

Psychotic Symptoms as a Continuum Between Normality and Pathology

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This paper reviews the presence of psychotic features in the nonclinical population. The results of a literature review suggest that delusional and hallucinatory experiences are more common in the general population than we may think, and that there could well be a symptomatic continuum between people who have and people who have not been diagnosed with indisputable psychotic disorders. In the nonclinical population, voices are mainly positive and nonthreatening. Conversely, in the psychiatric population, they tend to be frequent, intrusive, and distressing. We address the question of voices considered as various human experiences and describe the emergence of the nonclinical group of people who hear voices. We also review the pathophysiology of auditory hallucinations as an illustration of a neurophysiological anomaly, which is useful to understand psychosis or schizophrenia. The main obstacle in the category-specific thought is that it remains impossible to unmistakably demarcate the border around schizophrenia. It is evident that the creation of a boundary is always possible by using arbitrary criteria that improve interrater reliability but exclude a considerable number of people who share multiple common features with diagnosed people.

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Highlights

- Psychotic symptoms can be considered as a dimension of general human experience.
- Psychosis can be understood as one of many dimensions of schizophrenia.
- Knowledge of a person's social, cultural, and developmental context is fundamental when evaluating psychotic symptoms.

Key Words: *psychotic symptoms, dimensions of mental disorders, continuum between pathology and normality, schizophrenia, normality*

It is possible that clinical phenomena associated with mental illness lie on a continuum with normality. Along these lines, several recent reports have studied the prevalence of hallucinations and other psychotic symptoms in the general population. A recent meta-analysis of risk factors to develop subclinical psychotic symptoms shows associations with male sex, migrant status, living in urban centres, developmental stage, psychoactive drug use, and child and adult social adversity,¹ all of which are risk factors for schizophrenia as well. This study also revealed that about 75% to 90% of psychotic experiences are transitory and disappear over time. The transient developmental expression of psychosis (psychosis proneness) may persist and become clinically relevant

(impairment). This process depends on the degree of environmental risk to which the person is eventually exposed.

Continuum Between Normality and Pathological

The lifetime prevalence of schizophrenia is known to be about 1%.² The diagnosis requires the presence of symptomatic criteria, such as the presence of psychotic symptoms such as hallucinations or delusions, associated with functional impairment.³ While psychotic symptoms are the hallmark of schizophrenia, many recent studies have reported that large proportions of nonclinical populations experience such symptoms at some point in their lives. In fact, it has been

reported that percentages varying between 30% and 70% of college student populations answered that they have heard voices at least once in their lives. Moreover, studies attempting to estimate the prevalence of hallucinations in the general adult population have revealed percentages between 10% and 25%,⁴ while more than 1 out of 4 people responded positively to at least one question exploring psychotic symptoms.⁵

Thus, as these studies were carried out with self-report questionnaires, certain questions could have been misunderstood by subjects who are not trained in clinical psychiatry, leading to artificially high scores. And in fact, many symptoms reported with a self-report questionnaire are not retained in the wake of a structured interview conducted by a psychiatrist. Nevertheless, Van Os⁶ found comparable patterns of association between sociodemographic risk factors and psychotic symptoms identified with self-report questionnaires, whether or not these symptoms were retained after psychiatric interview.

Similarly, it has been found that adolescents in the general population present higher scores than adults on Chapman's positive scales,⁷ matching the finding that in diagnosed psychotic patients, the risk of hallucinations increases following puberty and peaks in young adulthood, before decreasing again in older patients. Verdoux et al⁸ used Peters Delusional Inventory and found a similar negative correlation between age and the expression of positive symptoms in the general population: the scores for most of the items explored (megalomania, formal thought disorder, and belief in the paranormal) decreased with age; the only exception was religiosity, which increased with time.

