psychomotor retardation, and emotional withdrawal. These positive and negative scales were derived from items outlined by Faustman et al. (1988) and Thiemann et al. (1987). The patients' severity of depression was measured by the 24-item Hamilton Depression Rating Scale (Ham-D).

#### 2.2.2. Cognitive measures

Attention, working memory, verbal memory, and executive function were the domains that were analyzed, with an emphasis on PMD patients' verbal memory performance. To assess for the PMD patients' attention, the Wechsler Adult Intelligence Scale-III (WAIS-III) Digit Span Forward (DSF) subtest, Trail Making Test, Part A, and Wechsler Memory Scale-III (WMS-III) Spatial Span Forward were administered to the participants. Working memory was measured by the WAIS-III Digit Span Backward (DSB), the Letter Number Sequencing (LNS), and the WMS-III Spatial Span Backward subtest. Verbal memory and learning was measured by the California Verbal Learning Test-II (CVLT-II). Furthermore, executive functioning was measured by the Trail Making Test Part B, Stroop Test, a phonemic fluency test (Controlled Oral Word Association—COWA), and a semantic fluency test (animal fluency test). Raw scores of these measures were used in the analyses.

### 2.3. Procedures of the original study

Data were collected at the Depression Research Clinic at Stanford University School of Medicine. Individuals were first screened over the phone, and those with mood symptoms were scheduled for an eligibility interview, which consisted of the Structured Clinical Interview for DSM-IV (SCID) and mood ratings (Ham-D and BPRS) to ensure eligibility for the studies. Afterwards they were administered a neuropsychological battery, mood rating scales, self-report questionnaires, overnight blood draws at the Stanford University Hospital General Clinical Research Center (GCRC) to assess cortisol levels, and magnetic resonance imaging scans for the baseline study.

### 2.4. Statistical analyses

All statistical analyses were carried out with the Statistical Package for the Social Sciences (SPSS) version 19.0 for Windows (Somers, NY, IBM Cooperation 2010). Pearson correlation coefficients were calculated to assess the relationship between positive and negative symptoms with the raw scores of the cognitive variables, since the data were normally distributed. Hierarchical regressions were conducted to determine the ability of negative symptoms to predict verbal memory after controlling for depression severity. Notably, age and education as potential demographic covariates were not significantly correlated with any of the dependent variables.

## 3. Results

Table 2 reports the descriptive statistics for all variables of interest. Because a negative relationship was predicted between severity of psychotic symptoms and cognitive functioning, one-tailed Pearson correlations were conducted between the positive and negative

**Table 1**  
PMD participant characteristics ( $N = 49$ ).

Variable	Frequency	Mean	Standard deviation	Range
Age		37.71	12.23	18–66
Education level (years)		15.04	2.71	9–23
Gender				
Male	21			
Female	28			

متن کامل مقاله

دریافت فوری ←

**ISI**Articles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات