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THE CONTINUITY OF PSYCHOTIC EXPERIENCES IN THE GENERAL POPULATION

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ABSTRACT. *Schizophrenia is a severe mental illness that affects1% of the population. The diagnosis is made according to current diagnostic systems of DSM-IV (American Psychiatric Association, 1994) and ICD-10 (World Health Association, 1992) on the basis of characteristic 'positive' and 'negative' symptoms. The traditional medical model assumes a categorical view of the schizophrenia syndrome and its core symptoms, in which differences between psychotic symptoms and their normal counterparts are considered to be qualitative. An alternative, dimensional approach assumes that schizophrenia is not a discrete illness entity, but that psychotic symptoms differ in quantitative ways from normal experiences and behaviours. This paper reviews evidence for the continuity of psychotic symptoms with normal experiences, focusing on the symptoms of hallucinations and delusions. It concludes by discussing the theoretical and treatment implications of such a continuum.* © *2001 Elsevier Science Ltd.*

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THE CONTINUITY HYPOTHESIS: DISEASES OR DISTRIBUTIONS?

ANYONE WORKING IN a clinical mental health setting is naturally inclined to think that psychosis reveals itself as ''cases'' in need of treatment. This clinical perspective has greatly influenced the conceptualisation of the psychosis phenotype, as evidenced by current systems of classification such as DSM-IV and ICD-10. The psychosis phenotype is generally thought of as a dichotomous entity that can

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be identified by applying certain operationalised criteria. These criteria that have been derived from clinical observations on individuals with severe illness who passed through the various filters of help-seeking behaviour and recognition by professionals that separate non-medicalised experiences in the general population from psychiatric treatment at the level of mental health services (Tien, Costa, & Eaton, 1992). From the epidemiological perspective, however, things look somewhat different. Rose and Barker (Rose & Barker, 1978) cogently argued that, contrary to the situation in *clinical practice*, disease at the level of the *general population* generally exists as a continuum of severity rather than as an all-or-none phenomenon. Thus, blood pressure and glucose tolerance are continuously distributed characteristics in the general population, but because the clinical decision to treat is dichotomous, terms such as hypertension and diabetes are used in medicine. This clinical perspective, however, cannot be taken as evidence that these conditions exist as such in nature; they are the extremes of a continuous characteristic.

PSYCHOSIS CONTINUUM VIEWS

The hypothesis that psychosis exists in nature as a distribution of symptoms is not as bold as it may seem. For example, in the case of depression, both genetic and community studies suggest that the phenotype is more likely to exist as a continuous (albeit skewed, [Weich, 1997]) distribution of symptoms rather than a true disease dichotomy (Anderson, Huppert, & Rose, 1993; Kendler & Gardner, 1998; Kendler & Gardner, 1998; Whittington & Huppert, 1996). Given the substantial degree of overlap in terms of psychopathology, outcome, risk factors, and treatment between depression and psychosis (Van Os, Jones, Sham, Bebbington, & Murray, 1998), it is unlikely that psychosis, contrary to depression, would have a completely non-continuous, dichotomous distribution. Although possibly more skewed because of their lower prevalence, a degree of continuity in the distribution of symptoms would be expected. This hypothesis, however, has attracted relatively little research effort, especially from the psychiatric profession (Claridge, 1997a).

The supposition of a psychosis continuum does not necessarily imply that there is a continuum of *disorder*. For example, in the US National Comorbidity Survey, approximately 28% of individuals endorsed psychosis-screening questions. However, when clinicians made diagnoses, the rate of even broadly defined psychosis was only 0.7% (Kendler, Gallagher, Abelson, & Kessler, 1996). This suggests that the clinical definition of psychosis may represent only a minor selection of the total (not necessarily clinical) phenotypic continuum. The existence of lesser states on a distributed continuum in the population may, perhaps, instead of a *forme fruste* of disease, be better thought of as a risk factor for what clinicians would call disorder (Claridge, 1994, 1997b). In epidemiological terms, this argument can be explored by examining the possible combinations of underlying causes of the presumed psychosis continuum in relation to the predicted distribution of the trait. For example, if psychosis was the result of a single, unconfounded, fully penetrant cause such as a single gene, the distribution would be truly dichotomous. However, it is very unlikely that psychosis is caused by a single factor, and a multifactorial aetiology, similar to that seen in other chronic disorders such as
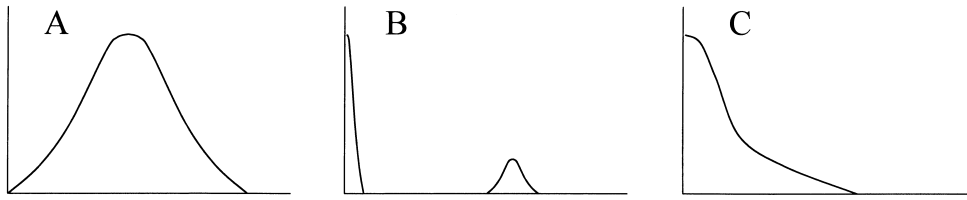
FIGURE 1. Possible Degrees of Continuity of Psychosis Distributions. In A, there is a continuous and normal distribution of psychotic traits in the general population, much as one would expect of, for example, weight or blood pressure. In B, there is a clear bimodal distribution, with the great majority of the population having negligible values of the psychosis trait, whereas a very small proportion has extremely high values. In C, there is a continuous but only half-normal distribution, with the majority of the population having very low values, but also a significant proportion with non-zero values.