Thus these results appear to indicate that young subjects are more likely to present unusual or strange ideas, whether they are considered to be clinically diagnosed with schizophrenia or not. As for sex, women in the general population usually obtain higher scores than men for the positive symptoms measuring schizotypal personality, whereas men score higher for negative symptoms. Again, this is close to what is found in schizophrenia patients, where negative symptoms are usually more severe in men.

Abbreviations used in this article

ACC	anterior cingulate cortex
AVH	auditory verbal hallucination
BOLD	blood oxygen level-dependent
DSM	Diagnostic and Statistical Manual of Mental Disorders
fMRI	functional magnetic resonance imaging
PFC	prefrontal cortex
rTMS	repeated transcranial magnetic stimulation

In general, these considerations regarding age and sex support the hypothesis of a continuum, that is, that the differences between without disease and disease, as for psychotic symptoms, are not all-or-none distinctions, but rather more-or-less shadings, with threshold effects: a threshold of perceptible eccentricity, but without any diagnosed disability, for the DSM-IV Cluster A personality types, and a threshold of obvious functional disability for schizophrenia.

Are Psychotic Symptoms Frequent in the General Population?

Familial epidemiologic studies have shown that personality disorders are more frequent in the relatives of schizophrenia patients (need a reference here).² These types of personalities are grouped into the DSM-IV's Cluster A, which includes schizotypal, schizoid, and paranoid personality disorders. However, these personality disorders are not classified on Axis I, and the main difference between Cluster A personality disorders and schizophrenia is related to functional performance, which is better preserved in personality disorders than in schizophrenia.³

When one considers subjects whose manifest symptoms are not sufficiently severe to lead to a categorical diagnosis of schizophrenia or of personality disorder, psychotic experiences are not exceptional in the general population. In a large sample of more than 7000 men and women aged 18 to 64 years who belonged to the general population, Van Os⁶ showed that 4.2% of these people had experienced hallucinatory or delusional symptoms attested to by a psychiatrist and 17.5% of the sample had reported at least one experience evoking the concept of psychosis, whereas only 2% of these 1237 people had been given a categorical diagnosis of nonaffective psychosis.

In summary, these results suggest that the most broadly defined phenotype of psychosis (with a prevalence of 17.5%) is about 50 times more common than the most narrowly defined phenotype of schizophrenia (with a prevalence of 0.4% to 0.7%).

In another study, Verdoux⁹ assessed patients who were consulting a general practitioner and administered a self-report questionnaire in the waiting room. According to the physician, only 1.2% had a definite diagnosis of psychosis. But among the other subjects, who did not officially have psychosis, 25% said that they were being persecuted in some way, 21% felt particularly close to God, 18% felt that people were looking at them strangely, and almost 5% had even heard hallucinatory voices talking to each other. These results are consistent with the principle that psychotic symptoms, notably hallucinations, are significantly more prevalent in the general adult population than psychotic disorders such as schizophrenia.

Table 1 Psychotic features in the nonclinical population

Study	Subject type (n)	Location	Psychopathology investigated	Variables	Deficit observed	Scale used	Research used	Comparison group
Schubert and McNeil ^{44,a}	Schizophrenia offspring (166)	Sweden	Psychosis	Mental disorder in adolescence Maternal affective disorder		SCID	Longitudinal	Women with no history of psychosis
Verdoux et al ⁴⁵	Female undergraduate (571)	France	Psychosis Cannabis use	Dimension of psychosis	Positive Negative Depressive	CAPE	Cross-sectional	n/a
van Os et al ⁴⁶	No psychiatric disorder (378)	France	Psychosis-like symptoms	Delusional ideation Hallucination experiences	Delusional ideation Hallucination experiences Grandiosity Paranormal beliefs Anxiety Depression	GHQ-12 PDI-21 BPRS	Survey	GHQ psychosis
Verdoux et al ⁴⁷	Undergraduate student (79)	France	Psychosis	Social company Daily life psychotic experiences	Unusual perception Dynamic change in the social company	MINI PDI-21 CAPE	Cohort	n/a
Larøi et al ⁴⁸	Normal subjects (65)	Belgium	Hallucination	Cognitive factors	Hallucination proneness was associated with meta-cognitive beliefs	Source monitoring task Questionnaire on meta-cognitive beliefs LSHS		
Larøi et al ⁴⁹	Young and elderly (526)	Belgium	Hallucination Delusion Personality	Suspiciousness Persecutory ideas Thought disturbance Jealousy Grandiose idea Paranormal beliefs Apocalyptic ideas Religious ideation Age	Openness Neuroticism Agreeability facets Delusional ideation	PDI-21 NEO-PI-R		

