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# Sociodemographic and clinical correlates of psychotic symptoms in the general population: Findings from the MHGP survey

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ABSTRACT

*Background:* We aimed to explore the sociodemographic and psychiatric correlates of psychotic symptoms in a large general population sample.
*Methods:* The French Mental Health in the General Population cross-sectional survey interviewed 38,694 individuals using the Mini International Neuropsychiatric Interview. We looked for associations between the presence of lifetime psychotic symptoms, sociodemographic characteristics (including migrant status over three generations) and clinical characteristics. We then looked for associations regarding only hallucinations, delusional symptoms, and the co-occurrence of both hallucinations and delusional symptoms. To test the psychosis continuum hypothesis, associations with sociodemographic characteristics were compared with the characterized psychotic disorders' associations.
*Results:* We found that 22.3% of the population declared psychotic symptoms without psychotic disorders, including 5.7% who declared hallucinations, 20.5% delusional symptoms, 4.0% both hallucinations and delusional symptoms, and 2.8% characterized psychotic disorders. The presence of psychotic symptoms was associated with young age, migrant status (over three generations), secondary education level, low-income level and never-married and separated marital status. Hallucinations, delusional symptoms and the co-occurrence of both hallucinations and delusional symptoms showed the same correlates, and hallucinations were also associated with elementary education level. Characterized psychotic disorders showed the same correlates. Concerning clinical outcomes, the presence of psychotic symptoms, hallucinations and delusional symptoms was associated with all non-psychotic disorders, i.e., bipolar, depressive, alcohol use, generalized anxiety, social phobia, panic and post-traumatic stress disorders and dysthymia (except dysthymia, which was not associated with hallucinations).
*Conclusions:* Our results indicate that psychotic symptoms are associated with broad psychopathologies and support the continuum model of psychosis.



## 1. Introduction

Epidemiological research on psychotic symptoms, including delusions and hallucinations, in nonclinical populations has grown in recent years. In fact, psychotic symptoms are much more common than characterized psychotic disorders in the general population, suggesting the

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existence of a symptomatic continuum ranging from the general healthy population to individuals with characterized psychotic disorders (Szöke et al., 2014; van Os et al., 2000, 2001). A meta-analysis estimated the prevalence rate of psychotic symptoms in the general adult population to be 7.2% (Linscott and van Os, 2013).

In this context, the study of psychotic symptoms in the general population, particularly their sociodemographic correlates, is a key issue. Indeed, such a study could help determine the etiology and different courses of psychosis phenomena. Because these symptoms constitute early indicators of increased risk for psychosis, the study of the sociodemographic correlates of psychotic symptoms could enhance the performance of psychosis prediction models (Kaymaz et al., 2012; Kirkbride et al., 2013). Moreover, such studies could allow for testing of the validity of the continuum model of psychosis. According to this model, attenuated psychosis, such as psychotic symptoms, should show the same correlates as characterized psychotic disorders (Linscott and van Os, 2013). In a meta-analysis, Linscott and van Os (2013) addressed this issue by examining the relationship between the presence of psychotic symptoms and key risk factors for characterized psychotic disorders, including sociodemographic characteristics. The authors found significant associations with ethnicity, low income and not being married. Based on these findings, the authors concluded that such symptoms lie on a continuum of risk with characterized psychotic disorders (Linscott and van Os, 2013).

Recently, additional evidence has suggested that psychotic symptoms in nonclinical populations are also associated with other psychiatric disorders, e.g., anxiety, depressive or substance use disorders (DeVylder et al., 2014b; Kaymaz et al., 2012; McGrath et al., 2016; Saha et al., 2011). Thus, psychotic symptoms may reflect vulnerability to a wide range of adverse mental health outcomes. Moreover, among psychotic symptoms in the general population, the co-occurrence of both hallucinations and delusional symptoms is associated with poorer clinical outcomes (e.g., worse general functioning, higher probability of transition to psychotic disorders) and could be associated with higher comorbidity rates (Krabbendam et al., 2004; Smeets et al., 2012; Nuevo et al., 2013). To our knowledge, except for those of depression (Nuevo et al., 2013), the clinical correlates of the co-occurrence of both hallucinations and delusional symptoms have never been studied.

In the present study, our aim was to explore the sociodemographic and clinical correlates of lifetime psychotic symptoms in a very large sample of the French general population. The studied socio-demographic variables were migrant status (first, second or third generation), gender, income, education, and marital status. To our knowledge, the prevalence of non-clinical psychotic symptoms in second- and third-generation migrants has never been studied. Moreover, to test the psychotic continuum hypothesis, the sociodemographic correlates of psychotic symptoms were compared with those of characterized psychotic disorders. Finally, we explored the association between the presence of psychotic symptoms and several clinical characteristics, particularly bipolar, depressive, dysthymia, alcohol use, generalized anxiety, social phobia, panic and post-traumatic stress disorders.