diabetes and cardiovascular disease, is more likely (Jones & Cannon, 1998). If there are, for example, five or more different causal factors underlying psychosis, the observed distribution of the trait is highly dependent on the degree to which these causes interact, their prevalence, and the degree to which their effect sizes differ. If the effects of each of the five causes was moderate, not hugely different in magnitude, and contributed additively to the risk function independently of each other, it can be shown that, according to what statisticians call the central limit theorem, psychosis would have to exist in nature as a quantitative trait, as depicted in Fig. 1A (Kendler & Kidd, 1986). If, on the other hand, the five different causes interacted in such a way that expression of psychosis would *only* occur in the case of joint exposure to all five factors simultaneously (i.e. complete co-participation of the causes), the distribution would much more resemble a dichotomy as depicted in Fig. 1B. If the five causes both contributed independently and also co-participated to a degree, the distribution would lie somewhere between that of Fig. 1A and Fig. 1B (see Fig. 1C), depending on the degree of independent additive action and co-participation of the causes. In the case of large differences in effect size, with one or two very rare but extremely potent causes overshadowing the effect of more prevalent but weak causes, the appearance of the distribution would also be less continuous and more quasi-continuous. It can be surmised that the ''real'' distribution of psychosis most likely lies somewhere between that of the dichotomous one in Fig. 1B and the continuous one in Fig. 1A, depending on the degree of interaction between the different causes and differences in their effect size, always assuming that psychosis is subject to more than one causal influence.

ASSESSMENT OF THE DISTRIBUTION OF PSYCHOSIS

From the above, it follows that studying the distribution of psychosis may tell us something about the degree of continuity and underlying causation. However, the resulting distribution very much depends on how the trait is measured. Broadly, two approaches can be distinguished. The first approach is to measure in the general population the same symptoms that are seen in patients with

psychotic disorders. The implicit assumption of this approach is that experiencing symptoms of psychosis such as delusions and hallucinations is not inevitably associated with presence of disorder. The latter is dependent on symptom factors such as intrusiveness and frequency and comorbidity of symptoms on the one hand, and personal and cultural factors such as coping, illness behaviour, societal tolerance, and the development of functional impairments on the other. Thus, even though the prevalence of the clinical disorder is low, the prevalence of the symptoms can conceivably be much higher. The second approach is different, and assumes that in the sub-disorder range along the continuum, the expression of the trait is attenuated and takes on the form of "schizotypal" signs and symptoms. In this context, different schizotypy instruments have been developed, some including items that are close to the "pathological" experiences seen in psychosis (e.g. the Perceptual Aberration Scale [Chapman, Chapman, & Raulin, 1978]), others being more "normalised" (e.g. the Schizotypal Personality Scale [Claridge & Broks, 1984]), and yet others based on the symptoms seen in relatives of patients with schizophrenia that are the main source for the DSM criteria for schizotypy (e.g. Schizotypal Personality Questionnaire [Raine, 1991]). Latterly, these various scales have been combined to generate comprehensive inventories of schizotypal traits (Bentall, Claridge, & Slade, 1989; Mason, Claridge, & Jackson, 1995).

The choice of instruments greatly influences the resulting distribution in prevalence studies. For example, the distribution of the number of delusions and hallucinations per person will be very skewed compared to the sum score of a schizotypy instrument with normalised items, whereas an instrument like the PAS will be somewhere in between that of a dichotomous and a truly continuous one. The distribution will also be influenced by the symptom dimension that the instrument is aiming to capture, for example positive or negative dimensions (Chapman, Chapman, & Raulin, 1976).

ARE THERE FINDINGS SUPPORTING A PSYCHOSIS CONTINUUM?

Several research findings can be brought forward to support the hypothesis of a psychosis continuum. These are discussed below.

Prevalence of Symptoms of Psychosis

Schizotypal signs.   As described in the previous section, the distribution of these experiences is highly dependent on the instrument used. For example, in a study of a representative sample of 2000 young men in Greece, Stefanis and colleagues (submitted) found that the distribution of scores on the PAS (more clinical in its approach to schizotypy) was half normal, whereas the distribution of the SPQ total score (more normalised in its approach to schizotypy) was approximately normal (Fig. 2).