Table 1 continued

Study	Subject type (n)	Location	Psychopathology investigated	Variables	Deficit observed	Scale used	Research used	Comparison group
Scott et al ⁵⁰	General community (10 641)	Australia	Delusion	Sex Age Marital status Migrant status Urban or rural status Employment Education SES	Younger age, migration from non-English speaking background	CIDI	Survey	n/a
Jacobs et al ⁵¹	General population, twin pairs, female (289)	Belgium	Psychotic experience (positive and negative)	Genetic Environment Distress level	Liability to develop dysfunctional emotional appraisals	CAPE	Prospective survey	n/a
Niemi et al ^{52,a}	Offspring (179)	Finland	Negative Positive Catatonic Affective	Hallucination Delusion Positive thought disorder Catatonic behaviour Affective deterioration Negative thought disorder Depressive symptoms Manic symptoms Bizarreness of delusions Anhedonia-asociality Avolition-apathy Bizarre behaviour	High maternal positive symptoms predict decrease morbidity	MSSS SANS-items SAPS-items	Cohort	n/a

continued

Table 1 continued

Study	Subject type (n)	Location	Psychopathology investigated	Variables	Deficit observed	Scale used	Research used	Comparison group
Murray et al ⁵³	Adult population (387)	United Kingdom	Latent construct psychosis	Gender ratio Fertility Age of onset Self-harming behaviour Substance misuse Season of birth Depression Reality distortion Mania Disorganization Bipolar	Depression Reality distortion Mania Disorganization	OPCRIT	Cohort	
Maric et al ⁵⁴	General population (7075)	The Netherlands	Entire range of psychotic experience	Sex differences	Men associated with higher prevalence of negative symptoms Women associated with higher positive psychotic experiences	CIDI	Prospective	n/a
Hanssen et al ⁵⁵	General population (7075)	The Netherlands	Hallucination Delusion	Persecution Thought interference Auditory hallucination Passivity phenomena	Screening increases the risk of high risk for stigmatization	CIDI SCID GHQ-12 items	Cross-sectional	n/a
Allen et al ⁵⁶	Healthy volunteers (57)	United Kingdom	Hallucination-like experience Unusual beliefs	Hallucination proneness Delusional ideation		Source-monitoring task Speech appraisal task LSHS NART PDI-21		

Table 1 continued

Study	Subject type (n)	Location	Psychopathology investigated	Variables	Deficit observed	Scale used	Research used	Comparison group
Lataster et al ⁵⁷	General population, adolescents (1290)	The Netherlands	Delusional ideation Hallucinatory experiences	Unwanted sexual experiences Bullied	Nonclinical psychotic experiences strongly and independently associated with both bullying and sexual trauma	DISC-C	Cohort	n/a
Buist-Bouwman et al ⁵⁸	General population (21 000)	Belgium France Germany Italy The Netherlands Spain	Mental disorder	Anxiety disorders Mood disorders Alcohol disorders Physical disorders Functional disorders	Anxiety disorders Mood disorders Alcohol disorders	CIDI WHO DAS II	Cross-sectional	n/a
Konings et al ⁵⁹	General population (765)	United Kingdom	Positive Negative Depressive			CAPE42 SIS-R BPRS	Longitudinal cohort-validation study	n/a
Hanssen et al ⁶⁰	General population (257)	The Netherlands	Familial positive and negative domains of subclinical psychosis; Depressive and disorganisation	Scales and interview and familial clustering of dimensions of subclinical psychosis	Depressed mood Nervous exhaustion Anxiety	BPRS CAPE SIS-R	Cohort	n/a
Peters et al ⁶¹	Krishnas and druids (26)	United Kingdom	Delusional ideation		Disorganization Distress Conviction	PDI DSSI EPQ	Between-subject design	Nonreligious Christian Deluded psychotic inpatients