## 2. Methods

### 2.1. Mental Health in the General Population (MHGP) survey

The cross-sectional MHGP survey conducted by the World Health Organization Collaborating Center interviewed 38,694 subjects in France between 1999 and 2003. Subjects were selected from 47 sites (900 subjects per site) using a quota-sampling method (Lunsford and Lunsford, 1995). This method provides a sample of subjects with a sociodemographic profile similar to that of the general population profile with respect to age, sex, educational level, and occupational category according to census figures from 1999 provided by the French National Institute for Statistics and Economic Studies. Subjects were included in the study if they met the following criteria: 1) provided informed consent to participate in the survey, 2) spoke French, 3) were aged 18 years or older, and 4) were neither institutionalized nor homeless. Legal authorization was obtained by the "Commission Nationale Informatique et Liberté" and the "Comité consultatif sur le traitement de l'information en matière de recherche" (No. 98.126).

### 2.2. Assessment of psychiatric symptoms

For each subject, the *Mini International Neuropsychiatric Interview* (MINI, French version 5.0.0), a standardized psychiatric interview, was used to screen for 10th International Classification of Diseases (ICD-10)-defined psychiatric disorders in the general population. The MINI has been validated in the general population. Compared with the *Composite International Diagnostic Interview* (CIDI), the MINI has good to very good kappa values. For current and lifetime psychotic symptoms, kappa, sensitivity, specificity and positive predictive values are above 0.76 and 0.82, 0.87 and 0.87, 0.94 and 0.95, and 0.75 and 0.87, respectively (Lecrubier et al., 1997). All MHGP interviewers (nurses and psychologists) were trained to administer the MINI using video recordings of interviews over a 3-day session provided by WHO-CC experts.

Concerning psychotic disorders, the MINI includes 1) five items that assess the lifetime occurrence of delusional symptoms: delusions of persecution, thought broadcasting, delusions of control, delusions of reference, and other delusional ideas (e.g., somatic delusions or delusions of grandiosity); and 2) two items that assess the lifetime occurrence of visual and auditory hallucinations. Any psychotic symptom was defined as at least one positive item among the seven items. Delusional symptoms and hallucinations were defined by the presence of at least one positive response among the five and two specific items, respectively. The co-occurrence of both hallucinations and delusional symptoms was defined by the presence of at least one delusional symptom and one hallucinatory symptom. Characterized psychotic disorders diagnoses were confirmed by a senior psychiatrist.

The following psychiatric disorders were also assessed using the MINI: bipolar disorder (BD, *F30* and *F31*), unipolar depressive disorder (UDD, current and recurrent, *F32* and *F33*), current dysthymia (*F34.1*), one-year alcohol use disorders (AUD, i.e., dependence *F10.1* and abuse *F10.2*) and current anxiety disorders (panic disorder with or without agoraphobia (*F41.0* and *F40.01*), social phobia (*F40.1*), generalized anxiety disorder (*F41.1*), and post-traumatic stress disorder (PTSD, *F43.1*)). For additional details regarding these diagnoses, see specific publications based on the MHGP data (Amad et al., 2013; Caria et al., 2010; Grolleau et al., 2008; Leray et al., 2011; Pignon et al., 2017; Rolland et al., 2017).

### 2.3. Migrant status

In light of the literature on migrant populations (Bourque et al., 2011; Cantor-Graae and Selten, 2005; Scott et al., 2006), the designation of migrant status was based on the country of birth of the subject, the subject's parents, and the subject's grandparents. We defined a first-generation migrant (1GM) as a subject born outside of metropolitan France, a second-generation migrant (2GM) as a subject with at least one parent born outside of metropolitan France, and a third-generation migrant (3GM) as a subject with at least one grandparent born outside of metropolitan France. This information was obtained from answers to the following 3 questions: "Where were you born?", "Where were your parents born?" and "Where were your grandparents born?" As in the literature on migrant populations (Bourque et al., 2012; Veling et al., 2011), subjects (or children or grandchild of subjects) born in French Overseas Departments and Territories (i.e., outside metropolitan France) were also considered migrants. Migrant generations were considered mutually exclusive (e.g., a subject born outside of metropolitan France, even with parents also born outside, was considered a first-generation migrant).

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