These distributions of variably-defined schizotypy signs are themselves difficult to interpret in the absence of associations with third aetiological, social impairment, or treatment variables. Therefore, as far as the prevalence argument is concerned, studies assessing the prevalence of psychotic symptoms themselves, rather than variably-defined attenuated experiences, may be more useful.
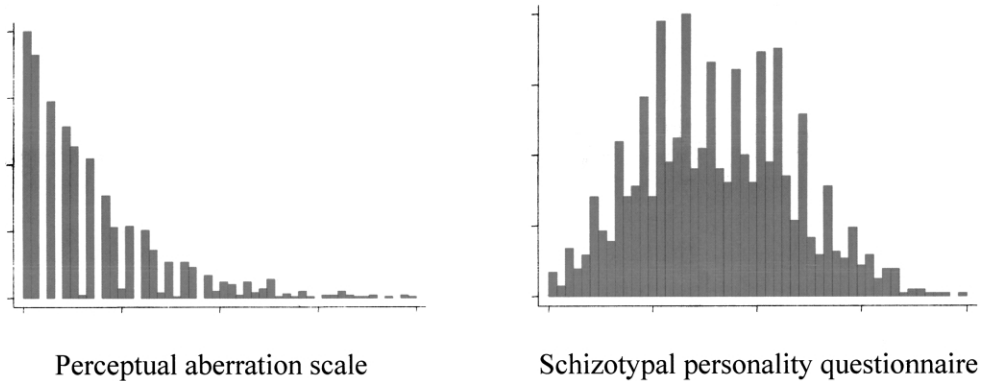
FIGURE 2. Distributions of Schizotypy According to Instrument Used (Data from Stefanis et al., 2000).

Hallucinations. There are normal individuals who experience hallucinations under no special circumstances, and surveys have shown that more people experience hallucinations than come into contact with medical or psychiatric services. For example, Romme and colleagues. (Romme, Honig, Noorthoorn, & Escher, 1992) conducted a self-selecting survey of auditory verbal hallucinations in 450 people who had responded to a request on television. Seventy-six of the 173 subjects who responded to the questionnaire were not in psychiatric care.

A number of studies have assessed hallucinatory experiences in samples of healthy college students using questionnaire measures. These studies have yielded consistent findings, showing that a considerable proportion of individuals experience hallucinations at some time in their lives. Posey and Losch questioned a sample of 375 college students. Seventy-one percent of their subjects reported some experience of at least brief, occasional hallucinated voices during periods of wakefulness; and 39% reported hearing their thoughts spoken aloud (Posey & Losch, 1983). Barrett and Etheridge found that between 30–40% of a sample of 586 college students reported the experience of hearing voices, and almost half of these indicated that the experience occurred at least once a month. Reports of verbal hallucinations were not related to measures of overt or incipient psychopathology (Barrett, 1992). The Launay-Slade Hallucination Scale measures predisposition towards experiencing hallucinations (Launay & Slade, 1981). Bentall and Slade (Bentall & Slade, 1985) and Young and colleagues (Young, Bentall, Slade, & Dewey, 1986) gave a modified version of the scale to 136 and 203 undergraduate students, respectively. Both studies found that a considerable proportion of subjects endorsed even some of the most ''pathological'' items, such as the Schneiderian item of hearing a voice speaking their thoughts aloud.

A few studies have attempted to estimate the prevalence of hallucinatory experiences in the general adult population. The earliest study was carried out by Sidgewick and colleagues of the Society for Psychical Research. They interviewed 17,000 adults, excluding people with obvious psychiatric or physical illness, using a standard interview schedule. Nearly 8% of men and 12% of women in the sample reported at least one hallucinatory experience in their lifetime (Sidgewick, Johnson, Myers et al., 1894). In a follow-up study, West distributed a questionnaire covering the same

areas surveyed in the Sidgewick study. Of the 1519 subjects who responded, 217 (14.3%) reported having experienced hallucinations (West, 1948). In the first modern survey of hallucinations, McKellar questioned a group of 500 'normal' people, and 125 (25%) of these reported at least one hallucinatory experience (McKellar, 1968). Tien reported data from the NIMH Epidemiologic Catchment Area Program (ECA) carried out in the US between 1980–1984. The program interviewed 18,572 community residents using the NIMH Diagnostic Interview Schedule (DIS). The lifetime prevalence of hallucinations (not related to drugs or medical problems) in this sample was 10% for men and 15% for women, and the overall rates were similar for visual, auditory, and tactile hallucinations. Furthermore, the proportions of hallucinations causing no distress or impairment of function were much higher than those associated with distress or impairment (Tien, 1991). Johns and colleagues analysed responses on the Psychosis Screening Questionnaire (PSQ), collected as part of the Fourth National Survey of Ethnic Minorities. The *annual* prevalence of hallucinatory experiences (hearing or seeing things that other people could not) was 4% in the sample of 2,800 white respondents (Johns, Nazroo, Bebbington, & Kuipers, 1998). The prevalence rates of hallucinatory experiences reported in these studies provide estimates for the general populations surveyed. However, as with schizotypy research, variation in reports of hallucinations partly reflects the different assessment measures used, some of which also assess attenuated anomalous experiences in addition to the hallucinations seen in psychosis.