continued

Table 1 continued

Study	Subject type (n)	Location	Psychopathology investigated	Variables	Deficit observed	Scale used	Research used	Comparison group
Krabbendam et al ⁶²	Population sample (3929)	The Netherlands	Neuroticism Self-esteem	Hallucination Delusion Unusual thought content Anxiety Depression Conceptual disorganization	Neuroticism Self-esteem	CIDI GHQ BPRS RSES	Interviewed, prospective	n/a
Krabbendam et al ⁶³	General population (7072)	The Netherlands	Positive symptoms (hallucination, delusion)	Depression Mania	Depression Sleep problems Suicidal thoughts Mania Paranoid delusion Delusion Hallucination	CIDI	Survey	n/a

^a Positive family history of psychosis—ultra-high risk

BPRS = Brief Psychiatric Rating Scale; CAPE = Community Assessment of Psychic Experiences; CIDI = Composite International Diagnostic Interview; DISC-C = Diagnostic Interview Schedule for Children; DSSI = Delusions symptom-state inventory; EPQ = Eysenck Personality Questionnaire; GHQ-12 = General Health Questionnaire—12 items; LSHS = Launay-Slade Hallucinations Scale; MINI = Mini International Neuropsychiatric Interview; MSSS = Major Symptoms of Schizophrenia Scale; n/a = not applicable; NEO-PI-R = NEO Personality Inventory—Revised; OPCRIT = operational criteria; PDI-21 = Peters Delusional Inventory—21 items; RSES = Rosenberg Self-Esteem Scale; SANS = scale for assessment of negative symptoms; SAPS = scale for assessment of positive symptoms; SCID = Structural Clinical Interview for DSM; SES = socioeconomic status; SIS-R = Structured Interview for Schizotypy—Revised; WHO DAS II = World Health Organization Disability Assessment Scale

The high percentages of psychotic features found in the adult population have been found in pediatric populations as well. Thus, among people aged 7 to 8 years, in a nonclinical sample, 8.7% presented hallucinations¹⁰; while among those aged 11 to 12 years, it was 21%.¹¹ In another population aged younger than 12 years, 46% to 65%^{12,13} interacted with an “imaginary companion.” Interestingly, a study conducted on a birth cohort indicates that among children aged 11 years presenting weak and strong psychotic symptoms were both significantly more at risk of having a schizophreniform disorder at age 26 years.¹⁴ This points to continuity with normality, but also to risk for overt disorder.

One would expect subjects in the general population who have high scores on scales of vulnerability to psychosis should present a higher risk of eventually meeting criteria for schizophrenia, and that is actually what has been found. After 10 years, subjects who had high scores on scales of perceptual aberration or magical ideation presented more obvious psychiatric pathology than subjects with low scores: 0.5%, compared with 0.1%, of psychotic disorders; 7.8%, compared with 1.3%, of manic or hypomanic disorders; and 37.2%, compared with 1.3%, of major depressive episodes without psychotic characteristics.¹⁵

Compared with subjects with a low initial score for magical ideation, subjects with a high score have a considerably increased risk of later developing a psychotic condition, a major depressive episode, or a bipolar spectrum disorder.¹⁶

Are Voices a Symptom of Illness or a Variety of Human Experience?

