Polish adaptation of the Prodromal Questionnaire–Brief version PQ-B(PL) in psychiatric patients and healthy persons

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Summary

Aim. Cognitive and affective experiences considered typical of psychotic disorders may also occur in the general population, though in a less severe form. The ability to differentiate them from prodromal states, preceding the onset of full-blown psychosis, is an important element of prevention and early detection of high risk of a sudden deterioration of mental state. In response to the current lack of questionnaire tools enabling assessment of psychotic-like experiences (PLEs), an attempt was made to adapt the PQ–B questionnaire for use in the Polish population.

Method. In the pilot study, a sample of 652 persons (66% women), aged 18–78 years, approximately 10% of whom were psychiatric patients, completed the Polish version of the PQ–B, and the O–LIFE, HCL–33, SWLS and TCT–DP measures.

Results. Results yielded a one-factor structure, satisfactory reliability (α > 0.85) and construct validity of the 21-item self-report questionnaire assessing the incidence of PLEs in the past month and severity of accompanying distress. Furthermore, there were significant correlations between PQ–B scores and symptoms of schizotypy (especially unusual perceptual experiences and cognitive disorganization), emotional lability (p < 0.05) and depressed mood (p > 0.001) typical of hypomania, as well as unconventional thinking (p > 0.05).

Conclusions. The PQ–B(PL) can be a useful tool in both Polish clinical practice and scientific research, filling the existing gap among screening tests for traits on the border of health and psychopathology.

Key words: PQ–B, psychotic-like experiences, prodromal states of psychosis
Introduction

Although psychotic experiences are a basic pathological manifestation of impaired cognition observed in patients suffering from psychotic disorders, they may appear in the course of mood or anxiety disorders, and in a less severe form also in the healthy population, taking the form of psychotic-like experiences (PLEs). Much like many other traits, they extend along the health and disease continuum, which means that their manifestations may be considered either harmless individual differences or pathological symptoms indicating impaired reality testing and the onset of a serious mental disorder [1, 2]. Clinically significant psychotic experiences may also take an attenuated form, making early detection and effective treatment more difficult than in the case of full-blown psychoses. In view of the undiminished prevalence of psychotic disorders, their significant cost and insufficient treatment effects, it has become of particular importance to focus on early recognition of the so-called prodromal or ultra-high risk (UHR) states of psychosis, i.e., such intensity of PLEs which does not yet allow to diagnose a mental disorder but goes beyond the accepted norm of mental health, in a way predicting its future onset [3].

One of the factors enabling differentiation between clinically relevant PLEs and normal individual differences may be increased distress reported as comorbid with those experiences. Although the incidence of PLEs turns out to be relatively frequent in the healthy population, as a rule these symptoms do not trigger any anxiety, discomfort or problems in everyday functioning. Increased stress associated with psychotic-like experiences can be a significant predictor of the actual deterioration of health. In a study on a group of over 1,000 students [4], as many as 93% reported the occurrence of at least one prodromal symptom in the last month, but only 35% declared the accompanying distress. In the same study, it was also observed that the likelihood of developing a full-blown psychosis was 4–5 times higher in people reporting distress as a consequence of experienced PLEs. Moreover, in the Italian study [5], it was noticed that 1 in 10 help-seeking people who initially did not meet clinical UHR criteria, but who were characterized by increased PLEs distress, developed full-symptom psychosis over next 12 months. Hence, it is crucial for self-report studies of psychotic-like experiences to measure not only their frequency but also the associated distress.

So far, there have been several Polish adaptations of psychological tools designed to measure traits from the border of health and psychopathology, such as psychoticism (e.g., the EPQ-R) [6], schizotypy (e.g., the O–LIFE) [7], or hypomania (e.g., the HCL) [8], not only among psychiatric patients but also in the general population. Since many of the instruments created to assess psychotic-like experiences [9, 10] have not yet been adapted for Polish conditions, the subject of this work is Polish adaptation of one of the most popular one among them – the Prodromal Questionnaire–Brief version (PQ-B) [11]. The scale is a self-report measure intended to be used as a screening tool to detect high-risk states of psychosis, but due to a significant rate of false positive
detections, it seems more appropriate to use it for assessment of the linear severity of PLEs in the general population, regardless of mental health status.

Among healthy individuals, PLEs are believed to appear mostly during adolescence, which is related to normal developmental changes and the process of reality testing, which is quite natural for this stage of development but may result in somewhat distorted interpretations. Mittel et al. [12] showed a link between juvenile PLEs and Internet addiction, which they attribute to adolescent desire to experience a different, alternative reality. In another study [13], they described correlations between PLEs, depression and socio-demographic inequalities in young adults. In turn, in a meta-analysis, Honing et al. [14] demonstrated that people with PLEs were at a 3.2 times higher risk of self-harm than those without such experiences. Adolescents with PLEs also declared a higher level of loneliness [15] and more frequent suicidal ideation [16]. Numerous studies [17, 18], including those on twins, show that a significant risk factor for development of PLEs in adolescence is experiencing violence or being a victim of abuse, which, apart from increasing the likelihood of developing psychotic disorders, also increases the risk of depression, while research on American students suggests a moderate positive correlation between PLEs and sleep disorders especially, especially experiencing nocturnal sensations, as well as a tendency to use psychoactive substances (p = 0.086) [19].

