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Original article

Dimensional and discrete variations on the psychosis continuum in a Dutch crowd-sourcing population sample

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ABSTRACT

Background: Mild psychotic experiences are common in the general population. Although transient and benign in most cases, these experiences are predictive of later mental health problems for a significant minority. The goal of the present study was to perform examinations of the dimensional and discrete variations in individuals' reporting of subclinical positive and negative psychotic experiences in a unique Dutch internet-based sample from the general population.
Methods: Positive and negative subclinical psychotic experiences were measured with the Community Assessment of Psychic Experiences in 2870 individuals. First, the prevalence of these experiences and their associations with demographics, affect, psychopathology and quality of life were investigated. Next, latent class analysis was used to identify data-driven subgroups with different symptom patterns, which were subsequently compared on aforementioned variables.
Results: Subclinical psychotic experiences were commonly reported. Both positive and negative psychotic experiences were associated with younger age, more negative affect, anxiety and depression as well as less positive affect and poorer quality of life. Seven latent classes ('Low psychotic experiences', 'Lethargic', 'Blunted', 'Distressed', 'Paranormal', 'Distressed/grandiose' and 'Distressed/positive psychosis') were identified that demonstrated both dimensional differences in the number/severity of psychotic experiences and discrete differences in the patterns of reported experiences.
Conclusion: Subclinical psychotic experiences show both dimensional severity variations and discrete symptom-pattern variations across individuals. To understand and capture all interindividual variations in subclinical psychotic experiences, their number, nature and context (co-occurrence patterns) should be considered at the same time. Only some psychotic experiences may lay on a true psychopathological psychosis continuum.

1. Introduction

Like many other psychopathology domains [1–4], psychosis is currently conceptualized as a continuum with psychotic disorders located at the extreme end [5]. The full (or 'extended' [6]) psychosis continuum is hypothesized to range from a vulnerability for psychosis at the level of the general population through subclinical psychotic experiences and schizotypy, to full-blown clinical disorders [7,8]. As such, psychotic experiences are more prevalent than psychotic disorders [9]. Recent reviews estimated the prevalence of psychotic experiences at 5–6% for adults [7,10] but estimates have varied [11].

Subclinical psychotic experiences form a paradox [12,13]. On the one hand, psychotic experiences are relatively prevalent in the general population, with the majority of experiences being transient [8,9,14,15]. Even most individuals at clinical high risk (CHR) for psychosis do not develop a clinical psychotic disorder [16–23]. On the other hand, psychotic experiences are associated with a large number of concurrent mental health problems such as distress [9,12,24,25], comorbid psychopathology [12,26–29] and suicidal ideation [30,31]. Also, psychotic experiences have been shown to be predictive of later psychotic [15,32–35] and nonpsychotic [18,36,37] mental disorders in a minority of individuals who endorse such experiences. Even in individuals at CHR who do not develop a psychotic disorder, psychotic

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experiences are associated with other mental health problems (e.g. nonpsychotic disorders) or poorer psychosocial functioning [19,21,22,35]. As such, psychotic experiences may reflect an "index of psychopathological severity" [28], especially when they are present in the context of other psychopathological domains such as depression [28,38]. A challenge for both researchers and clinicians is to adequately distinguish those with benign experiences from those with more pathological psychotic experiences [39].

One possible explanation for above described paradox may be that most research on psychotic experiences has focused almost exclusively on positive psychotic experiences (e.g. hallucinations) [14]. However, these types of experiences represent only one domain of the multidimensional psychosis construct, which also encompasses negative (e.g. anhedonia, apathy) and affective (depression and mania) symptoms [40]. Importantly, in keeping with the continuous view of psychosis, the same multidimensional structure has been shown to underlie psychotic experiences in clinical, non-clinical (e.g. schizotypy [41,42]) and general population samples [43–45]. Although positive symptoms have been shown to be associated with poor clinical outcome, negative symptoms have been shown to be more strongly associated with poor psychosocial outcome [46–48]. Therefore, it is important to consider both positive and negative symptoms when examining their structure and associative patterns with persons' characteristics and/or outcomes [39]. Another possible explanation for the dual nature of psychotic experiences may be that they form a heterogeneous concept. Not all experiences may be pathological in nature [49,50]; they may have different etiological pathways or have different courses/outcomes. Especially in the general population, the group of individuals endorsing psychotic experiences may in fact consist of several distinct subgroups with different patterns of reported experiences and associated clinical characteristics and only some of these subgroups may lay on a psychopathological continuum with later mental health problems.