Delusions.   Normal individuals can hold overvalued and delusional ideas. In a survey of 60,000 British adults, Cox and Cowling found that beliefs in unscientific or parapsychological phenomena were commonly held. For example, 50% of the sample expressed a belief in thought transference between two people, 25% believed in ghosts, and 25% in reincarnation (Cox & Cowling, 1989). Using a formal diagnostic interview in a general population sample, Eaton and colleagues found that bizarre delusions were reported by around 2% of the general population. Paranoid delusions and delusions of having special powers had prevalence rates of 4–8% (Eaton, Romanoski, Anthony, & Nestadt, 1991).

   To measure delusional ideation in the normal population, Peters and colleagues (Peters, Joseph, & Garety, 1999) developed the Peters Delusions Inventory (PDI), using the Present State Examination (Wing, Cooper, & Sartorius, 1974) as a template. The 40 items selected covered a wide range of delusional beliefs, and the original PSE questions have been toned down to measure attenuated rather than florid psychotic symptoms. For each delusional belief endorsed, questions also assess associated distress, preoccupation, and conviction. Peters and colleagues administered the PDI to 272 healthy adults and 20 psychotic inpatients. Although the psychotic patients had significantly higher mean PDI scores, the ranges of scores were almost identical between the healthy and deluded groups. Thus, nearly 10% of the healthy sample scored above the mean of the deluded group. These overlapping distributions between the two groups provide further support for the notion of a continuum between normality and psychotic symptoms (Peters, E.R. et al., 1999). Verdoux and colleagues used the 21-item version of the PDI (Peters, Day, & Garety, 1996) to assess the prevalence of delusional ideation in 790 primary care patients in South-west France. The sample comprised individuals aged over 18 years who attended their GP, for whatever reason, on 4 half-days over a 2-week period. Individual PDI item endorsement by subjects with no history of psychiatric disorder ranged from

5–70%. Psychotic patients endorsed nearly all the PDI items more frequently, and the main discriminative items between psychotic and non-psychotic patient groups were delusional ideas with persecutory, religious, and guilt themes (Verdoux, Maurice-Tison, et al., 1998).

People with intense spiritual or religious beliefs can have experiences similar to the positive symptoms of schizophrenia (Jackson, 1997). Peters and colleagues explored the incidence of delusional ideation in New Religious Movements (NRMs). They compared a NRMs group (Hare Krishnas and Druids) with two control groups (non-religious and Christian), and a group of deluded psychotic inpatients on two delusion inventories. Individuals from the NRMs scored significantly higher than the control groups on all the delusional measures apart from levels of distress. They could not be differentiated from psychotic patients on the number of delusional items endorsed on the PDI or on levels of conviction, but they were significantly less distressed and preoccupied by their experiences (Peters, Day, McKenna, & Orbach, 1999).

Delusions and hallucinations.   The studies reviewed above provide evidence for the continuity of the individual phenomena of hallucinations and delusions. However, in patients with psychotic disorder, the positive symptoms of hallucinations and delusions typically occur together (Bilder, Mukherjee, Rieder, & Pandurangi, 1985; Liddle, 1987; Peralta, de Leon, & Cuesta, 1992). This clinical observation is compatible with theories that some delusions arise secondarily in an attempt to explain abnormal perceptual experiences (Maher, 1974, 1988) and that biased conscious appraisal processes are critical in judging that these confusing experiences are in fact externally caused (Garety, Kuipers, Fowler, Freeman, & Bebbington, 2001). Observational studies suggest that there is also an association between the presence of these psychotic experiences in non-clinical samples. In the study by Verdoux and colleagues, in addition to endorsing items on the PDI, 16% of subjects with no history of psychiatric disorder reported that they had experienced auditory hallucinations during their lifetime (Verdoux, Maurice-Tison et al., 1998). In the Johns and colleagues' study, there was an association between reports on the PSQ of hallucinations and other psychotic experiences (Johns et al., 1998).

