Published in final edited form as:

Schizophr Res. 2007 July ; 93(1-3): 144–151.

Self-Report of Attenuated Psychotic Experiences in a College Population

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Abstract

This study assessed the rates of self-reported “prodromal” psychotic symptoms and related distress in a college population. 1,020 students completed the Prodromal Questionnaire (PQ), a self-report screening measure for psychosis risk. Participants’ responses were highly similar to the responses of non-psychotic-spectrum patients in the original PQ validation sample (Loewy et al., 2005), suggesting that the PQ may perform similarly with a variety of populations. Applying the cutoff proposed for screening treatment-seeking patients (8 or more positive symptoms) identified 43% of students, while comparatively fewer participants (25%) endorsed eight or more items at the frequency required for prodromal syndrome diagnosis by interview (i.e., weekly), and only 2% endorsed eight or more items as distressing. Although attenuated psychotic experiences are commonly reported by “normal” young adults, frequent and distressing items identify a proportion of students more consistent with the prevalence of psychotic-spectrum disorders in the general population, which suggests a potential for future screening of unselected samples.

Keywords

Prodromal; Psychosis; Schizophrenia; Schizotypy; Self-report; Ultra-High-Risk

1. Introduction

1.1 Screening of risk for psychosis by interview

Identification of individuals at heightened risk for psychosis has been a long-standing focus of psychopathology research, and recently developed structured clinical interviews that assess prodromal schizophrenia have truly advanced the specification of risk. The two most widely used instruments are the Structured Interview for Prodromal Syndromes (SIPS; Miller et al., 1999) and the Comprehensive Assessment of At-Risk Mental States (CAARMS; Yung et al., 2003). Approximately 41–50% of individuals presenting to specialty prodrome clinics who are diagnosed with at-risk syndromes by these instruments transition to full psychosis within

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one year (Miller et al., 2003; Yung et al., 2005), and attenuated positive psychotic symptoms define the most commonly-diagnosed at-risk syndromes (Loewy et al., 2005; Yung et al., 2004). However, as the definition of “symptoms” shifts from full psychosis to attenuated forms of psychotic experiences, it becomes increasingly important to explore the threshold between normal and abnormal experiences by characterizing attenuated psychotic occurrences in non-clinical populations.

1.2 Psychotic-like experiences in the general population

Studies examining the base rates of psychotic symptoms in the general population have consistently shown that a large proportion of people report a psychotic experience at some point in their lifetime without presenting sufficient symptoms to warrant a psychotic disorder diagnosis (Hanssen et al., 2003; Kendler et al., 1996). Self-reported rates of schizotypy or psychosis-proneness in non-clinical samples are much higher than estimated prevalence rates of schizophrenia-spectrum disorders (Raine, 1991), show only moderate power to predict later psychosis (Chapman et al., 1994), and include large numbers of people reporting infrequent experiences, with smaller proportions reporting frequent symptoms (McGorry et al., 1995).

Self-report of these experiences can be reliable and valid, when compared to clinician assessment of symptoms, such as on the Community Assessment of Psychic Experiences (CAPE; Konings et al., 2006), although they may still offer poor prediction of future psychosis, due largely to the low rate of psychosis in general population samples. However, subjects who reported distress and/or help-seeking on the CAPE were at least five times more likely to be diagnosed with a psychotic disorder 4 years later, suggesting that including these qualifiers may improve the predictive validity of screening (Hanssen et al., 2003).

From these studies, it is clear that high levels of self-reported attenuated psychotic experiences do not directly equate to risk for schizophrenia, suggesting that general population screening for psychosis risk using a self-report questionnaire could result in a high false-positive rate unless other factors are considered. Additionally, statistical considerations demonstrate that a very large number of individuals must be screened to retain even a small number of true positive cases when prevalence of the disorder is low, as is the case for psychosis in the general population (O'Toole, 2000). Therefore, it is unlikely that general population screening would be feasible without limiting consideration to individuals who report significant distress or who are treatment-seeking.

1.3 The Prodromal Questionnaire

Previously, we developed the Prodromal Questionnaire (PQ), a self-report screening measure that identifies individuals who could benefit from further clinical assessment for psychosis risk by structured diagnostic interview. The construct of prodromal psychosis includes dimensions of positive symptoms, negative symptoms, affective symptoms and disorganization, all of which are assessed by the PQ. However, we will focus largely on the positive symptom dimension in this paper, as positive symptoms define the necessary criteria for the symptomatic prodromal syndrome diagnoses on the SIPS. In this way, items on the PQ are anchored to the “prodromal” schizophrenia construct as described in the SIPS and CAARMS, conceptualized as a syndrome identifying *imminent* risk for psychosis, rather than only a latent vulnerability or long-term risk indicator.

