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Psychotic experiences as indicators of suicidal ideation in a non-clinical college sample

Jordan E. DeVylder [a], Elizabeth Thompson [b], Gloria Reeves [c], Jason Schiffman [b,*]

[a] School of Social Work, University of Maryland, Baltimore, MD, United States
[b] Department of Psychology, University of Maryland, Baltimore County, Baltimore, MD, United States
[c] Division of Child and Adolescent Psychiatry, University of Maryland, Baltimore, MD, United States

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ABSTRACT

Suicide is a leading cause of preventable death. Epidemiological studies have shown strong associations between sub-threshold psychotic experiences and risk for suicidal ideation and behavior. Screens designed to assess psychotic experiences may have clinical utility in improving suicide prevention efforts. In the current study, we hypothesized that the Prodromal Questionnaire-Brief (PQ-B) would reliably distinguish levels of suicidal ideation within a sample of college students ($n=376$). As predicted, PQ-B scores varied significantly across levels of suicidal ideation, both when treated as a raw count of sub-threshold psychotic experiences and when taking into account subjective distress associated with those symptoms. In addition, we explored the feasibility of developing a short screen based on the most discriminating items, finding that a six-item version of the PQ-B yielded higher accuracy for detecting elevated suicidal ideation over the full measure. The PQ-B has the potential for clinical utility in detecting groups that might be at increased risk for suicidal ideation.

1. Introduction

Suicide is a leading cause of preventable death, with an estimated 38,000 people dying by suicide each year in the United States alone (Centers for Disease Control and Prevention (CDC), 2010). Intervention efforts, however, have been hindered by difficulty identifying which individuals are at the greatest risk for severe suicidal behavior (Borges et al., 2006). Recent epidemiological studies have shown that sub-threshold psychotic experiences are predictive of suicidal thoughts and attempts among people with ideation, and thus, individuals having psychotic experiences may constitute a group at increased risk (Nishida et al., 2010; Saha et al., 2011; Kelleher et al., 2012, 2013, 2014; Fisher et al., 2013; DeVylder et al., In press; DeVylder and Hilimire, In press).

Common in the general population (7.2% estimated lifetime prevalence; Linscott and Van Os, 2013), psychotic experiences qualitatively resemble hallucinations and delusions found in psychotic disorders, but are of insufficient persistence, intensity, or impairment to meet diagnostic criteria. Epidemiological studies provide compelling evidence that psychosis screens may be useful as adjunctive indicators of suicide risk. However, there has not yet been sufficient translational research to draw clinical benefit from these population-level findings, particularly in non-clinical populations. Most notably, epidemiological screens typically do not assess for distress related to psychotic experiences, which is a key component to several psychosis screens.

The purpose of this study was to assess the effectiveness of a psychosis-risk screen, the Prodromal Questionnaire-Brief (PQ-B; Loewy et al., 2011), in detecting individuals at elevated risk for suicidal thoughts. We hypothesized that higher scores on the PQ-B would be related to more severe suicidal ideation. In particular, we tested the PQ-B using both its standard scoring method (including distress ratings) and as a raw symptom score, a count of psychotic experiences without considering associated distress. Further, we explored the feasibility of modifying the PQ-B psychosis screen to be tailored towards identification of suicide risk with maximal sensitivity and specificity.

2. Methods

2.1. Participants

Participants ($N=387$) were undergraduate students recruited from introductory psychology courses from March 2012 through May 2014 at University of Maryland, Baltimore County (UMBC). Eleven participants (2.8%) were excluded from the study due to

* Corresponding author. Tel.: +1 410 455 1574.
E-mail address: schiffma@umbc.edu (J. Schiffman).

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missing demographic data, leaving a final analysis sample of $n=376$. All individuals were over the age of 18 and offered extra credit for their participation in the study.

2.2. Procedure

The study was conducted by the Youth FIRST Lab at UMBC and the protocol was approved and overseen by the UMBC Institutional Review Board. Prior to participation, individuals were given an overview of the study after which they read and signed the consent form, keeping a copy for themselves. As part of a larger battery assessing mental health and psychological functioning, all participants completed a demographics form as well as the Prodromal Questionnaire-Brief Version (PQ-B; Loewy et al., 2011), the Beck Depression Inventory-II (BDI-II; Beck et al., 1996), and a treatment history questionnaire developed by the research team that included items assessing current treatment and need for care specific to suicidal thoughts and behavior. Study data were collected via paper and pen self-report measures. Feedback was not provided to participants. Participants were provided referral information for clinical resources in the event of psychological distress or mental health care needs.

2.3. Measures

Demographics, including race/ethnicity, age, and sex, were self-reported by participants. Race/ethnicity was recorded into a single categorical variable indicating white, Asian, or other ethnic minority, given the relatively low frequency of many specific racial/ethnic groups. Substance use was assessed using a measure created by the research team to assess the presence and frequency of alcohol and drug use.