Research suggests links between behaviors measured with the PQ-B and symptoms of psychosis spectrum disorders. Research on students aged 13–19 demonstrated moderate associations between PLEs and schizotypal traits, such as unusual perceptual experiences, bizarre thoughts and speech, paranoid ideation, magical thinking, ideas of reference, and weak connections with bizarre behavior, lack of close friendships, excessive social anxiety, and poor general health [20]. Kline et al. [21] showed an interesting relationship between PLEs and schizotypal traits among healthy students. It turned out that individuals with higher level of schizotypy also had significantly higher PQ-B total scores (with more frequent PLEs), but interestingly, they did not score higher on the distress scale (i.e., the experienced PLEs did not cause significant anxiety). In addition to the link with depressive symptoms, there were also associations between UHR states and manic symptoms [21] and bipolar disorder [22].

Psychotic experiences consist of perceptual disorders (such as problems in the distinction between reality and imagination, illusions or sensory hypersensitivity) and cognitive disorders, including increased distractibility and poor divided attention, racing thoughts, thought blocking or interference, or impaired abstract thinking [23]. Longitudinal research [22] on the Kenyan population demonstrated that compared to healthy controls, UHR patients manifested more attention deficits but better abstract thinking. However, neither of these features differentiated subjects who developed full-blown psychosis in the next 7 months from those maintaining adaptive PLE level.
Characteristics of the tool

The PQ-B is a 21-item questionnaire, modified from its original 92-item version [11]. During a 3–5-minute session, the subject first responds to the positive symptom questions (yielding the total score), ticking the answer YES if the symptom has occurred at least once in the past month and NO if it has not. If the answer is yes, the subject is to assess the experience on the distress scale, i.e., a five-point Likert scale (from 1 – “strongly disagree” to 5 – “strongly agree”), indicating how distressing (anxiety-provoking) the described thoughts, feelings or experiences have been. The PQ-B generates two independent scores – the total score (0 to 21 points) and the distress score (0 to 105 points). However, it does not determine the duration or intensity of the assessed experiences, nor does it differentiate PLEs occurring earlier than in the past month.

The PQ-B is also used as a screening tool for persons with such intense PLEs that they may be considered prodromal and precede conversion to full-blown psychosis. However, a full diagnosis requires a follow-up structured interview with a psychiatrist. Originally, the cut-off scores of ≥ 3 symptoms and ≥ 6 points on symptom distress were recommended as indicating a clinical likelihood of a sudden deterioration of health and the transition from PLEs acceptable in the general population into symptoms of, e.g., schizophrenia. The original cut-off points suggested by Loewy et al. [24] allowed detection of UHR patients with high sensitivity (88–89%) and moderate specificity (58–68%) for both scales. Subsequent studies by other authors [25–28] confirmed the tool’s high sensitivity but a markedly lower specificity – from 4.5% in the Chinese to 42% in the American population, which meant a significant rate of false positive detections. In 2018, Loewy et al. [30] proposed increasing the cut-off points for both scales. Apart from prognostic doubts, the tool consistently shows very satisfactory reliability, i.e., Cronbach’s alpha of 0.85 in the original study and from 0.87 to 0.95 in other population studies [25–27].

The PQ-B is therefore a handy tool for self-assessment of PLEs and their differentiation with clinically relevant psychotic experiences. Within just a few minutes, this self-report questionnaire provides a quantitative assessment of the prevalence of PLEs and the severity of accompanying distress, as well as initial screening for prodromal states of psychosis together with a qualitative score interpretation. In the absence of psychological tools enabling fast assessment of psychotic symptoms in the general population of Poles, the aim of this work was to adapt the PQ-B to Polish conditions and verify the relationship between PLEs and schizotypy traits, hypomania, thinking paradigms, and quality of life among healthy and mentally ill individuals.
Material and method

The sample

652 persons (females – 66%) aged 18–78 participated in the Polish adaptation of the PQ-B. Data collection was performed in two ways – via traditional surveys, using printed questionnaire sets (n = 266), and on-line, via the website www.schi-found.pl (n = 386). 89.4% of the sample were healthy individuals (not reporting using psychological or psychiatric help), mainly students of local high schools and university students of such majors as nursing, emergency medical service, physiotherapy, psychology, dietetics, and cosmetology, 65.5% of them were females aged from 18 to 66 years. The remaining 1/10 of the sample were patients of the day treatment wards of the Department and Chair of Psychiatry, Pomeranian Medical University in Szczecin, as well as persons who declared current use of psychiatric help and reported diagnosed psychiatric condition (60.5% – females aged 19–78) of whom 29.8% were diagnosed with F20–F29, 38.8% – with F30–F39 and 31.4% – with F40–F49, according to ICD-10. Detailed sociodemographic characteristics of the sample are presented in Table 1.