In the initial PQ validation study (Loewy et al., 2005), adolescents and young adults seeking treatment for potential prodromal psychosis at the Center for Assessment and Prevention of Prodromal States (CAPPS) completed the PQ and the SIPS (Miller et al., 1999) at intake. Participants were classified as those with SIPS diagnoses of prodromal syndromes, psychotic syndromes, or no SIPS diagnosis. In that study, eight or more PQ positive symptom items

discriminated between subjects diagnosed as prodromal or psychotic versus subjects with no SIPS diagnosis with 90% sensitivity and 49% specificity. Two cutoff scores maximized both sensitivity and specificity; fourteen or more positive symptoms was associated with 71% sensitivity and 81% specificity, and thirty-six or more total symptoms produced 70% sensitivity and 84% specificity. These results suggest good preliminary concurrent validity of self-reported attenuated psychotic experiences with clinician diagnosis of a prodromal syndrome.

To our knowledge, no studies to date have assessed the prevalence of prodromal psychotic symptoms, as currently defined in the research literature, in a non-clinical population. Therefore, the goal of this study was to examine the base rates and frequencies of a broad range of putatively “prodromal” symptoms in an undergraduate university sample. Corollary goals were to estimate the proportions of students who would be selected for diagnostic interview by the screening measure and to evaluate the influence of distress and help-seeking on the proportion of students selected. In the current study, we hypothesized that PQ items would be endorsed at very high rates, consistent with studies of schizotypy in college samples, but that a large number of symptoms, frequency of symptoms, distress, and help-seeking would identify a substantially smaller subset of students that would be more consistent with the potential prevalence of prodromal psychosis in a non-clinical population.

2. Methods

2.1 Measures

The PQ is a 92-item self-report questionnaire that takes approximately 20 minutes to complete. Items are answered True/False and sum to form four major scales: 1) positive symptoms (unusual thinking, perceptual abnormalities and cognitive disorganization); 45 items, 2) negative symptoms (e.g. flat affect, social isolation); 19 items, 3) disorganized symptoms (e.g. odd behavior); 13 items, and 4) general/affective symptoms (e.g. depression, role functioning); 14 items. Item domains are parallel to scales from the SIPS and include items from the Schizotypal Personality Questionnaire (SPQ; Raine 1991) as well as the SIPS, plus additional items. Sample items include “Sometimes I think that people can read my mind,” and “I tend to avoid social activities with other people.” Participants are asked to rate their experiences in the last month and are instructed NOT to include any experiences that occurred while using alcohol or street drugs.

Several modifications were made to adapt the PQ for use with a non-clinical sample and to address the specific hypotheses of this project. In the CAPE study (Hanssen et al., 2003), an association was found between help-seeking or distress about attenuated psychotic symptoms and risk for psychosis. In order to assess rates of help-seeking and distress, the PQ was first modified (PQ-T/F) for the present study by asking subjects if they had sought or received any psychiatric or psychological treatment in the past month, and when an item was endorsed, the subjects were asked if they were distressed by that experience. We were also interested in the frequency of experiences in the general population, given the SIPS criterion for prodromal syndromes that attenuated level symptoms occur at least weekly. We hypothesized that although many students might endorse psychotic-like experiences (PLEs), few students experience them frequently. In a second revision (PQ-Likert), we replaced the true/false response format with Likert-scale response options assessing the frequency of experiences (“never,” “one to two times per month,” “once per week,” “few times per week,” or “daily”). Additionally, six items were rephrased and reverse-coded to check reliability of responding.

2.2 Participants and assessments

Undergraduate students (N=1,020) aged 18 years and older who were enrolled in Introductory Psychology courses at UCLA completed the PQ anonymously as part of a packet of

questionnaires at the beginning of class during the first week of the course. Participants gave informed consent and were given the option to refuse any or all questions on the surveys. Refusals per class were not documented, but response rate per quarter, when compared to class sizes, suggests that the refusal rate was negligible. The study protocol and informed consent procedures were approved in advance by the UCLA IRB. Students who participated during the first academic quarter in which this study was conducted completed the PQ-T/F (N=271). The decision to assess frequency of experiences led to subsequent changes, students who participated during the following three academic quarters completed the PQ-Likert (N=749). Table 1 presents demographic information for the samples.