Data on psychotic symptoms collected as part of the Dutch NEMESIS study (Bijl, van Zessen, Ravelli, de Rijk, & Langendoen, 1998) suggest a psychosis continuum in the general population (van Os, Hanssen, Bijl, & Ravelli, 2000; Van Os, Hanssen, Bijl, & Vollebergh, 2001). In this study, a representative general population sample of 7,076 men and women was interviewed using the Composite International Diagnostic Interview (CIDI). For the 17 CIDI core positive psychosis items, the authors studied the four possible ratings on each of these items: (i) a rating of ''true,'' psychiatrist-verified presence of hallucinations and/or delusions, (ii) a rating indicating that the symptom was present but the respondent did not appear to be bothered by it, (iii) a rating indicating that the symptom was the result of drugs or a physical disorder, and (iv) a rating indicating that the symptom *appeared* to be present but the interviewer was uncertain because there could have been a plausible explanation. Although all symptom ratings were strongly associated with the presence of DSM-III-R psychotic disorder in terms of relative risk, the authors found that of the 1,237 individuals with any type of positive psychosis rating (17.5%), only 26 (2.1%) had a DSM-III-R diagnosis of non-affective psychosis. In addition, all four positive symptom ratings were elevated in both cases and non-cases of any DSM-III-R psychiatric disorder, although more so in the former (odds ratio 3.2, 95% CI: 2.8–3.7). The presence of any rating of

hallucinations was strongly associated with the presence of any rating of delusion, supporting Maher's hypothesis of psychological mechanisms of delusion formation. Associations between hallucinatory and delusional experiences were apparent not only in individuals with any CIDI DSM-III-R lifetime diagnosis (OR = 5.5, 95% CI: 4.4–6.9) but also in individuals without a CIDI lifetime diagnosis (OR = 4.3, 95% CI: 2.9–6.3), suggesting continuity of psychological mechanisms of delusions across patient and non-patient groups. Although psychotic symptoms in this sample were much more common than psychotic disorders, the distribution of individual total psychotic symptom scores in the sample was very skewed. These findings therefore suggest that both symptoms and underlying psychological mechanisms of psychosis occur as part of a continuous, albeit very skewed, distribution that shows only very partial overlap with clinical disorder.

Similarity in Underlying Dimensional Representation

The above findings suggest that the positive symptoms of psychosis are prevalent in the general population, but give little information about other symptoms and how different symptoms might cluster together. One way to further test the hypothesis of a psychosis continuum would be to investigate to what degree non-clinical, or attenuated, ''schizotypal'' phenomena show a similar pattern of correlation with each other into different symptom dimensions as their equivalents do in clinical psychotic disorders such as schizophrenia. Thus, as mentioned above, complementing the studies of individual symptoms is research into schizotypy, which shares the view that the features of schizophrenia lie on a continuum with normal behaviour and experience (Claridge, 1994). Schizotypy refers to the personality trait of experiencing ''psychotic'' symptoms, and psychometric identification of non-clinical schizotypal traits in the normal population provides further evidence for a continuum model of psychosis (Claridge, 1997b). Schizotypy, or ''psychosis-proneness,'' may be a quantitative rather than a qualitative trait, ranging from normality at one end, through eccentricity and different combinations of schizotypal characteristics, to florid psychosis at the other.

   A number of scales have been developed to measure schizotypal traits in the normal population. There is growing evidence from factor analytical studies that schizotypy is a multidimensional construct composed of three, and possibly four, dimensions: a positive dimension (aberrant perceptions and beliefs), a negative dimension (introvertive anhedonia), a conceptual disorganisation dimension, and an asocial/non-conformity dimension (Vollema & van den Bosch, 1995). Although the non-conformity dimension has been fairly consistently replicated, its presence may reflect a covarying normal personality trait resembling Eysenck's ''toughmindedness'' (Eysenck & Eysenck, 1973) rather than a core component of schizotypy itself (Vollema, 1999). Other authors have proposed a slightly different three-factor model, with a third factor of social impairment (Lenzenweger, 1991; Venables & Rector, 2000). Several authors have drawn attention to the striking resemblance between the exploratory and confirmatory factorial solutions of the signs and symptoms of schizotypy and those observed in schizophrenia. Thus, the dimensions of positive, negative, and disorganisation symptoms reported in schizophrenia (Bilder et al., 1985; Liddle, 1987; Peralta et al., 1992) are comparable to similarly construed dimensions in schizotypy (Bentall et al., 1989; Claridge, 1990; Gruzelier, 1996; Raine et al., 1994; Venables & Bailes, 1994; Vollema & Hoijtink, 2000; Vollema & van den

Bosch, 1995). These findings suggest that psychosis may exist as a continuum of variation along various comorbid symptom dimensions (Van Os, Verdoux, Bijl, & Ravelli, 1999).