In a subgroup of 59 students (72.4% – females aged 19–32, M = 21.74; SD = 2.13), we measured quality of life, schizotypal and hypomanic traits. We then added 13 psychiatric patients to conduct further assessment of thinking paradigms (72 persons in total; 69.4% – females aged 19–63, M = 24.34; SD = 7.87). Questionnaire surveys were conducted by a trained psychologist during individual sessions and in small groups (up to 15 people) in the period from January to April 2018 in the city of Szczecin. The internet survey, conducted in the same period of time, was of a nationwide range and included persons from all 16 provinces, although the vast majority of subjects (80.2%) were from the West Pomeranian Voivodeship. The project was approved by the PMU bioethics committee (no. KB-0012/123/17). No personal data allowing identification of participants were collected in the study.

Table 1. Sociodemographic characteristics of the sample, N (%) or M (SD)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Whole group N = 652</th>
<th>Healthy controls n = 583</th>
<th>Psychiatric patients n = 69</th>
<th>X² / Z</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>430 (66.0)</td>
<td>382 (65.5)</td>
<td>48 (69.6)</td>
<td>0.449</td>
<td>1</td>
<td>0.591</td>
</tr>
<tr>
<td>Male</td>
<td>222 (34.0)</td>
<td>201 (34.5)</td>
<td>21 (30.4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>25.14 (9.81)</td>
<td>23.77 (7.93)</td>
<td>36.84 (15.25)</td>
<td>-11.371</td>
<td>649</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>99 (15.2)</td>
<td>96 (16.5)</td>
<td>3 (4.3)</td>
<td>17.672</td>
<td>4</td>
<td>0.005</td>
</tr>
<tr>
<td>Vocational</td>
<td>110 (16.9)</td>
<td>99 (17.0)</td>
<td>11 (15.9)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary</td>
<td>298 (45.7)</td>
<td>263 (44.9)</td>
<td>35 (50.7)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher</td>
<td>145 (22.2)</td>
<td>125 (21.4)</td>
<td>20 (29.0)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Table continued on the next page*
<table>
<thead>
<tr>
<th>Place of residence</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>χ²</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Countryside</td>
<td>110</td>
<td>99</td>
<td>11</td>
<td>7.004</td>
<td>4</td>
<td>0.136</td>
</tr>
<tr>
<td>Small town</td>
<td>118</td>
<td>107</td>
<td>11</td>
<td>4.004</td>
<td>4</td>
<td>0.136</td>
</tr>
<tr>
<td>Medium-size town</td>
<td>85</td>
<td>77</td>
<td>8</td>
<td>7.004</td>
<td>4</td>
<td>0.136</td>
</tr>
<tr>
<td>Big city</td>
<td>339</td>
<td>300</td>
<td>39</td>
<td>7.004</td>
<td>4</td>
<td>0.136</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Occupation</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>χ²</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student</td>
<td>494</td>
<td>472</td>
<td>20</td>
<td>132.221</td>
<td>3</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Employed</td>
<td>110</td>
<td>86</td>
<td>24</td>
<td>0.824</td>
<td>1</td>
<td>0.376</td>
</tr>
<tr>
<td>Unemployed</td>
<td>22</td>
<td>17</td>
<td>5</td>
<td>7.004</td>
<td>4</td>
<td>0.136</td>
</tr>
<tr>
<td>Pensioner</td>
<td>26</td>
<td>8</td>
<td>18</td>
<td>7.004</td>
<td>4</td>
<td>0.136</td>
</tr>
<tr>
<td>Current psychiatric</td>
<td>100</td>
<td>33</td>
<td>69</td>
<td>411.305</td>
<td>1</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>treatment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Past psychiatric</td>
<td>160</td>
<td>140</td>
<td>20</td>
<td>0.824</td>
<td>1</td>
<td>0.376</td>
</tr>
<tr>
<td>treatment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: own study.

N – number of subjects; M – arithmetic mean; SD – standard deviation; χ² – value of Pearson’s χ² test; Z – value of Mann-Whitney U test; df – degrees of freedom; p – level of significance.

**Tools**

To prepare the Polish version of the PQ-B, the authors of the original tool were contacted by e-mail in May 2017, and subsequently provided their permission to start the adaptation procedure as well as necessary materials. Firstly, the English version of the tool was translated into Polish by a certified English translator with a master’s degree in psychology, then the Polish translation was back-translated into English by a second independent English translator. Thus obtained English-language back translation was forwarded to the PQ-B authors in order to verify the content compatibility of both versions in June 2017. After all recommended adjustments were made, Polish translation of the PQ-B was finally accepted and administered in the pilot study (Annex 1).

In order to verify the validity of the scale, we used Polish versions of the following questionnaires:

1) The Oxford-Liverpool Inventory of Feelings and Experiences (O-LIFE) – a 104-item inventory of schizotypal traits, designed to assess cognitive, emotional and behavioral components of schizotypy in healthy individuals [7].

2) The Hypomania Checklist (HCL-33) – a list of behaviors indicating the occurrence of periodic increase in activity and affect, and additional items concerning various aspects of subjective assessment of one’s mood [8].