2.3 Validity check

In order to assess random or inaccurate responding, students were asked to indicate whether they had read the instructions at the beginning of the questionnaire. Comparisons of PQ scale scores of instruction-readers versus non-readers were conducted using Wilcoxon rank sum tests, which suggested that both groups were likely sampled from the same population. Therefore, both groups of participants were used in the present analyses. On the PQ-Likert, six items were rephrased in the opposite direction and reverse-coded, with both items presented in the measure (e.g. “I have *not* been sleeping well lately” and “I have been sleeping well lately.”) Difference scores on the six item pairs were summed to form a reliability score, where higher scores are more unreliable. Twenty students with poor reliability scores (> 3 SD above the mean) were consequently deleted from all analyses in this paper, leaving 749 subjects in the PQ-Likert group.

2.4 Statistical Analyses

Given the positively skewed distribution of PQ scores, non-parametric tests were used for all comparisons. The very small proportion of help-seekers in this study created grossly unequal sample sizes when comparing the PQ scores of those who reported seeking mental health treatment to those who did not. Therefore, Fisher’s exact test was used with 2X2 contingency tables that calculated the proportion of help-seekers and non-help-seekers in each half of the PQ scale score distributions, split at the median value for that scale. Additionally, separate logistic regressions were performed with each PQ scale as the independent variable and help-seeking as the dependent variable, along with stepwise logistic regressions that entered all PQ scales as independent variables, for both samples. Unfortunately, the low base rates of help-seeking (PQ-T/F, N=12; PQ-Likert, N=23) and items endorsed as distressing created undue influence of individual scores within the help-seeking group. As a result, we were unable to compare distressing items between help-seekers and other students. All statistical analyses were completed using SAS 8.2.

3. Results

3.1 Base rates and frequencies

On the PQ-T/F, 93% of students endorsed at least one positive symptom item, although only 35% of the sample indicated that they were *distressed* by at least one positive symptom item. Using the screening cutoff suggested by the initial PQ validation study of 8 positive symptom items (Loewy et al., 2005) selected 43% of the present sample, although that proportion would drop to only 2% if the cutoff were eight positive symptom items rated as *distressing*. The proportions of the sample identified by various selection methods on the PQ-T/F and PQ-Likert are presented in Table 2. Undergraduates’ responses on the PQ-T/F were most similar to the CAPPS patients who did not receive any SIPS diagnosis, across all PQ scales (Table 3). We did not calculate statistical comparisons of participants’ responses in the CAPPS study to responses in the current investigation due to sampling and research design differences between the two studies (Loewy et al., 2005).

3.2 Help-seeking

Help-seeking students reported twice as many distressing items across all PQ scales in both samples as those students who had not sought or received treatment. Less than 1% of the sample indicated that they had sought or received mental health treatment in the last month on the PQ-TF (0.5%) and the PQ-Likert (0.3%). Help-seeking students were over-represented in the top half of the PQ-T/F distribution for positive ($p=.016$), negative ($p=.014$), disorganized ($p<.0001$), general ($p=.0001$), and total symptoms ($p=.005$), as well as general ($p=0.013$) and total symptoms ($p=.01$) on the PQ-Likert. Stepwise logistic regression with all PQ scales entered as independent variables revealed that disorganized symptoms ($\beta=.27$, $\chi^2=19.7$, $df=1$, $p<.0001$) and general symptoms ($\beta=.22$, $\chi^2=5.9$, $df=1$, $p=.015$) significantly predicted help-seeking behavior on the PQ-T/F, and only general symptoms predicted help-seeking on the PQ-Likert, with symptoms weighted by frequency ($\beta=.07$, $\chi^2=15.3$, $df=1$, $p<.0001$).

4. Discussion

4.1 Feasibility of general screening

As expected, undergraduate students endorsed a large number of items, with much lower rates if only frequent and/or distressing items are included. Non-statistical comparison of mean PQ scores indicates that undergraduates reported similar levels of symptoms to *non-psychotic-spectrum* patients who sought treatment in the initial validation study, with psychotic and at-risk patient groups scoring much higher (Loewy et al., 2005). Overall, the current results are broadly consistent with those of the preliminary validation study, which demonstrated that a few positive symptoms were endorsed by a majority of individuals, while a higher number of symptoms were more rarely reported and were often associated with a SIPS diagnosis.