Hearing voices is usually a disturbing experience, both for the person who hears voices and for their family and friends. Until recently, voices were usually considered as a symptom of a mental illness, and not talked about because they are regarded as socially stigmatizing. In the past, clinicians were taught not to engage people about the content of their voice experience as this was

Table 2 Area involved in auditory hallucinations

Area	Method	Population, <i>n</i>	Studies
ACC	SPET, PET, fMRI	SCZ (and HS hypnosis) 29 (8)	Ait Bentaleb et al, ³² McGuire et al, ⁶⁴ Silbersweig et al, ⁶⁵ Suzuki et al, ⁶⁶ and Szechtman et al ⁶⁷
Broca's area	fMRI	SCZ	Dierks et al ³⁵ and McGuire et al ⁶⁴
	SPET	15	
Superior temporal gyrus	SPET, fMRI, PET	SCZ (an elderly woman) 42 (1)	Kasai et al, ⁶⁸ Ait Bentaleb et al, ³² Dierks et al, ³⁵ Shergill et al, ³⁶ McGuire et al, ⁶⁴ Lennox et al, ⁶⁹ Mori et al, ⁷⁰ and Woodruff et al ⁷¹
Middle temporal gyrus	SPET, fMRI, PET	SCZ 31	Bentaleb et al, ²⁹ Shergill et al, ³⁶ McGuire et al, ⁶⁴ Mori et al, ⁷⁰ Woodruff et al, ⁷¹ and Lennox et al ⁷²
Primary auditory cortex	fMRI	SCZ 7	Bentaleb et al ²⁹ and Van de Ven et al ⁷³
Thalamus	PET	SCZ 11	Shergill et al ³⁶ and Silbersweig et al ⁶⁵

HS = healthy control subject; PET = positron emission tomography; SCZ = schizophrenia; SPET = single photon emission tomography

thought to be buying into the patients' delusions. Hearing voices is still considered by clinicians as auditory hallucinations that are a symptom of conditions such as schizophrenia, schizoaffective, and schizophreniform disorder, bipolar disorder with psychotic features and psychosis not otherwise specified. Similar to the surgeon who needs to remove an affected organ, the medical attitude is that patients should not be expected to deal with voices, and that the best way to help is to remove the hallucination. The usual treatment—typical and second-generation antipsychotic medication—is administered to reduce delusions and hallucinations. However, not everyone responds to this type of treatment.¹⁷

In addition, there are life experiences in which hearing voices is considered normal, such as bereavement.¹⁸ A survey of 293 widowed people was conducted in Wales. Rees¹⁸ found that 14% of those interviewed reported having had a visual hallucination of their deceased spouse and 13.3% experienced an auditory one. Interestingly, in light of the previous heading, 46.7% of the sample reported experiencing the presence of the deceased spouse. In another study, widowed residents of 2 nursing homes were interviewed to determine the extent to which they had hallucinatory experiences associated with their deceased spouse.¹⁹ Fifty-two interviews were completed with 46 widows and 6 widowers. Twenty-eight (61%) of the widows reported hallucinatory experiences of their deceased spouse. Twenty-four (86%) of the widows described the experiences as good or helpful. Thirteen (46%) reported that the experiences continue to happen. Nineteen (54%) of the widows had never discussed the experiences with anyone before this survey. In conclusion, research literature has delimited the occurrence of AVHs in the general population to such an extent that they cannot be considered

pathognomonic of a psychiatric illness. Certain hallucinatory experiences occur in health, such as hypnopompic or hypnagogic hallucinations.²⁰ In the nonclinical population, these are mainly positive and nonthreatening. In contrast, in the psychiatric population, these tend to be frequent, intrusive, and distressing.

The Emergence of a Nonclinical Group of People who Hear Voices

For several years, a social movement lobbying for hearing voices to be treated as a normal phenomenon has been growing. They claim that in our society more people hear voices and never seek psychiatric services than people who hear voices and become psychiatric patients (for a review and debate, see references^{21–28}).

