Psychiatry Research ■ (■■■■) ■■■–■■■

Contents lists available at ScienceDirect

Psychiatry Research

journal homepage: www.elsevier.com/locate/psychres

Depressed mood in individuals with schizophrenia: A comparison of retrospective and real-time measures

Lisa H. Blum [a], Julia Vakhrusheva [b], Alice Saperstein [b,c], Samira Khan [c], Rachel W. Chang [c], Marie C. Hansen [c], Vance Zemon [a], David Kimhy [b,c,*]

[a] Ferkauf Graduate School of Psychology, Yeshiva University, Bronx, NY, USA
[b] Department of Psychiatry, Columbia University, New York, NY, USA
[c] New York State Psychiatric Institute, New York, NY, USA

ARTICLE INFO

Article history:
Received 2 November 2013
Received in revised form
27 February 2015
Accepted 8 March 2015

Keywords:
Experience sampling method (ESM)
Schizophrenia
Depression
Long-term memory

ABSTRACT

Depressed mood is prevalent among individuals with schizophrenia, leading to difficulties in functioning. Typically, depressed mood is evaluated using retrospective assessments during which individuals are asked to recall their mood during the past week or month. However, as individuals with schizophrenia may display memory difficulties, the results of such assessments may be biased, potentially leading to inaccurate clinical characterizations and/or suboptimal treatment. Our aim was to assess the potential impact of long-term memory on depressed mood in individuals with schizophrenia. Employing an Experience Sampling Method (ESM) approach, 51 individuals with schizophrenia and 22 healthy controls rated their momentary emotions up to 10 times/day over a two-day period, along with retrospective measures of depressed mood, long-term memory, quality of life, social functioning, and symptoms. ESM assessment of real-time depressed mood demonstrated discriminant and convergent validity. Among the schizophrenia group, there was a significant correlation between the real-time and retrospective measures of depressed mood. However, once variance due to long-term memory was controlled, the relationship between the real-time and retrospective measure was no longer significant. The findings suggest that a real-time measure of depressed mood may allow overcoming some of the limitations associated with long-term memory difficulties common among individuals with schizophrenia.

1. Introduction

Schizophrenia is a chronic illness that brings significant and long-lasting health, social, and financial burdens (Knapp et al., 2004). Further adding to this cost, is the high rate of psychiatric comorbidity common to this disorder (Buckley et al., 2009). In particular, depressive illnesses have been found in up to 75% of individuals with schizophrenia, and are associated with greater disability, recurrence of illness, demoralization, as well as an increased risk of suicide (Baynes et al., 2000). Likewise, sub-syndromal depressive symptoms are present in over 80% of individuals with schizophrenia, contributing significantly to functional difficulties (Zisook et al., 2006).

1.1. Assessment of depression among individuals with schizophrenia

Depressive symptoms in individuals with schizophrenia are most commonly assessed using measures such as the Hamilton Rating Scale for Depression, the Calgary Depression Scale for Schizophrenia, or the Beck Depression Inventory, which have been shown to be highly correlated and reported to have good validity and test–retest reliability (Niv et al., 2007). However, these measures are retrospective in nature, asking participants to recall experiences from the past week or two weeks, thus vulnerable to long-term memory impairments and biases. This is particularly relevant for assessments of individuals with schizophrenia, given the well-documented prevalence of long-term memory difficulties in this population (Ranganath et al., 2008) which have been found to adversely impact real-world functioning (Fett et al., 2011; Zhornitsky et al., 2013). Additional limitations of retrospective assessments include lack of information about fluctuations in symptoms (Kimhy et al., 2006), as well as difficulties distinguishing between depressive and negative symptoms (Stahl and Buckley, 2007). Of note, social withdrawal, anhedonia, and lack of energy, are particularly problematic when attempting to differentiate between

* Correspondence to: Division of Cognitive Neuroscience, Department of Psychiatry, Unit #55, Columbia University, 1051 Riverside Drive, New York, NY 10032, USA. Tel.: +212 543 6817; fax: +212 543 6176.
E-mail address: kimhyda@nyspi.columbia.edu (L.H. Blum).

http://dx.doi.org/10.1016/j.psychres.2015.03.008
0165-1781/

negative and depressive symptoms (Green et al., 2003). Taken together, retrospective assessments of depressive symptoms among individuals with schizophrenia may potentially have limited ecological validity, hindering the identification of symptoms and delivery of effective treatments.