3) The Satisfaction with Life Scale (SWLS) – a 5-item scale assessing the overall level of satisfaction with one’s life [30].
4) The Test for Creative Thinking – Drawing Production (TCT-DP) – consists in completing a drawing using the elements printed on a sheet of paper, and allows to calculate the overall score and assess 14 content-related creativity criteria of the produced drawing [31].

5) A self-designed survey gathering basic sociodemographic data, information on mental health and psychoactive substance use.

Statistical analysis was carried out with the IBM SPSS Statistics v. 25 package using methods such as principal component factor analysis, Cronbach’s alpha, the Mann-Whitney U test and pairwise correlation with Spearman’s rho coefficient. Statistical significance was set at $p < 0.05$, and $p < 0.1$ was interpreted as a statistical trend.

**Results**

Principal component factor analysis confirmed a one-factor structure of the PQ-B. The sampling adequacy (Kaiser–Meyer–Olkin measure – KMO) of both the frequency scale (KMO = 0.887; $X^2(210) = 2,968.095; p < 0.001$) and the distress scale (KMO = 0.889; $X^2(210) = 3,548.915; p < 0.001$) were found to be suitable for each analysis. Both scales had very satisfactory reliability ($\alpha > 0.85$). Table 2 contains detailed information on each scale’s reliability, change of reliability after removal of individual items and factor loadings of individual items in a one-factor solution.

**Table 2. Reliability and factor structure of both PQ-B(PL) scales**

<table>
<thead>
<tr>
<th></th>
<th>Frequency scale $\alpha = 0.857$</th>
<th>Distress scale $\alpha = 0.873$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Alpha after item removal</td>
<td>Factor loading</td>
</tr>
<tr>
<td>Do familiar surroundings sometimes</td>
<td>0.849 0.556 0.865 0.597</td>
<td></td>
</tr>
<tr>
<td>seem strange, confusing, threatening or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>unreal to you?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have you heard unusual sounds like</td>
<td>0.850 0.546 0.867 0.542</td>
<td></td>
</tr>
<tr>
<td>banging, clicking, hissing, clapping</td>
<td></td>
<td></td>
</tr>
<tr>
<td>or ringing in your ears?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do things that you see appear</td>
<td>0.856 0.334 0.873 0.338</td>
<td></td>
</tr>
<tr>
<td>different from the way they usually do</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(brighter or duller, larger or smaller,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>or changed in some other way)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have you had experiences with</td>
<td>0.852 0.473 0.869 0.485</td>
<td></td>
</tr>
<tr>
<td>telepathy, psychic forces, or fortune</td>
<td></td>
<td></td>
</tr>
<tr>
<td>telling?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have you felt that you are not in</td>
<td>0.849 0.569 0.866 0.582</td>
<td></td>
</tr>
<tr>
<td>control of your own ideas or thoughts?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*table continued on the next page*
<table>
<thead>
<tr>
<th>Question</th>
<th>Correlation 1</th>
<th>Correlation 2</th>
<th>Correlation 3</th>
<th>Correlation 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you have difficulty getting your point across, because you ramble or</td>
<td>0.850</td>
<td>0.536</td>
<td>0.865</td>
<td>0.605</td>
</tr>
<tr>
<td>go off the track a lot when you talk?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you have strong feelings or beliefs about being unusually gifted or</td>
<td>0.855</td>
<td>0.380</td>
<td>0.871</td>
<td>0.406</td>
</tr>
<tr>
<td>talented in some way?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you feel that other people are watching you or talking about you?</td>
<td>0.847</td>
<td>0.593</td>
<td>0.864</td>
<td>0.631</td>
</tr>
<tr>
<td>Do you sometimes get strange feelings on or just beneath your skin, like</td>
<td>0.855</td>
<td>0.386</td>
<td>0.870</td>
<td>0.455</td>
</tr>
<tr>
<td>bugs crawling?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you sometimes feel suddenly distracted by distant sounds that you are</td>
<td>0.849</td>
<td>0.564</td>
<td>0.867</td>
<td>0.554</td>
</tr>
<tr>
<td>not normally aware of?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have you had the sense that some person or force is around you, although</td>
<td>0.848</td>
<td>0.596</td>
<td>0.867</td>
<td>0.565</td>
</tr>
<tr>
<td>you couldn't see anyone?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you worry at times that something may be wrong with your mind?</td>
<td>0.848</td>
<td>0.589</td>
<td>0.865</td>
<td>0.608</td>
</tr>
<tr>
<td>Have you ever felt that you don't exist, the world does not exist, or</td>
<td>0.853</td>
<td>0.469</td>
<td>0.870</td>
<td>0.487</td>
</tr>
<tr>
<td>that you are dead?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have you been confused at times whether something you experienced was</td>
<td>0.848</td>
<td>0.611</td>
<td>0.864</td>
<td>0.627</td>
</tr>
<tr>
<td>real or imaginary?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you hold beliefs that other people would find unusual or bizarre?</td>
<td>0.849</td>
<td>0.556</td>
<td>0.867</td>
<td>0.564</td>
</tr>
<tr>
<td>Do you feel that parts of your body have changed in some way, or that</td>
<td>0.856</td>
<td>0.340</td>
<td>0.871</td>
<td>0.423</td>
</tr>
<tr>
<td>parts of your body are working differently?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are your thoughts sometimes so strong that you can almost hear them?</td>
<td>0.852</td>
<td>0.484</td>
<td>0.868</td>
<td>0.548</td>
</tr>
<tr>
<td>Do you find yourself feeling mistrustful or suspicious of other people?</td>
<td>0.849</td>
<td>0.571</td>
<td>0.865</td>
<td>0.603</td>
</tr>
<tr>
<td>Have you seen unusual things like flashes, flames, blinding light, or</td>
<td>0.854</td>
<td>0.426</td>
<td>0.871</td>
<td>0.424</td>
</tr>
<tr>
<td>geometric figures?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have you seen things that other people can't see or don't seem to see?</td>
<td>0.852</td>
<td>0.520</td>
<td>0.868</td>
<td>0.544</td>
</tr>
<tr>
<td>Do people sometimes find it hard to understand what you are saying?</td>
<td>0.850</td>
<td>0.527</td>
<td>0.866</td>
<td>0.575</td>
</tr>
</tbody>
</table>