Verbal Hallucinations as a Neurophysiological Anomaly

If we consider that AVHs are a core feature of the phenomenology of schizophrenia, the neurocognitive and neurophysiological bases of AVHs remain obscure. The current literature suggests that in addition to primary²⁹ and secondary sensory cortices, dysfunction in prefrontal, cingulate, subcortical, and cerebellar regions could also be involved in hallucinatory experiences.

For instance, it has been proposed that AVHs arise from the disordered monitoring manifested by patients' inability to recognize their inner speech as their own. On the neurophysiological level, the AVHs have been attributed to the aberrant activity in the primary auditory cortex (Heschl's gyrus). Based on the findings of 54 studies, Allen and colleagues³⁰ proposed a very stimulating neurocognitive model

in which both bottom-up and top-down processes interact to produce AVHs. Although interesting, this comprehensive model cannot account for the very specific and restricted content of AVHs in individual patients. The specific content of AVHs persists across different psychotic episodes even after extended periods of remission.

Further, the AVHs are usually triggered by emotionally charged and stressful situations. We hypothesized that even during the absence of AVHs, when patients are in remission, the verbal content remains present in the latent, preclinical form.³¹ The verbal content of auditory hallucinations may remain present at a subclinical level, even during periods of total remission from hallucinations. This is why we used a lexical decision task with 12 right-handed adult subjects evenly split between control subjects and patients in remission at the time of the study. Two lists of words (H and A) and 2 lists of nonwords (NH and NA) were used with each patient-control subject pair. The H list consisted of words from the verbal content hallucinated by a given patient during at least 2 psychotic episodes separated by at least 6 months' remission. The A list was made up of words matched with those in the H list on the basis of length, semantic content, affective valence, abstract-concrete dimension, and frequency of use. Patients were slower than the control subjects in recognizing all the words, regardless of the list to which the words belonged. More interestingly, the patients were significantly faster ($P = 0.001$) at recognizing the words from the H list (median 823 ms) than those from the A list (median 943 ms). Among the control subjects, no significant difference was noted (Figure 1).

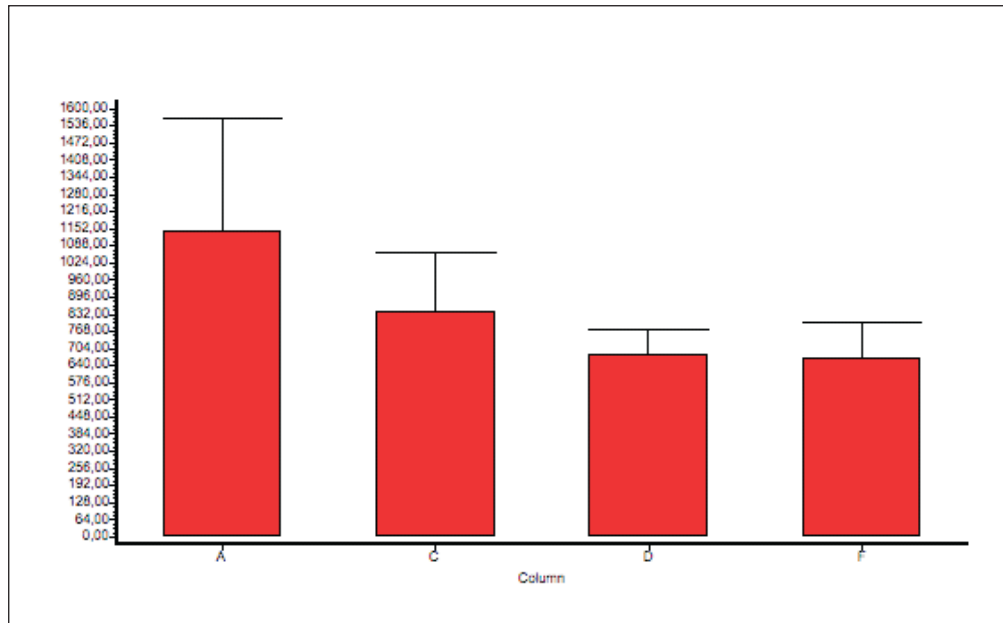
These results suggest that even during a period of total remission, the patients more rapidly recognize the words they heard when they were in a hallucinatory state than those which were never included in their hallucinations. The advent of brain imaging techniques allowed neuroscientists to explore mental processes occurring in people who experience hallucinations. To elucidate a potential cerebral substrate of dormant AVHs' content, we employed fMRI in 6 schizophrenia patients, who had been in total remission from AVHs for at least 12 months, while they listened to words they had heard while hallucinating in the past.³² We predicted that exposure to the hallucinated, compared with nonhallucinated, words would result in increased activation in cerebral areas associated with cognitive and emotional content of previously experienced AVHs in patients, whereas the same comparison will not produce any significant changes in BOLD signal in control participants. Each pair of participants was analyzed separately. The most consistent finding in patients, absent in all control subjects, was significant activation in the orbitofrontal and medial PFC during listening to previously hallucinated, compared with nonhallucinated, words. The orbitofrontal and