Familial clustering and longitudinal associations

If there is variation on a continuum, one would expect lesser states on the continuum to show familial and longitudinal continuity. In other words, one would expect (i) that the families of probands with clinical psychotic disorder have higher rates of psychosis-like symptoms and/or schizotypy, and (ii) that individuals with high levels of psychosis-like symptoms and/or schizotypy have a higher risk of developing clinical psychotic disorder. Family studies have shown that schizotypy co-occurs with schizophrenia in the same family more often than would be expected by chance (Kendler, McGuire, Gruenberg, O'Hare et al., 1993; Kendler, McGuire, Gruenberg, & Walsh, 1995; Kendler & Walsh, 1995). This suggests that the same social and/or genetic factors that contribute to schizophrenia also contribute to schizotypy, i.e. that the two conditions are at least in part aetiologically continuous.

Similarly, follow-up studies of subjects with elevated schizotypy scores have demonstrated high rates of clinical psychosis and related disorders (Chapman, Chapman, Kwapil, Eckblad, et al., 1994; Kwapil, Miller, Zinser, Chapman, et al., 1997). A fascinating study of a birth cohort of children from New Zealand showed that children who had reported psychotic symptoms at age 11 years had a more than 16-fold higher risk of developing schizophreniform disorder by the age of 26 (Poulton et al., 2000). This suggests that lower states on the continuum are a risk factor for more elevated states, and that transitions over the continuum occur with time.

Associations with demographic risk factors

Samples of patients who receive a diagnosis of schizophrenia for the first time (incident cases) show, as a group, a characteristic pattern of associations with a range of demographic variables. Thus, incident patients are more likely to be young, single, and unemployed. They also have a lower mean level of education and are more likely to reside in urban environments (Driessen, Gunther, Bak, van Sambeek, & van Os, 1998; Galdos, van Os, & Murray, 1993; Kendler et al., 1996; Marcelis, Navarro-Mateu, Murray, Selten, & Van Os, 1998). The characteristic age-related variation in the incidence of schizophrenia is mirrored in a similar age-related expression of variably defined schizotypy (Claridge et al., 1996; Rust, 1988), delusional ideation measured with the PDI (Peters, E.R. et al., 1999), and delusions and hallucinations in the absence of a clinical psychotic disorder (van Os et al., 2000). Verdoux and colleagues speculated that early adulthood, when levels of psychosis-like experiences are highest, may be a critical developmental phase for the expression of the trait psychosis, other factors determining at what level of the continuum the expression will occur (Verdoux, van Os et al., 1998). With regard to the other demographic factors that are associated with schizophrenia, similar associations have been reported for non-clinical psychotic and psychosis-like symptoms (van Os et al., 2000; Van Os et al., 2001). Although it is not known whether these factors are causally related to the incidence of psychotic disorder or the result of premorbid drift, the similarity of the pattern of associations between psychotic disorder and mental states

that occupy a lower position on the distribution is again suggestive of a continuum of psychotic experiences.

IMPLICATIONS OF A PSYCHOSIS CONTINUUM

The studies reviewed indicate that hallucinations and delusions are dimensional phenomena lying on continua with normal experiences. Although the great majority of individuals experiencing these ''symptoms'' are not in need of care, longitudinal studies suggest they may nevertheless have an increased risk of developing a clinical disorder. This section considers the implications of the results of these studies.

Aetiology

The findings suggest that psychosis may exist as a continuous trait or phenotype in nature. Although we do not know whether psychosis is similar to pain or fever, where quantitative differences between different samples do not exclude qualitative differences in cause, aetiological studies should take into account the possibility of an aetiological continuum. For example, the great majority of molecular genetic studies of schizophrenia have focussed on the search for so-called qualitative trait loci, or genes of major effect that are thought to be involved in the causation of the dichotomously defined disorder of schizophrenia. However, if psychosis exists as a continuum, it may also be rewarding to search for quantitative loci, that is, genes of small effect that contribute to variation of a trait with a continuous distribution.

The view that psychotic symptoms vary along quantitative dimensions also facilitates psychological research into the factors that drive such variation. There is a growing body of research on the role of emotions, perceptions, and inferential processes in relation to the onset and persistence of psychotic symptoms (Garety & Hemsley, 1994; Garety et al., 2001), and the coping mechanisms that people use to deal with them (Bak et al., 2001a; Carr, 1988). Calls have been made to extend the search for psychological mechanisms underlying specific psychotic symptoms, such as possible deficits in theory of mind (Frith & Corcoran, 1996), impaired self-monitoring (Johns & McGuire, 1999), reasoning bias (Garety, Hemsley, & Wessely, 1991), and dysfunctional attributions (Bentall, Kinderman, & Kaney, 1994) to samples at lower levels of the continuum (Garety & Freeman, 1999). As described earlier, there is some evidence that psychological mechanisms associated with psychotic symptoms also operate in non-patient samples, and further study of these could greatly contribute to our understanding of psychosis.

