Psychiatry Research 243 (2016) 246–254

Contents lists available at ScienceDirect

Psychiatry Research

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

Classifying risk status of non-clinical adolescents using psychometric indicators for psychosis spectrum disorders

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ARTICLE INFO

Article history:
Received 29 September 2015
Received in revised form
18 May 2016
Accepted 26 June 2016
Available online 29 June 2016

Keywords:
Prodromal symptoms
Early detection
Schizotypal
Social/interpersonal pleasure
Anhedonia
Latent class

ABSTRACT

This study is an attempt to evaluate extant psychometric indicators using latent profile analysis for classifying community-derived individuals based on a set of clinical, behavioural, and personality traits considered risk markers for psychosis spectrum disorders. The present investigation included four hundred and forty-nine high-school students between the ages of 12 and 19. We used the following to assess risk: the Prodromal Questionnaire-Brief (PQ-B), Oviedo Schizotypy Assessment Questionnaire (ESQUIZO-Q), Anticipatory and Consummatory Interpersonal Pleasure Scale-Adolescent version (ACIPS-A), and General Health Questionnaire 12 (GHQ-12). Using Latent profile analysis six latent classes (LC) were identified: participants in class 1 (LC1) displayed little or no symptoms and accounted for 38.53% of the sample; class 2 (LC2), who accounted for 28.06%, also produced low mean scores across most measures though they expressed somewhat higher levels of subjective distress; LC3, a positive schizotypy group (10.24%); LC4 (13.36%), a psychosis high-risk group; LC5, a high positive and negative schizotypy group (4.45%); and LC6, a very high distress, severe clinical high-risk group, comprised 5.34% of the sample. The current research indicates that different latent classes of early individuals at risk can be empirically defined in adolescent community samples using psychometric indicators for psychosis spectrum disorders. These findings may have implications for early detection and prevention strategies in psychosis spectrum disorders.

1. Introduction

High-risk studies provide a framework for identifying risk factors and establishing the predictive validity of schizophrenia and psychosis indicators (Cornblatt, 2002). For example, genetic high-risk studies indicate that family history, attentional deviance, cognitive impairments, thought disorder, and social deficits are risk factors for schizophrenia-related psychoses (Cornblatt et al., 1999; Parnas, 1999; Erlenmeyer-Kimling et al., 2000; Tarbox and Pogue-Geile, 2008; Gooding et al., 2013). Psychometric high-risk studies suggest that schizotypal traits (e.g., perceptual aberrations and magical ideations) are risk factors for psychotic disorders in general (Chapman et al., 1994), whereas social anhedonia, the diminished ability to experience pleasure in the interpersonal domain, is associated with heightened risk for the development of schizophrenia-spectrum disorders (Kwapil, 1998; Gooding et al., 2005, 2007). These genetic and psychometric high-risk studies have, in turn, informed and inspired the next generation of studies, namely, the clinical high-risk (CHR) studies aimed at the early identification of early and late (prodromal) risk factors.

Given that not all individuals who are at heightened risk for the later development of schizophrenia and psychosis manifest disorder, the need for early and reliable clinical indicators becomes more pressing. Individuals who develop psychosis and psychosis-spectrum disorders are often preceded by a period of variable duration, during which there is a marked decline in functioning. Individuals experiencing these often nonspecific symptoms are said to be undergoing a "prodromal state"; perhaps more accurate terms for "prodromal status" are "ultra high risk", "clinical high

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http://dx.doi.org/10.1016/j.psychres.2016.06.049
0165-1781/

risk", or "at risk mental state", because in medical nomenclature, prodromal implies that conversion to disorder is imminent (e.g., Fusar-Poli et al., 2014).

Prodromal symptoms and clinical indicators, whether identified via the basic symptom approach (Ruhrmann et al., 2010) or through application of ultra-high-risk (UHR) criteria (Miller et al., 2003; Yung et al., 2005), typically include psychotic-like experiences, attenuated positive symptoms, attenuated negative symptoms, intermittent psychotic symptoms, and functional decline in combination with genetic risk indicators. Moreover, CHR are also a key factor in terms of the prediction of clinical psychosis, and have been related to nonpsychotic psychopathology, social impairments, neurocognitive performance impairments, and/or structural and neurochemical alterations (Yung and McGorry, 1996; Cornblatt et al., 2003; Fusar-Poli et al., 2012, 2013, 2014, 2015; Carríon et al., 2013). Consistent with the developmental psychopathology construct of equifinality, the etiological pathways towards schizophrenia-related psychoses and/or psychosis spectrum disorders are heterogeneous (Gooding and Iacono, 1995). Indeed, investigators such as Cornblatt et al. (2003) have identified several distinct risk groups who display different clusters of deficits associated with adverse psychiatric outcomes, including a CHR group without attenuated psychotic symptoms.