Suicidal ideation was assessed using multiple measures. One component of suicide ideation was the suicidality item of the BDI-II, which assesses severity of ideation over the past 2 weeks (Beck et al., 1996). Additionally, self-reported current treatment (past 2 months) for suicidal behavior, and/or need for treatment for suicidal behavior were also used as indicators of suicidal ideation. A single ordinal suicide variable was constructed, divided into (1) "lower" suicidal ideation ("I don't have any thoughts of killing myself") *without* indicating current treatment or need for care specifically for suicidality; (2) "moderate" suicidal ideation, defined as a score of 1 on the BDI suicide item ("I have thoughts of killing myself, but I would not carry them out"), but *without* indicating current treatment or need for care specifically for suicidality; and (3) "higher" suicidal ideation, defined as either (a) a score of 1 on the BDI suicide item *plus* current treatment or need for care specifically for suicidality, or (b) a score of 2 on the BDI suicide item ("I would like to kill myself").

Psychotic experiences were assessed using the PQ-B, a 21-item measure assessing the presence/absence of sub-threshold psychotic experiences, and the distress associated with each symptom rated on a 5-point Likert scale, with higher scores indicating greater distress (Loewy et al., 2011). First published in its longer form in 2005, the PQ-B is a well validated and frequently used measure of psychosis risk (Loewy et al., 2005, 2011; Jarrett et al., 2012; Kline et al., 2012; Addington et al., 2014; Kline and Schiffman, 2014). There are no items on the PQ-B that inquire about suicide or suicidal ideation. PQ-B distress scores were reported as the total sum of distress ratings in accordance with original scoring guidelines. An alternative approach in scoring the PQ-B as a sum of endorsed psychotic experiences (Kline et al., 2014), referred to as PQ-B symptom scores, was also examined. Internal consistency of the PQ-B was excellent in this sample, both with original scoring (i.e. distress scores; $a=0.90$) and when scored as the sum of psychotic experiences (i.e. symptom scores; $a=0.88$). The PQ-B was chosen as the measure of psychotic experiences based on prior studies showing strong psychometric properties of this measure within college samples (Kline et al., 2012; Kline and Schiffman, 2014).

Depression was measured using the sum score of the BDI-II (Beck et al., 1996), excluding the suicide item. The remaining 20 items were scored each on a four-point scale from 0 to 3, with higher scores indicating greater severity of depressive symptoms.

2.4. Analyses

Associations between continuously measured clinical symptoms (PQ-B distress, PQ-B symptom score, and BDI-II) and three levels of suicidality (lower, moderate, and higher) were tested using analysis of variance (ANOVA), with Bonferroni post-hoc tests between pairs of groups. Receiver operating characteristic (ROC) analysis was used to calculate the area under the curve (AUC) and to establish the threshold of maximum sensitivity and specificity for the PQ-B distress, PQ-B symptom score, and BDI-II in distinguishing higher versus moderate suicidal ideation. Logistic regression models were used to calculate odds ratios (OR) to facilitate interpretation of effect sizes of psychotic experiences on suicidality, specifically by showing the increased risk of greater severity of suicidal ideation with each endorsed item on the PQ-B. *T*-test analyses of individual PQ-B items were used to identify items that indicated higher versus moderate suicidal ideation. A new scale was created using only items (distress scores) that distinguish levels of suicidal ideation at the level of two-tailed alpha=0.01 to focus on those items that clearly distinguished levels of suicidal ideation. ROC procedures were repeated for this new exploratory scale, and sensitivity, specificity, positive and negative predictive values, and accuracy were likewise calculated.

3. Results

The mean sample age was 20.08 years (S.D.=3.29). The sample was half female ($n=191$, 50.8%), and of mixed race/ethnicity including white ($n=134$, 35.6%), Asian ($n=130$, 34.6%), and other minority ($n=112$, 29.8%). Substance use was as follows: tobacco: 32.9%; alcohol: 60.5%; marijuana: 29.8%; stimulants: 7.4%; cocaine, amphetamines, sedatives, hallucinogens, or opiates: 20.5%. Substance use was not, however, significantly related to PQ-B scores (no significant Pearson's r between any class of substances, use and frequency of use, with PQ-B symptom or distress scores; data available upon request), and therefore not included in subsequent analyses. Most respondents did not report suicidal thoughts and were included in the "lower" suicidal ideation group ($n=309$, 82.2%). "Moderate" suicidal ideation was reported by 56 individuals (14.9%), and "higher" suicidal ideation was reported by nine respondents (2.4%). Suicide ideation groups did not vary on age, $F(\text{d.f.}=2,371)=1.41$, $p=0.245$, race/ethnicity, $\chi^2(\text{d.f.}=2,\ n=374)=3.65$, $p=0.455$, or sex, $\chi^2(\text{d.f.}=2,\ n=374)=1.04$, $p=0.594$. Descriptive data for clinical measures are reported in Table 1. All skewness and kurtosis values fall within acceptable range for use of parametric statistics.

Table 1
Descriptive data for clinical measures.

	Range	Mean	S.D.	Skewness	Kurtosis
PQB-symptom	0–21	4.70	4.63	1.13	0.70
PQB-distress	0–84	13.19	15.46	1.51	1.91
BDI	0–41	9.89	8.16	1.22	1.55

Note: BDI is scored with the exclusion of the suicidal ideation item.

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