Psychosis ''Transitions''

The study of psychological mechanisms of psychotic symptoms would be particularly important in view of the current interest in preventing individuals from making ''transitions'' from non-clinical to clinical psychotic states. It then becomes crucially important to understand what actually causes individuals on some position at the hypothesised continuum to become a clinical ''case.'' As mentioned earlier, it is important to distinguish between a truly continuous and quasi-continuous relationship between symptoms and disorder (Claridge, 1994). Thus, with regard to the transition from having one or more psychotic symptoms to becoming a patient with a

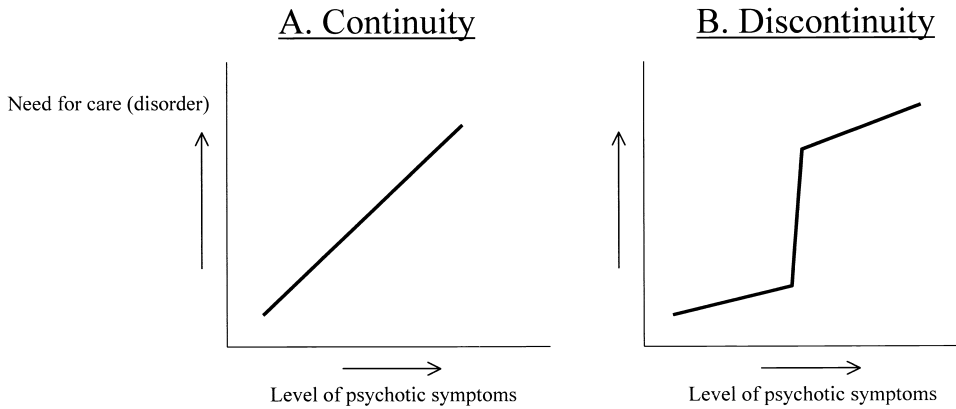## A. Continuity B. Discontinuity

FIGURE 3. Relationship Between Psychotic Symptoms and Psychotic Disorder. In Fig. A, there is a continuous relationship between level of psychotic symptoms and need for care. In figure B, the initial increase is weak, but after a certain threshold the risk increases disproportionally.

psychotic disorder, there may be a true linear relationship between symptoms and disorder without major discontinuity (Fig. 3A). However, another possibility is that psychotic symptoms behave like hypertension, which is on a direct continuum with continuous normal variation in blood pressure and in itself is not symptomatic, but beyond a certain threshold, the risk of somatic complications involving other organs increases exponentially (Fig. 3B). This latter possibility, the most likely one according to some (Hafner, 1988, 1989), corresponds to a continuum-threshold relationship between psychosis-proneness in the form of psychotic symptoms and the clinical disorder. It may be that an individual becomes much more likely to develop need for care caused by the psychotic symptoms themselves above a ''critical'' value of psychosis. Alternatively, an individual exposed to a number of independent risk factors with small effect sizes and a certain level of psychosis may develop an abrupt, non-linear increase in need for care after exposure to additional, interacting risk factors with possibly larger effect sizes that result in overt disorder.

If there is a discontinuous relationship, what are the factors that are additionally important in bringing about an abrupt change resulting in need for care? A full consideration of the range of possible biological and social factors is beyond the scope of this paper, but some psychological aspects in relation to the transition from experiencing symptoms to becoming a patient need to be considered here. Symptoms vary in terms of frequency, degree of conviction, preoccupation, influence on behaviour, distress, and secondary attributions, all of which may be of crucial importance in producing illness and help-seeking behaviour. In this context, Strauss (Strauss, 1969) suggested four criteria for defining the boundaries of clinical psychosis. These were: the degree of the person's conviction of the objective reality of the unusual experience, the degree to which cultural or stimulus determination of an experience was absent, the amount of time spent preoccupied with the experience, and the implausibility of the experience. The evidence suggests that the implausibility of experiences and degree of conviction may not be related to illness status (Garety & Hemsley, 1994). However, the cultural context of psychotic experiences and degree of preoccupation and distress do seem to be important factors

(Peters, E. et al., 1999; Peters, E.R. et al., 1999). For example, Peters et al. (Peters, E. et al., 1999) found that individuals from NRMs were similar to psychotic patients in terms of number of delusional items endorsed on the PDI and levels of conviction, but were similar to controls in terms of levels of distress. In addition, there do seem to be some qualitative differences in psychotic experiences between psychiatric patients and non-patients. In studies of predisposition to hallucinations in student samples (Bentall & Slade, 1985; Young et al., 1986) hardly any subjects reported that they had been troubled by hearing voices, whereas patients with schizophrenia most commonly experience stressful auditory verbal hallucinations (Kendell, 1985). Therefore, as far as the patient–non patient distinction is concerned, it may be important to consider two interacting risks: one that determines which position a person is going to occupy along the psychosis continuum, and one that determines whether a person at a certain point of the continuum is going to develop illness behaviour. Thus, two persons at different positions on the continuum may experience differences in the number, intrusiveness, or frequency of symptoms, or the degree of other comorbid symptom dimensions such as negative symptoms, thought disorder, or cognitive impairment (Kendler et al., 1996). Because of this, the person at the highest position may have a higher risk of becoming a mental health patient. Conversely, however, at each point of the continuum, two persons with the same level of psychotic symptoms may differ in that one copes well and does not develop illness behaviour, whereas the other may develop functional impairments and need for care (Claridge, 1997a). Further research is needed to clarify these relationships (Bak et al., 2001b). One interesting research paradigm to separate the two interacting risks that contribute to ''patient status'' is to follow individuals who make a transition to clinical disorder followed by full recovery and vice versa (Bellack, Gold, & Buchanan, 1999).