To improve our ability to detect individuals who are at increased risk for poor clinical and/or functional outcomes and may benefit from early interventions, it is vital to gain a better understanding of why subclinical psychotic experiences predict later problems in some individuals and are relatively benign and transitory in others [39,51]. To accomplish this, the heterogeneity of psychotic experiences should be further unraveled, considering both dimensional severity variations and discrete variations in reported patterns of experiences [10,38,52]. Therefore this study aimed to investigate both the dimensional and discrete variations among individuals reporting subclinical psychotic experiences in a general population sample, which was recruited through a unique internet-based crowdsourcing project in the Netherlands. First, the prevalence of positive and negative psychotic experiences and their associations with sociodemographic risk factors and psychopathology measures were investigated. Next, data-driven subgroups were identified and compared in terms of dimensional severity and discrete patterns of reported experiences.

2. Methods

2.1. Sample

The data were collected through a large-scale crowdsourcing project in the Netherlands (www.HoeGekIs.nl), which aimed to collect self-reported information about mental health in the general population through an internet platform [53]. The project's specific aims were to:

- investigate the continuity of mental health dimensions in the Dutch population;
- to gain more insight into the interactions between mental strengths on the one hand and vulnerabilities/problems on the other hand.

Registration and participation took place through the project website (launched December 13th 2013). Prior to their decision to participate, participants were informed that their data was to be stored, anonymized and used for scientific research. The project was announced on local/national radio broadcasts, television, during local podium discussion, in newspapers/magazines and through social media. Once registered, participants could complete a range of questionnaire modules (e.g. living situation, affect/mood, well-being, personality) that could be completed one at a time. Only participants older than 18 that consented to the use of their data for research were included in the study. The study protocol was reviewed and exempted by the Medical Ethical Committee of the UMCG, because it concerned a nonrandomized open study targeted at anonymous volunteers in the general public.

At the first data extraction (December 13th 2014), 12,503 individuals (65.2% female; mean age = 45.0; SD = 15.0) had completed at least one questionnaire module. Participants were more often female and slightly older than Dutch census data (50.5% female; 39 years).

2.2. Instruments

2.2.1. Psychotic experiences

Lifetime subclinical psychotic experiences were assessed with the 20-item 'positive psychotic experiences' and 11-item 'negative psychotic experiences' subscales of the Community Assessment of Psychic Experiences (CAPE) [45]. Each item assesses the frequency and secondary distress on a 4-point scale. Only frequency items were used.

2.2.2. Other measures

The Depression Anxiety Stress Scales (DASS) [54] was used to measure past-week depression, anxiety and stress (14 items per scale). The Positive and Negative Affect Schedule (PANAS) [55] was used to assess past-week positive affect (PA) and negative affect (NA). Quality of life (QOL) was assessed with the 16-item Manchester Short Assessment of Quality of Life (MANSA) [56]. Urbanicity was quantified by linking the first four postal code numbers to population density data from Statistics Netherlands. The resulting measure ranged from 1 (urban) to 6 (rural), reflecting the mean population density in the surrounding 500 meters.

2.3. Statistical analyses

The distributions of the CAPE frequency items were tabulated and investigated. Univariate linear regression analyses were done with either the positive or negative psychotic experiences scale as outcome and either age, gender, education, partner-status, employment, PA, NA, depression, anxiety, stress or QOL as determinant. Multivariate regression analyses were run for each outcome with all determinants in one model. Because the positive psychotic experiences score was not normally distributed, it was log-transformed prior to analysis. To examine the associations of psychotic experiences with QOL, univariate linear regression analyses were done with QOL as outcome and either the positive or negative psychotic experience score as predictor. A multivariate analysis was run next with both scales included as determinants. Latent class analyses (LCA) using robust maximum likelihood estimation, were conducted to investigate population heterogeneity in reported patterns of psychotic experiences. For the LCAs,

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