Source: own study.
None of the items significantly reduced the initial reliability of the scales, which allowed to preserve the original composition of the PQ-B, considering the tool to be satisfactorily reliable ($\alpha > 0.8$).

The participants of the study reported from 0 to 20 out of the 21 possible PQ-B symptoms ($M = 4.34$; $SD = 4.18$), scoring from 0 to 85 points on the distress scale ($M = 12.56$; $SD = 14.23$). Although the maximum scores were higher in the healthy subjects, the patients achieved higher mean scores, thus manifesting a higher frequency of PLEs (mean 6.17 points compared to 4.13 points in healthy persons) and greater discomfort level (mean 22.26 points compared to 11.42 points in healthy persons).

Table 3 contains information concerning all observed links between PLEs and other psychological features, thinking paradigms and quality of life measures.

### Table 3. Correlations between PLEs and other psychological features

<table>
<thead>
<tr>
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<th>1</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1. PQ-B frequency</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. PQ-B distress level</td>
<td>0.905***</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. O-LIFE: Unusual experiences</td>
<td>0.746***</td>
<td>0.704***</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>4. O-LIFE: Cognitive disorganization</td>
<td>0.640***</td>
<td>0.708***</td>
<td>0.565***</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. O-LIFE Anhedonia, introversion</td>
<td>0.224</td>
<td>0.296’</td>
<td>-0.048</td>
<td>0.192</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. O-LIFE impulsive nonconformity</td>
<td>0.307*</td>
<td>0.231</td>
<td>0.419***</td>
<td>0.068</td>
<td>0.045</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. HCL – Hypomania</td>
<td>-0.035</td>
<td>-0.012</td>
<td>0.014</td>
<td>-0.059</td>
<td>0.060</td>
<td>0.319’</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>8. SWLS – Quality of life</td>
<td>-0.101</td>
<td>-0.159</td>
<td>0.054</td>
<td>-0.181</td>
<td>-0.343**</td>
<td>-0.102</td>
<td>-0.286’</td>
<td>-</td>
</tr>
<tr>
<td>9. TCT–DP – Creative thinking</td>
<td>0.040</td>
<td>0.060</td>
<td>0.131</td>
<td>-0.118</td>
<td>-0.370**</td>
<td>0.147</td>
<td>0.048</td>
<td>0.048</td>
</tr>
</tbody>
</table>

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Source: own study.

PLEs were especially strongly associated with two factors of schizotypy – unusual perceptual experiences and cognitive disorganization. Anhedonia and introversion were weakly associated with the distress score, and also, on a trend-level, with the frequency scale ($\rho = 0.224$; $p = 0.094$). In turn, there were weak associations between impulsive non-conformism and PLE frequency, and some trend-level associations with the severity of experienced discomfort ($\rho = 0.231$, $p = 0.081$). Although there were no correlations between the PQ-B and HCL scores, several dependencies were identified with additional questions included in the HCL, including those concerning subjective mood stability – i.e., students reporting frequent mood swings scored significantly higher on both PQ-B scales ($Z = 2.138$; $p = 0.033$).
The frequency of PLEs was also linked with worse assessment of one’s own mood ($\rho = -0.604$, $p < 0.001$).

Regarding thinking paradigms, no relationships were found between PQ-B scores and the overall creativity scores, except for a weak association between the frequency of PLEs and unconventionality ($\rho = 0.256$; $p = 0.030$). This means that persons reporting more PLEs manifested a greater originality of thinking.

PLE symptoms were more frequent in females, who reported an average of 1 more symptom ($Z = 2.148$; $p = 0.032$) and > 6 points more on the distress scale ($Z = 3.791$; $p < 0.001$), compared to males. The frequency of PLEs slightly decreased with age ($\rho = -0.220$; $p = 0.002$), and the distress level slightly increased with increasing level of education ($\rho = 0.150$; $p = 0.015$). There were no associations between the two PQ-B scales and the tendency to use nicotine, alcohol or drugs.