Although we did not directly assess validity of the PQ in this study, the results have implications for the feasibility of general population screening. While retaining one-half of the non-psychotic-spectrum group for interviewing may be feasible at specialty clinics whose goal is to maximize sensitivity and capture as many prodromal/psychotic cases as possible, this approach becomes infeasible when used with non-treatment seeking populations.

Alternatively, if the importance of sensitivity is balanced with concerns about stigma and resource allocation, the cutoff for screening could be increased (e.g., at least fourteen positive symptom items) to improve specificity, thereby reducing the number of false-positives. Adding a frequency criterion to this approach by requiring weekly symptoms results in screening a smaller but still substantial (8%) number of students. Given the moderate amount of overlap in the PQ scores of the prodromal syndrome group and the group with no SIPS diagnoses in the validation study, there would likely be a moderate rate of false-positives in the first case where sensitivity is maximized and a higher number of false-negatives with the second approach. This may be partially due to the nonspecific nature of many at-risk symptoms, which are still being investigated to improve their predictive accuracy in relation to psychosis (Yung et al., 2004). However, the sensitivity/specificity trade-off must be addressed in any health screening context and should be decided by individual clinicians and researchers based on their specific aims and by weighing the relative risks and efficiency concerns associated with both choices.

We also investigated distress as a qualifier of self-report that could aid screening and found that the cutoff of eight or more distressing positive symptoms identified a very small proportion of students (2% or less). However, although it seems safe to assume that treatment-seeking subjects presenting to prodromal clinics are to some degree distressed, it is unclear how many specific attenuated psychotic symptoms on the PQ would be identified as distressing by at-risk patients. Future research will investigate rates of distress about specific symptoms reported by prodromal patients and the factors that modify the expression of distress, given its potential to

predict later psychotic disorder (Hanssen et al., 2003) and its relationship to insight and depression in psychosis (Selten et al., 2000). The small number of students who would be selected for interview using the distress criterion is consistent with the hypothetical prevalence of prodromal psychosis in this sample, suggesting that such screening approaches may in fact be both theoretically and practically grounded.

4.2 Help-seeking

Although the rates of reported treatment-seeking were low, those students who reported that they had sought or received mental health services did report higher rates of symptoms. The dynamics of help-seeking in adolescents and young adults are quite complex, including the influence of insight, shame or denial, knowledge about mental health treatment, and availability of services; these factors were not directly addressed in this study. Despite this caveat, we conclude that students who seek help are experiencing larger numbers of a variety of symptoms, including attenuated psychotic symptoms, but students seek professional assistance most often when they are experiencing stress, mood symptoms, difficulty with role functioning and attention problems. Restricting screening to only those students who access services may, therefore, not identify students suffering from attenuated psychotic symptoms in solitude, such as those who are suspicious, grandiose, or preoccupied with perceptual disturbances and magical thinking. Many youth actively avoid recognition of their prodromal symptoms during the early stage of psychosis (Boydell et al., 2006), and hospitalization is often the first treatment contact despite having significant prodromal symptoms, with psychotic patients reaching a more severe stage before help is introduced (Addington et al., 2002). Therefore, endorsement of a large number of symptoms associated with distress in the absence of help-seeking may identify young people at risk who might not otherwise receive clinical attention.

4.3 Limitations

The present study has several limitations. First, no external validity data were collected, such as clinical interviews or other established self-report symptom measures. Therefore, we do not know the true prevalence of psychotic-spectrum symptoms in this sample, nor can we determine the relationship between PQ responses and the presence of symptoms or disorder in this sample. Consequently, our results are placed in the context of the estimated prevalence of prodromal psychosis in the general population. In addition, the expected rate of transition to full psychosis would be much lower in a general population sample than in a treatment-seeking group. Predictive validity is reduced when the prevalence of the target disorder is low (O'Toole, 2000), limiting the utility of general population screening, which must be considered when choosing to implement a screening strategy.

Although we suspect that in the absence of treatment-seeking, modifying factors such as symptom frequency and distress may help to identify those at risk, we will not know the actual impact of these qualifications on ultimate risk until we have collected concurrent external validity data and followed participants over time. A second limitation is the selection effects that may be associated with a college sample that may reduce the generalizability of our results. The probable higher IQ of the sample and relatively high functioning decrease the chances that symptomatic students at risk for schizophrenia were included in this study (Robins et al., 1984), but it does not preclude their participation.

