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Prevalence and dimensionality of hallucination-like experiences in young adults

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Abstract

Background: The study of hallucination-like experiences (HLEs) in non-clinical populations is increasingly used to corroborate etiological models of psychosis. This method capitalizes on the absence of confounding factors that typically affect the study of hallucinations in clinical subjects.
Aim: To estimate the prevalence of HLEs in young adults; validate the mutidimensionality and explore the correlates of latent HLEs clusters.
Methods: Cross-sectional survey design. The extended 16-item Launay–Slade Hallucination Scale (LSHS-E) and the 12-item General Health Questionnaire (GHQ-12) were administered to 649 Italian college students (males: 47%). Confirmatory factorial analysis was used to test multidimensionality of the LSHS-E. Hierarchical nested, progressively constrained models were used to assess configural, metric and scalar invariance of the LSHS-E. Latent class analysis was used to test the existence of different profiles of responding across the identified hallucination-proneness dimensions.
Results: Factor analysis showed that the four-factor model had the best fit. Factors were invariant across demographic variables and levels of psychological distress. Three latent classes were found: a large class with no HLEs (70% of participants), a multisensory HLEs class (18.8%), and a high hallucination-proneness class (11%). Among those reporting high levels of HLEs, approximately half reported scores indicative of considerable psychological distress.
Conclusions: Although HLEs have a relatively high prevalence in the general population, the majority of those experiences happen in isolation and are not associated to psychological distress. Approximately half of those individuals experiencing high levels of HLEs report significant psychological distress. This may be indicative of general risk for mental health conditions rather than specific risk for psychosis.

1. Introduction

Hallucinations are considered a hallmark symptom of psychosis; however, a significant minority of healthy individuals from the general population experience them in the absence of clear indicators of psychopathology [1,2]. The investigation of hallucination-like experiences (HLEs) in non-clinical populations is increasingly used as a method to corroborate etiological models of hallucinations [3–7].

HLEs have been conceptualized as a continuum of experience underlying a latent vulnerability to experiencing hallucinations, from vivid daydreams, intrusive and vivid thoughts to the occasional experience of sounds with no clearly identifiable source, and even the brief experience of voices [8,9]. This continuum of experience is expected to be related to a continuum of risk, with some people unlikely to ever note the occurrence of sporadic HLEs in their life and other reporting them with greater and greater frequency, until the occurrence of more severe forms of auditory hallucinations [10–14]. The investigation of HLEs in non-clinical individuals can be useful to detect subthreshold hallucinations at their onset and to evaluate their correlates in the absence of confounding factors typically affecting the study of

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hallucinations in individuals with a psychiatric diagnosis, such as medications, self-selection, co-morbid disorders [15], the role of stigma [16].

Undergraduate college students are the ideal candidates to investigate HLEs since they were found to be more forthcoming in providing answers to socially undesirable topics [17], and because they are less likely to misunderstand the items of self-report tools and interviews [18,19]. Students are also generally in an age range when the risk of developing psychosis is the highest. Lastly students are widely used for this type of research and results are easy to compare with the existing literature.

Past investigations of HLEs in non-clinical individuals focused on auditory HLEs, and verbal auditory HLEs in particular [2,20]. The study of the multidimensionality of HLEs may provide better knowledge on the etiology of these experiences. For example, the psychometric characterization of clusters of individuals with homogeneous set of HLEs may prompt more detailed investigation in these groups and help characterizing specific pathways accounting for transition to psychosis. Different HLEs clusters may also bear a different association with well-being. Groups with different levels of distress but similar level of HLEs can be useful to study the role of coping strategies, predisposition and appraisal in dealing with the emergence of HLEs. To be valid for such a comparison, a questionnaire should measure identical constructs with the same structure across different groups. The assessment of measurement invariance by confirmatory factor analysis (CFA) serves the purpose of demonstrating that the participants, across groups of interest (e.g., gender, age), interpret the single items, as well the underlying latent factor, in the same way. Conversely, failure to prove measurement invariance indicates that groups or individuals interpret the items differently, and as a consequence factor means cannot be compared [21,22].

This study aims to: 1) assess the prevalence of HLEs in a representative sample of undergraduate college students; 2) explore the dimensionality of HLEs using two data reduction methods: CFA to consolidate dimensions observed in previous studies and, for the first time, Latent Class Analysis (LCA) to explore latent constructs distribution; 3) examine the relationship of these dimensions with wellbeing.

2. Methods

This study is part of the **Ca**gliari — **P**sychosis: **I**nvestigation on **R**isk **E**mergence (CAPIRE, which means "to understand" in Italian), a study of screening tools to assess and diagnose mental states at risk of psychosis; the study is focused on university undergraduate students. The institutional review board approved the study protocol in accordance with the guidelines of the 1995 Declaration of Helsinki (as revised in Tokyo in 2004). All participants provided informed consent; participation was voluntary and no fee or other compensation was paid for participation.

2.1. Participants

Participants were recruited within the CAPIRE study. This study targets university undergraduates attending courses at the University of Cagliari. Participants were enrolled using a snowball procedure [23], with a method that avoids self-selection, the bias occurring when recruiters only use their personal social networks [24].

Overall, 962 people were been asked to take part in the study; 120 declined after having had a look at the booklet; 842 people accepted to participate; 153 did not return the booklet, and 689 participants actually returned the booklet; 40 cases were not considered because their questionnaires were left blank in some parts; 649 participants were included in this study (67% overall participation rate).

2.2. Measures

All participants provided written informed consent and received a booklet containing several questionnaires. For the purpose of this study, the following questionnaires were considered: the Italian version of the 12-item General Health Questionnaire (GHQ-12) [25,26], as a measure of general psychological distress, and the Italian version of the extended, 16-item Launay–Slade Hallucination Scale (LSHS-E) [8,9,27,28].

The GHQ-12 is a screening questionnaire aiming to identify people suffering from psychological distress and compromised wellbeing [25]. Respondents have to rate the presence and frequency of each symptom on a 4-point scale (i.e. "not at all", "less than usual", "more than usual", "rather more than usual") within the past four weeks [25,26]. For the purpose of this study, a dichotomous scoring system was used, attributing one point to each item with a "more than usual" or "rather more than usual" response. Previous research using this scoring method showed that a total score of 4 or more is likely to be associated with a common mental disorder [26].

The LSHS-E is a self-report scale investigating the multidimensionality of hallucinatory experiences in the general population and taps into all major sensory modalities beyond the auditory modality, such as the visual, olfactory, and tactile modalities, and it is particularly apt to investigate the multidimensionality of HLEs (Table 1).

The original version of the LSHS [27] had dichotomous items (i.e., "true/false"), but it was modified to account for different intensities replacing the binary choice with a five-point Likert scale [29]. A further, revised version of the scale was created (LSHS-R) including items tapping on visual hallucinations [8,28]. The LSHS-E includes items tapping into all major sensory modalities. On the LSHS-E respondents have to rate each item on a five-point scale: (0) "certainly does not apply to me"; (1) "possibly does not apply to me"; (2) "unsure"; (3) "possibly applies to me"; and (4) "certainly applies to me" [8,28]. The considered time interval covers the latest 5 years. Depending on the response format and the number of items included in the scale,