**Discussion**

All conducted analyses suggest that the PQ-B shows satisfactory psychometric properties also in studies on the Polish population. It enables quick assessment of frequency of PLEs and resulting distress, distinguishing subjects with satisfactory reliability and validity. The experiences measured with the PQ-B(PL), much like most psychological characteristics, extend along the health-and-disease continuum, which means that the socially acceptable severity of symptoms otherwise considered typical of mental disorders can occur in the general population without causing a clinically significant risk of health deterioration.

Psychometric properties of the Polish language version of the PQ-B are quite consistent with those of its other language versions. Similarly to American, European and Asian studies, the PQ-B(PL) maintains a single factor structure, achieves very satisfactory reliability ($\alpha > 0.8$) and convergent theoretical validity, remaining correlated with other factors from the border of health and mental illness.

In view of the observed prevalence of mental disorders, it has become crucial to identify their prodromal symptoms and develop tools that enable their objective assessment. Although a fully reliable diagnosis can be made only by a trained psychiatrist in the course of an examination and a face-to-face interview with the patient, short self-report tools can be used as screening tests, enabling preliminary detection of risk groups. One of the factors hindering effective treatment is the fact that patients seek professional assistance too late, when symptoms of psychosis have already led to significant deterioration of their personal, professional or social functioning. Developing methods for early detection of developing disorders may increase the chance of reducing the incidence of serious mental illnesses, especially schizophrenia.

In their lighter, non-worrying forms, PLEs appear also in the general population, as manifestations of non-adaptive personality traits or temperamental or socialization differences in the area of conformity, openness to experience, need for stimulation, novelty seeking, etc. Their common biological basis can be considered to be dopa-
minergic activity, associated with pathogenesis of psychotic disorders [32, 33], high trait psychoticism and schizotypy [34, 35], as well as cognitive changes, resulting in greater creativity and unconventional thinking [36, 37].

In accordance with the observations of other authors, this study results suggest that a certain frequency of PLEs may be acceptable in the general population. The differences between healthy and mentally ill individuals indicate that patients do experience a greater severity of PLEs, but what is noteworthy, the difference in the mere number of PLEs was small (on average, compared to healthy controls, patients experienced only 2 more symptoms), while the difference in the mean distress was twice as high in patient population. In addition, it turns out that non-anxiety-related psychotic-like symptoms may also occur in the course of neurodegenerative diseases [38] or congenital anatomical defects, e.g., agenesis of the corpus callosum [39], whereas the actual onset of a full-blown psychosis is usually associated with increased anxiety [40]. These conclusions support the hypothesis of the significant role of PLE-induced distress in clinical assessment, thus emphasizing validity of considering symptom-related discomfort alongside symptom severity and frequency.

Quick assessment of PLE manifestations in the general population may prove very useful in psychiatric prevention. The fact that after 7 years of research on the PQ-B, its authors have decided to alter the previously accepted diagnostic criteria (increase the cut-off points), indicates that non-clinical symptoms of PLEs might appear in the general population at a higher frequency than initially expected.

Conclusions

1. The PQ-B(PL) can be used as an assessment tool measuring the severity of psychotic-like experiences in the general population, as well as a screening test for detecting prodromal states of psychosis.
2. Quantitative statistical analyses confirmed a one-factor structure of the tool, its satisfactory reliability and theoretical validity.
3. Psychotic-like experiences are most strongly associated with the symptoms of schizotypy, and to a lesser extent also with the deterioration of mood and unconventional thinking.
4. The PQ-B questionnaire is an assessment tool which can find its use in everyday clinical practice, filling the existing gap among screening tests for psychotic-like experiences extending along the health and disease continuum.

References


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Annex 1

PQ-B (PL) Starkowska A., Kucharska-Mazur J., Mak M., Samochowiec J. PUM¹
w Szczecinie 2019

Proszę wskazać, czy w ciągu ostatniego miesiąca doświadczył/a Pan/i następujących myśli, uczuć i zdarzeń, zaznaczając „tak” lub „nie” przy każdej pozycji kwestionariusza. Proszę nie uwzględniać doświadczeń, które mają miejsce tylko wtedy, gdy znajduje się Pan/i pod wpływem alkoholu, narkotyków lub leków, które nie zostały Panu/i przepisane przez lekarza. Jeśli odpowie Pan/i „tak” na którekolwiek z pytań, proszę wskazać, jak bardzo dokuczliwe było/jest dla Pana/i opisywane doświadczenie.