4.4 Stigma and screening

As other researchers and consumers have previously proposed (Post, 2001; Rosen, 2000), we maintain that concerns about stigma should be carefully considered in psychosis screening. False identification of youth as prodromal to psychosis can lead to unnecessary concern and emotional harm. However, our continued interest in general population screening is motivated by evidence that symptomatic individuals are suffering without the help that could delay,

prevent, or ameliorate the painful symptoms and disability of schizophrenia, as well as reduce overwhelming healthcare costs for individual consumers and society at large (Keshavan et al., 2003; McGorry et al., 2002; Rice and Miller, 1998). It is with this goal in mind, along with appropriate sensitivity to the relevant risks, that we continue to investigate screening options. Furthermore, while the present authors do not support the implementation of general population screening at this time, we do support the continued investigation of prodromal symptoms as assessed in a variety of settings in order to establish and improve the concurrent and predictive validity of screening measures. Potential settings include outpatient mental health clinics, general health practitioners' offices, school mental health settings, and behavioral treatment facilities.

4.5 Conclusions

In conclusion, the present results support our hypotheses that common psychotic-like experiences may potentially be distinguished from prodromal "symptoms" by self-report when factors such as symptom frequency, distress, and help-seeking are taken into account. These qualifiers identify a proportion of an undergraduate sample that is small enough to be feasibly screened by clinical interview for purposes of further validation research. These findings support the inclusion of questions about contextual information such as distress and impairment in assessments of non-clinical populations, issues that must ultimately be validated by clinician diagnosis (Hanssen et al., 2003; Kendler et al., 1996).

Acknowledgments

We would like to acknowledge Jacqueline Horwitz, Katherine Karlsgodt and Tara Niendam for their assistance with data collection procedures; Ashley Jennings for administrative support, Steven P. Reise for statistical consulting, Carrie E. Bearden and Cindy Yee-Bradbury for comments on drafts of the manuscript and Adrian Raine for the use of his Schizotypal Personality Questionnaire in developing our measure.

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Figure 1.

Mean proportion of endorsed items rated as distressing at each level of frequency on the PQ-Likert scales (N=749).

Table 1.

Demographic characteristics

	Age (years)	Gender	Race/Ethnicity				
			Caucasian	Asian	Black or African-American	Hispanic/Latino	More than one ethnicity
PQ-T/F N = 271*	19.5 ± 1.6	69% female	24%	43%	4%	14%	8%
PQ-Likert N = 629*	19 ± 1.3	66% female	34%	38%	2%	12%	7%

* Demographic data were missing for 3 participants on the PQ-T/F and for 100 participants on the PQ-Likert

Table 2.

Proportion of undergraduate sample selected by each scoring method derived from the clinical sample study.

PQ Version	Scale	Modifier	Cutoff	% sample selected
PQ-T/F	Positive	None	8 + *	43%
	Positive	None	14 + *	18%
	Positive	Distressing	8 + *	8%
	Total	None	36 + *	13%
PQ-Likert	Positive	Weekly	8 +	25%
	Positive	Weekly & distressing	8 +	1.3%

* These cutoffs balanced sensitivity and specificity in the clinical sample; all others maximized sensitivity.

Table 3. Mean number of endorsed items on the PQ-T/F for undergraduates and the CAPPS clinical sample.

	Positive Symptoms (46 Items)		Unusual Thinking (22 Items)		Perceptual Disturbances (17 Items)		Negative Symptoms (19 Items)		Disorganized Symptoms (13 Items)		General Symptoms (14 Items)		Total Scale (92 Items)	
	M	SE	M	SE	M	SE	M	SE	M	SE	M	SE	M	SE
CAPPS psychotic (N= 37)	19.84	1.65	9.59	0.87	7.08	0.74	9.68	0.87	6.38	0.60	7.84	0.64	43.73	3.27
CAPPS at-risk (N= 39)	18.49	1.44	8.97	0.71	5.79	0.67	10.26	0.73	6.15	0.49	8.33	0.65	43.23	2.67
CAPPS other (N= 37)	9.27	1.28	4.57	0.65	2.62	0.47	6.11	0.78	3.89	0.46	5.27	0.65	24.54	2.71
UCLA Students (N=271)	8.03	0.41	4.48	0.23	1.95	0.15	4.08	0.25	2.95	0.16	3.08	0.19	18.14	0.87

M= mean, SE= standard error