medial PFC are both part of the corticolimbic system and play an important role in cognitive control of emotion processing. Thus these results suggest that previously hallucinated words, even in remission, are associated with inappropriate emotional response on the neurophysiological level in schizophrenia patients. The relative hyperactivation of orbitofrontal and medial PFC in patients may stem from and (or) may contribute to anomalous neural plasticity and disordered connectivity in the corticolimbic circuitry. In turn, this could lead to attribution of excessive emotional salience to usually neutral stimuli, and, over time, via process of sensitization, could result in hallucinations.³³ Potential normalization of this dysfunction could reduce patients' susceptibility to experience AVHs in stressful situations. In addition to the observed hyperactivations in the PFC, some schizophrenia patients exhibited anomalous BOLD signal in other regions of the corticolimbic system such as ACC gyrus and parahippocampal gyrus. These additional anomalies could be related to greater affective sensitivity to the hallucinated, compared with nonhallucinated, words in some patients. A more recent trial compared brain activation in patients with schizophrenia with persistent hallucinations to that in control subjects in an auditory emotional paradigm based on the most frequent words heard by patients with auditory hallucinations.³⁴ Stronger activation in the frontal lobe, temporal cortex, insula, cingulate, and amygdala were observed in patients, compared with control subjects, when hearing emotional words.³⁵⁻³⁷ Additional activations in regions responsible for the processing of emotion (for example, the amygdala-hippocampus complex and insula) were also reported. According to Kircher et al,³⁸ activation in these regions may be associated with the anxiety typically experienced when hearing voices. Research into hallucinations involves the use of rTMS. We have performed a quantitative review,³⁹ which shows efficacy of rTMS as an intervention that selectively alters neurobiological factors underlying AVH, specifically if the temporal cortex is stimulated.

Mystical Context

Beauregard and Paquette conducted an interesting fMRI study to identify the brain activations of a mystical experience.⁴⁰ The brain activity was assessed in a group of Carmelite nuns recruited in Montreal while they were subjectively in a state of union with God. Their results suggest that mystical experiences are mediated by several brain regions and systems. The ecstatic state was related to significant loci of activation in the right medial orbitofrontal cortex, right middle temporal cortex, right inferior and superior parietal lobules, right caudate, left medial PFC, left ACC, left inferior parietal lobule, left insula, left caudate, and left brainstem. Some authors hypothesize a similarity between religious mystical experiences and the effects of D-lysergic

Figure 1 Lexical decision task with hallucinated words in patients and control subjects (mean and standard deviation)