Płeć:  ☐ Kobieta  ☐ Mężczyzna
Data urodzenia: ………………………… Data badania: ……………………………

1. Czy znajome otoczenie czasami wydaje się Panu/i dziwne, niezrozumiałe, groźne lub nierealne?
   ☐ TAK  ☐ NIE
   Jeśli TAK: Kiedy tak się dzieje, czuję się przestraszony/a, zaniepokojony/a, lub powoduje to, że mam problemy:
   ☐ Zdecydowanie się nie zgadzam  ☐ nie zgadzam się  ☐ nie mam zdania
   zgadzam się  ☐ zdecydowanie się zgadzam

2. Czy zdarzyło się Panu/i słyszeć nietypowe dźwięki jak piski, trzaski, szumy, klaskanie lub dzwonienie w uszach?
   ☐ TAK  ☐ NIE
   Jeśli TAK: Kiedy tak się dzieje, czuję się przestraszony/a, zaniepokojony/a, lub powoduje to, że mam problemy:
   ☐ Zdecydowanie się nie zgadzam  ☐ nie zgadzam się  ☐ nie mam zdania
   zgadzam się  ☐ zdecydowanie się zgadzam

3. Czy przedmioty, które Pan/i widzi wydają się inne niż zazwyczaj (jaśniejsze lub ciemniejsze, większe lub mniejsze, albo odmienne w jakiś inny sposób)?
   ☐ TAK  ☐ NIE
   Jeśli TAK: Kiedy tak się dzieje, czuję się przestraszony/a, zaniepokojony/a, lub powoduje to, że mam problemy:
   ☐ Zdecydowanie się nie zgadzam  ☐ nie zgadzam się  ☐ nie mam zdania
   zgadzam się  ☐ zdecydowanie się zgadzam

4. Czy miał/a Pan/i doświadczenia związane z telepatią, działaniem innych sił psychicznych lub przepowiadaniem przyszłości?
   ☐ TAK  ☐ NIE

¹ Department and Chair of Psychiatry, Pomeranian Medical University in Szczecin, Broniewskiego Street 26
Contact: a.starkowska.pum@gmail.com
Jeśli TAK: Kiedy tak się dzieje, czuję się przestraszony/a, zaniepokojony/a, lub powoduje to, że mam problemy:

☐ Zdecydowanie się nie zgadzam  ☐ nie zgadzam się  ☐ nie mam zdania
☐ zgadzam się  ☐ zdecydowanie się zgadzam

5. Czy zdarzyło się Panu/i mieć poczucie utraty kontroli nad własnymi myślami?
☐ TAK  ☐ NIE
Jeśli TAK: Kiedy tak się dzieje, czuję się przestraszony/a, zaniepokojony/a, lub powoduje to, że mam problemy:

☐ Zdecydowanie się nie zgadzam  ☐ nie zgadzam się  ☐ nie mam zdania
☐ zgadzam się  ☐ zdecydowanie się zgadzam

6. Czy miewa Pan/i trudności z porozumiewaniem się, bo podczas rozmowy często zdarza się Panu/i mówić chaotycznie lub zbaczać z tematu?
☐ TAK  ☐ NIE
Jeśli TAK: Kiedy tak się dzieje, czuję się przestraszony/a, zaniepokojony/a, lub powoduje to, że mam problemy:

☐ Zdecydowanie się nie zgadzam  ☐ nie zgadzam się  ☐ nie mam zdania
☐ zgadzam się  ☐ zdecydowanie się zgadzam

7. Czy ma Pan/i silne przekonanie, że posiada Pan/i jakieś niezwykłe umiejętności czy talenty?
☐ TAK  ☐ NIE
Jeśli TAK: Kiedy tak się dzieje, czuję się przestraszony/a, zaniepokojony/a, lub powoduje to, że mam problemy:

☐ Zdecydowanie się nie zgadzam  ☐ nie zgadzam się  ☐ nie mam zdania
☐ zgadzam się  ☐ zdecydowanie się zgadzam

8. Czy czuje Pan/i, że inni ludzie obserwują lub rozmawiają o Panu/i?
☐ TAK  ☐ NIE
Jeśli TAK: Kiedy tak się dzieje, czuję się przestraszony/a, zaniepokojony/a, lub powoduje to, że mam problemy:

☐ Zdecydowanie się nie zgadzam  ☐ nie zgadzam się  ☐ nie mam zdania
☐ zgadzam się  ☐ zdecydowanie się zgadzam

9. Czy czasami miewa Pan/i dziwne doznania na skórze lub tuż pod nią, np. pełzających robaków?
☐ TAK  ☐ NIE
Jeśli TAK: Kiedy tak się dzieje, czuję się przestraszony/a, zaniepokojony/a, lub powoduje to, że mam problemy:

☐ Zdecydowanie się nie zgadzam  ☐ nie zgadzam się  ☐ nie mam zdania
☐ zgadzam się  ☐ zdecydowanie się zgadzam

10. Czy czasami zdarza się, że rozpraszają Pana/ią dźwięki z oddali, na które zazwyczaj nie zwraca Pan/i uwagi?
☐ TAK  ☐ NIE
Jeśli TAK: Kiedy tak się dzieje, czuję się przestraszony/a, zaniepokojony/a, lub powoduje to, że mam problemy:
☐ Zdecydowanie się nie zgadzam ☐ nie zgadzam się ☐ nie mam zdania
☐ zgadzam się ☐ zdecydowanie się zgadzam

11. Czy miewał/a Pan/i poczucie obecności jakiejś osoby lub siły, chociaż dookoła nie było nikogo widać?
☐ TAK ☐ NIE

Jeśli TAK: Kiedy tak się dzieje, czuję się przestraszony/a, zaniepokojony/a, lub powoduje to, że mam problemy:
☐ Zdecydowanie się nie zgadzam ☐ nie zgadzam się ☐ nie mam zdania
☐ zgadzam się ☐ zdecydowanie się zgadzam