The typical onset of prodromal symptoms is during adolescence, a period associated with considerable neuroplasticity as well as considerable affective and social development (Casey et al., 2008). Moreover, adolescence is a developmental period associated with heightened risk for the onset of psychosis-spectrum disorders (Harrop and Trower, 2003; Schimmelman and Schultze-Lutter, 2012). The prodromal period has been regarded by many to be a targeted window of opportunity in terms of timely prophylactic intervention (Lieberman et al., 2001). Indeed, halting or delaying the progression of psychosis during adolescence may be critical in terms of better patient outcomes (Strobl et al., 2012). Reliable identification of classes or subtypes of individuals at risk for psychosis spectrum disorder, particularly during the time of greatest risk of onset, may help elucidate possible risks and protective factors.

There have been several attempts to identify risk factors and indicators for psychosis and psychosis-spectrum disorders, especially schizophrenia-spectrum disorders. Prior research has supported the predictive value of schizotypal measures (Chapman et al., 1994; Miettunen et al., 2011; Salokangas et al., 2013), prodromal states (Cornblatt et al., 2003; Nelson et al., 2011; Addington and Heinssen, 2012), and anhedonia, especially social anhedonia (Kwapil, 1998; Davidson et al., l999; Gooding et al., 2005, 2007; Miettunen et al., 2011). Despite extensive study of these risk factors, predictors, and precursors associated with psychosis and psychosis spectrum disorders, few studies have attempted to empirically identify latent profiles using a combination of psychometric risk indicators on general community samples.

A relatively new measurement approach, namely, latent profile analysis (LPA; Muthén and Muthén, 1998–2012), is a form of latent class analysis (McCutcheon, 1987) that tests for the existence of discrete groups with similar profiles using continuous indicators (Hori et al., 2014). A few earlier studies (Cella et al., 2013; Geng et al., 2013; Tabak and Weisman de Mamani, 2013; Hori et al., 2014) utilized LPA in order to identify patterns of subclinical psychotic experiences in nonclinical samples. However, with the exception of Cella et al. (2013), the investigations focused on adult samples. While Geng et al. (2013) and Tabak and Weisman de Mamani (2013) relied upon undergraduate samples using the SPQ (Raine, 1991) and O-LIFE (Mason et al., 1995), respectively, Hori et al. (2014) studied adults with a mean age of 48 years using the SPQ.

Using a large sample (N=1023) of adolescents, Cella et al. (2013) assessed subjective schizotypal traits as well as psychological distress. They found a three-class solution, including a low schizotypy class, an unusual subjective experiences class, and a 'true schizotypy' class. However, one possible limitation of the Cella et al. (2013) investigation is that they did not also examine the co-occurrence of attenuated positive symptoms, using measures of self-reported CHR symptoms or screens of psychosis-risk. It is noteworthy that the mean age of the Cella et al. (2013) sample was 17.3 ($\pm$ 1.3 years), yet the primary measure used in the research was the short form of the O-LIFE (Mason et al., 2005), which was not developed specifically for use with an adolescent population.

Relatively little is known regarding the frequencies of these symptoms and indicators in the general adolescent population (Schimmelmann et al., 2011). To date, most of the studies of CHR symptoms and clinical indicators of incipient psychosis have been based upon studies of clinic-referred, help-seeking individuals. The eventual goal is to develop applicable psychosis risk screening measures for use in general population samples. The aim of the present study is to evaluate extant psychometric indicators using LPA as a relatively novel framework for classifying community-derived adolescents in terms of the presence of risk indicators for psychosis-spectrum disorders. We sought to combine the strengths of two approaches, namely, the traditions of the psychometric high-risk approach (e.g., schizotypy) and the clinical early intervention approach (e.g., self-reported CHR symptoms), using measures developed specifically for use with adolescent samples. Based upon findings from both lines of research, we hypothesized the following:1) Using LPA, we would be able to empirically identify different psychometric profiles; 2) the profiles would be differentially characterized by variations in terms of self-reported CHR symptoms and/or psychotic-like experiences, trait schizotypy, and subjective mental distress; and 3) using the psychometric profiles based upon LPA, we would be able to define distinct homogenous classes of individuals who varied in terms of levels of putative risk of developing psychosis spectrum disorders.

2. Method

2.1. Participants

In order to obtain a representative community sample, we recruited participants from different cities and different types of secondary schools (e.g., public, funded, and private) belonging to Principality of Asturias, a region located in the north of Spain. Both rural and urban areas were represented, as well as a range of socioeconomic levels. Some of the institutions were technical/vocational (n=4), whereas some were preparatory (secondary or higher) schools from rural areas (n=3), and three were preparatory schools located in urban areas.

The initial sample included 518 students. We omitted participants whose age was outside the range (i.e., younger than 13 or older than 19 years-old (n=16); and/or whose total score on the Infrequency scale was higher than 3 (n=43). The sample consisted of 449 students, including 251 males (55.9%). The age of the participants ranged from 13 to 19 years-old (M=15.14 years; SD=1.47). The age distribution of the sample was as follows: 13 years (n=7; 1.6%), 14 years (n=196; 43.7%), 15 years (n=110; 24.5%), 16 years (n=69; 15.4%), 17 years (n=23; 5.1%), 18 years (n=17; 3.8%), and 19 years (n=27; 6.0%).

2.2. Instruments

The choice of particular measures to include in our assessment reflect our simultaneous goals of wanting to combine a psychometric and CHR approach, as well as utilize measures that were