Legend: Reaction time (ms) to recognize a word from a nonword in a lexical decision task. Specifically, we created the list of previously hallucinated words: list of words presented to patients: A (neutral list: matched hallucinated words in terms of length, structure, emotional valence, semantic category, and frequency of usage) and C (hallucinated words). The same list of words was presented to control subjects: list D and F. All patients had a history of auditory hallucinations with at least 2 acute psychotic episodes of schizophrenia during which they presented the same verbal hallucinatory content. Moreover, at the time of the study, at least 6 months had gone by without any hallucinations.

diethylamide (also known as LSD).^{41,42} The emergence of hyper-perception, a powerful sense of noesis, elation, feelings of communion with the divine, may be common to schizophrenia and mystical experiences. The ease with which phenomenological components of the mystical experience can be induced in possession cults or in experimental situations “suggests that the capacity for such an altered state experience may be latently present in many people.”⁴²

At an earlier period of human history, the subjective experience of hearing voices was less likely to be perceived as pathological and is still accepted in some cultural contexts as a spiritual experience. Judaism, Christianity, and Islam have often seen auditory hallucinations as instructional: hearing voices and acting upon their commands has sometimes been considered divine.⁴³ However, in religions such as Buddhism, in which supreme reality is not characterized by a personal god, hearing voices would not have any spiritual value.

Conclusion

We suggest in this article that it is possible to consider psychosis as a dimension of the human experience, which, when reaches a certain degree or when meets internal or external circumstances (for example, genetic, stress, cultural, and meta-cognitive), can put on the clothes of a psychiatric

disease and comes to find a place in the DSM-IV wardrobe. For schizophrenia, the challenge is even more complex because of diagnostic heterogeneity as well as the fact that some features of schizophrenia are negative or cognitive. Moreover, this is a multifactorial, neurodevelopmental disease that shares features with a multitude of the other categories: obsessive-compulsive disorder, anxiety, depression, antisocial behaviour, mania, and so on. The clinician may be in the same position as the zoologist facing the platypus, who has fur, a duck’s beak, and 5 pairs of sexual chromosomes, and lays eggs and breast-feeds babies. How to classify them? (This is why the Monotremata order was introduced.)

The clinical implications of a dimensional approach are that in schizophrenia, we need to go beyond treating psychotic symptoms and consider other dimensions of the disease. Problems in treatment are reflected in the frequency of polypharmacy and the need for complementary strategies such as cognitive remediation. There is more to psychosis than hallucinations (which can occur in people without psychosis), and the defects associated with this disease go beyond the most common symptomatic targets for treatment.

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Résumé : Les symptômes psychotiques comme continuum entre normalité et pathologie

Cet article étudie la présence de traits psychotiques dans la population non clinique. Les résultats d'une revue de la documentation suggèrent que les expériences délirantes et hallucinatoires sont plus fréquentes dans la population générale que nous ne le croyons, et qu'il pourrait bien y avoir un continuum symptomatique entre les personnes qui ont reçu un diagnostic de troubles psychotiques incontestables et celles qui n'ont pas été diagnostiquées. Dans la population non clinique, les voix sont surtout positives et non menaçantes. À l'inverse, dans la population psychiatrique, elles tendent à être fréquentes, intrusives et alarmantes. Nous abordons la question des voix considérées comme étant diverses expériences humaines, et nous décrivons l'émergence du groupe non clinique de personnes qui entendent des voix. Nous étudions également la pathophysiologie des hallucinations auditives comme illustration d'une anomalie neurophysiologique, ce qui aide à comprendre la psychose ou la schizophrénie. Le principal obstacle de la pensée spécifique à cette catégorie est qu'il demeure impossible de délimiter sans équivoque la frontière bordant la schizophrénie. Évidemment, il est toujours possible de créer une frontière à l'aide de critères arbitraires qui améliorent la fiabilité inter-juge mais qui excluent un nombre considérable de personnes qui partagent de multiples traits communs avec les personnes diagnostiquées.