Prevention and Treatment

If, as suggested by longitudinal studies, psychotic and psychosis-like symptoms predict clinical disorder (Chapman et al., 1994; Kwapil et al., 1997), would it be useful to identify individuals with certain symptoms who have a higher risk of developing a need for care? Early detection and intervention of psychosis has increasingly become the focus of both schizophrenia research and mental health practice (McGlashan, 1998), with interest extending well into the prodromal phases of psychosis (Falloon, 1992; Yung et al., 1996). The problem with early intervention is that, as shown earlier, the prevalence of self-limiting, transient, or otherwise non-clinical psychotic and para-psychotic symptoms is many times higher than psychotic disorders fulfilling DSM or ICD criteria (Eaton et al., 1991), suggesting the possibility of unacceptably high rates of false-positive diagnoses (Van Os, Takei, Verdoux, & Delespaul, 1997). While the movement of early recognition and intervention, including intervention in the prodromal phases, is rapidly progressing to the stage of randomised controlled trials, there is little basic epidemiological work investigating the sensitivity, specificity, and post-test probability (predictive value) of diagnostic procedures. There are some indications, however, that certain self-reported psychotic symptoms in, for example, children may have enough predictive value to be useful for prevention (Poulton et al., 2000).

It is crucial to distinguish at what level along the different filters on the pathway to mental health care (Goldberg & Huxley, 1980) early detection of psychosis cases is actually intended to take place. In the general population, psychotic disorders are

rare, and individuals may not have developed illness-and/or help-seeking behaviour. At the level of mental health services and above, the prevalence of psychosis is higher and help-seeking behaviour the rule. Thus, risk of stigmatisation in false positives and violation of the right ''not to know'' (that one has a disorder) in true positives should be lowest at the level of mental health services (Hanssen, Bijl, Vollebergh, & van Os, 2001). Thus, any project aimed at identification of high-risk individuals should perhaps be limited to the population of individuals seeking help for psychological problems, rather than the general population. Some population-based approaches, however, may be both useful and ethically acceptable. For example, it has been shown that it is possible, by conducting a high-profile public health campaign, to facilitate the pathway to care for young individuals who, though not meeting diagnostic criteria for a psychotic disorder, have a high risk of developing a need for care in relation to psychotic symptoms (Yung & McGorry, 1997; Yung et al., 1996).

It can be argued that any early intervention for individuals whose level of psychotic symptoms puts them at risk of becoming a patient should be psychological rather than pharmacological, given the high risk of possibly irreversible and stigmatising side effects of the latter, especially in young people. There has been a recent significant development in new psychological interventions that can be used with patients to reduce psychotic symptoms and associated distress (Freeman et al., 1998; Garety, Kuipers, Fowler, Chamberlain, & Dunn, 1994; Jenner, van de Willige, & Wiersma, 1998; Kuipers, 1996; Lewis et al., 2000; Tarrier et al., 1998; Wykes, Parr, & Landau, 1999). Psychological treatment approaches in psychosis such as Cognitive Behaviour Therapy (CBT) are not associated with significant side effects. The normalising approach to symptoms in CBT stems from a dimensional view of psychosis. Such dimensional definitions of symptoms can be less stigmatising than categorical distinctions, as they imply that patients with a diagnosis of schizophrenia are not distinctly different from non-patients. In contrast, the categorical view of schizophrenia as a qualitatively different disease experience facilitates the frequently observed process of equating the person with his or her illness, as evidenced by the use of words like ''the schizophrenic'' or the ''schizophrenic patient'' in the medical literature.

CONCLUSION

Several independent sources of evidence indicate that psychosis exists as a continuum of experiences with a distribution in the general population. The implications of this evidence for the diagnosis, aetiology and treatment of psychotic states that are associated with need for care are increasingly apparent. The encouraging results (Jones, Cormac, Mota, & Campbell, 2000) of new therapeutic approaches that are characterised by a dimensional view and normalising rationale, suggest that it may be rewarding to further incorporate the notion of a psychosis continuum in scientific research and clinical practice.

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