12. Czy zdarza się Panu/i martwić, że coś może być nie tak z Pana/i umysłem?
☐ TAK ☐ NIE

Jeśli TAK: Kiedy tak się dzieje, czuję się przestraszony/a, zaniepokojony/a, lub powoduje to, że mam problemy:
☐ Zdecydowanie się nie zgadzam ☐ nie zgadzam się ☐ nie mam zdania
☐ zgadzam się ☐ zdecydowanie się zgadzam

13. Czy miał/a Pan/i poczucie, że Pan/i nie istnieje, świat nie istnieje, albo że jest Pan/i martwy/a?
☐ TAK ☐ NIE

Jeśli TAK: Kiedy tak się dzieje, czuję się przestraszony/a, zaniepokojony/a, lub powoduje to, że mam problemy:
☐ Zdecydowanie się nie zgadzam ☐ nie zgadzam się ☐ nie mam zdania
☐ zgadzam się ☐ zdecydowanie się zgadzam

14. Czy czuł/a się Pan/i zdezorientowany/a, czy coś, czego Pan/i doświadczył/a jest prawdziwe czy urojone?
☐ TAK ☐ NIE

Jeśli TAK: Kiedy tak się dzieje, czuję się przestraszony/a, zaniepokojony/a, lub powoduje, że mam problemy:
☐ Zdecydowanie się nie zgadzam ☐ nie zgadzam się ☐ nie mam zdania
☐ zgadzam się ☐ zdecydowanie się zgadzam

15. Czy posiada Pan/i przekonania, które inni ludzie uznają za niezwykłe lub dziwaczne?
☐ TAK ☐ NIE

Jeśli TAK: Kiedy tak się dzieje, czuję się przestraszony/a, zaniepokojony/a, lub powoduje, że mam problemy:
☐ Zdecydowanie się nie zgadzam ☐ nie zgadzam się ☐ nie mam zdania
☐ zgadzam się ☐ zdecydowanie się zgadzam

16. Czy ma Pan/i poczucie, że części Pana/i ciała w jakiś sposób się zmieniły, lub inaczej pracują?
☐ TAK ☐ NIE
Jeśli TAK: Kiedy tak się dzieje, czuję się przestraszony/a, zaniepokojony/a, lub powoduje to, że mam problemy:

☐ Zdecydowanie się nie zgadzam  ☐ nie zgadzam się  ☐ nie mam zdania
☐ zgadzam się  ☐ zdecydowanie się zgadzam

17. Czy Pana/i myśli są czasami tak silne, że prawie można je usłyszeć?
☐ TAK  ☐ NIE

Jeśli TAK: Kiedy tak się dzieje, czuję się przestraszony/a, zaniepokojony/a, lub powoduje to, że mam problemy:

☐ Zdecydowanie się nie zgadzam  ☐ nie zgadzam się  ☐ nie mam zdania
☐ zgadzam się  ☐ zdecydowanie się zgadzam

18. Czy czuje się Pan/i nieufny/a i podejrzliwy/a wobec innych ludzi?
☐ TAK  ☐ NIE

Jeśli TAK: Kiedy tak się dzieje, czuję się przestraszony/a, zaniepokojony/a, lub powoduje to, że mam problemy:

☐ Zdecydowanie się nie zgadzam  ☐ nie zgadzam się  ☐ nie mam zdania
☐ zgadzam się  ☐ zdecydowanie się zgadzam

19. Czy zdarzyło się Panu/i widzieć nietypowe rzeczy jak błyski, płomienie, oślepiające światło lub figury geometryczne?
☐ TAK  ☐ NIE

Jeśli TAK: Kiedy tak się dzieje, czuję się przestraszony/a, zaniepokojony/a, lub powoduje to, że mam problemy:

☐ Zdecydowanie się nie zgadzam  ☐ nie zgadzam się  ☐ nie mam zdania
☐ zgadzam się  ☐ zdecydowanie się zgadzam

20. Czy zdarzyło się Panu/i widzieć rzeczy, których inne osoby nie widzą lub zdają się nie widzieć?
☐ TAK  ☐ NIE

Jeśli TAK: Kiedy tak się dzieje, czuję się przestraszony/a, zaniepokojony/a, lub powoduje to, że mam problemy:

☐ Zdecydowanie się nie zgadzam  ☐ nie zgadzam się  ☐ nie mam zdania
☐ zgadzam się  ☐ zdecydowanie się zgadzam

21. Czy innym ludziom czasami trudno zrozumieć, co Pan/i mówi?
☐ TAK  ☐ NIE

Jeśli TAK: Kiedy tak się dzieje, czuję się przestraszony/a, zaniepokojony/a, lub powoduje to, że mam problemy:

☐ Zdecydowanie się nie zgadzam  ☐ nie zgadzam się  ☐ nie mam zdania
☐ zgadzam się  ☐ zdecydowanie się zgadzam