To overcome some of these limitations, researchers have used the Experience Sampling Method (ESM)–a time-sampling self-report methodology developed to study the dynamic process of person–environment interactions (Delespaul, 1995). Recent technological advances have allowed ESM to be used with mobile electronic devices (Kimhy et al., 2006, 2010, 2012). Typically, participants are provided with a mobile device, which is preprogrammed to randomly beep throughout the day. Upon hearing beeps, participants are instructed to answer questions on the device's screen about their current mood, thoughts, activities and/or social context. Thus, ESM allows *in vivo, in situ* ("real time, real world") ambulatory assessment of experiences with limited need for long-term memory input. In recent years, ESM has been successfully used with many psychiatric populations, including individuals with schizophrenia (Swendsen et al., 2011; Kimhy et al., 2012), bipolar disorder (Kwapil et al., 2011), depression (Ben-Zeev et al., 2012a), schizotypy (Kwapil et al., 2012), as well as individuals at high-risk for psychosis (Kimhy and Corcoran, 2008).

While an extensive literature suggests that many individuals with schizophrenia experience depressed mood, a number of important gaps in the literature remain unaddressed. Most importantly, it remains unclear whether deficits in long-term memory impact recollection of depressed mood during retrospective assessment. Additionally, while negative symptoms and retrospective measures of depressed mood tend to show a strong association, the relationship between negative symptoms and real-time measures of depressed mood has not yet been explored.

1.2. The present study

Our primary aims were: (1) to confirming findings from previous studies supporting the discriminant and convergent validity of real-time depressed mood in individuals with schizophrenia and healthy controls (2) to assess the association of real-time and retrospective ratings of depressed mood in individuals with schizophrenia and the putative impact of long-term memory on this association; and (3) to examine the association between real-time and retrospective ratings of depressed mood and negative symptoms in individuals with schizophrenia in order to determine if a real-time measure of depressed mood could better differentiate depressed mood from negative symptoms.

2. Methods

2.1. Participants

Individuals with schizophrenia were recruited from patients treated at the New York State Psychiatric Institute (NYSPI) at the Columbia University Medical Center (CUMC). Healthy participants were recruited via advertisements posted at CUMC. For all participants, the inclusion criteria were ages 18–50; English speakers; have an IQ > 80 (assessed using WAIS-R), and able to give informed consent. For the schizophrenia group, the inclusion criteria were a DSM-IV diagnosis of schizophrenia or related disorders; and moderate positive symptoms (score of ≥ 3 on the hallucination or delusion items of the Scale for the Assessment of Positive Symptoms). Individuals with a history of a severe cardiac condition (assessed via self-report) were excluded, as this study was part of larger protocol assessing cardiac reactivity. Individuals with a recent use of illegal drugs (assessed by urine toxicology tests) were also excluded. For healthy controls, the exclusion criteria were a personal or family history of psychosis and a diagnosis of any DSM-IV Axis-II Cluster A personality disorder. The DSM-IV diagnoses in the schizophrenia group were: Schizophrenia (68%), Schizoaffective disorder (24.5%), Delusional disorder (2.5%), and Psychosis NOS (5%). The study was approved by the NYSPI's Institutional Review Board and all subjects provided written informed consent. See Table 1 for sample description.

Table 1
Demographic and clinical information.

	Schizophrenia	Healthy controls	U/χ^2	p
Age	30.14 (S.D.=7.28)	23.90 (S.D.=4.68)	273.000	< 0.001
Years of education	14.39 (S.D.=4.19)	15.24 (S.D.=2.86)	454.000	0.312
Gender, *N* (%)			1.400	0.237
Male	32 (62.7%)	10 (47.6%)		
Race			1.353	0.852
White	27 (52.9%)	12 (57.1%)		
Black	5 (9.8%)	3 (14.3%)		
Asian American	7 (13.7%)	2 (9.5%)		
American Indian	1 (2.0%)	1 (4.8%)		
Multiracial	11 (21.6%)	3 (14.3%)		
Ethnicity -			0.823	0.364
Hispanic/latino (% Yes)	15 (29.4%)	4 (19%)		
Marital status			0.059	0.971
Single	46 (90.2%)	19 (90.5%)		
Divorced/separated	2 (3.9%)	1 (4.8%)		
Married/partnered	3 (5.9%)	1 (4.8%)		
Primary language			0.303	0.582
English	35 (68.6%)	13 (61.9%)		
Bilingual	16 (31.4%)	8 (38.1%)		
Schizophrenia			Mean	S.D.
Positive symptoms (Scale for assessment of positive symptoms)			31.20	18.87
Negative symptoms (Scale for assessment of negative symptoms)			36.10	18.92
Retrospective depressed mood (Beck depression inventory)			17.44	10.89
Real-time depressed mood (Experience sampling method)			41.67	23.17

Note: *N*=73 (schizophrenia=51, healthy controls=22).

Please cite this article as: Blum, L.H., et al., Depressed mood in individuals with schizophrenia: A comparison of retrospective and real-time measures. Psychiatry Research (2015), http://dx.doi.org/10.1016/j.psychres.2015.03.008