

## The continuum hypothesis of psychosis: David's criticisms are timely

A commentary on 'Why we need more debate on whether psychotic symptoms lie on a continuum with normality' by David (2010)

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Received 21 January 2010; Revised 26 January 2010; Accepted 26 January 2010; First published online 24 February 2010

**Key words:** Continuum, phenotype, psychosis.

Few colleagues will currently doubt the existence of psychotic experiences in non-clinical populations, as many cohort studies have consistently demonstrated (e.g. Tien, 1991; Poulton *et al.* 2000; Van Os *et al.* 2000; Verdoux & Van Os, 2002). These findings, together with the discovery of the large genetic overlap between psychiatric disorders, has led to a call for revisiting psychiatric diagnoses in general and the Krapelian dichotomy in particular (Boks *et al.* 2008; Carroll & Owen, 2009). This call is urgent with the review of the upcoming *Diagnostic and Statistical Manual of Mental Disorders*, 5th edition (DSM-V) and the need for more homogeneous schizophrenia phenotypes.

However, the continuum theory of psychosis not only predicts the existence of a non-clinical variant of psychotic experiences, it goes further, in presuming the existence of a continuous phenotype, measurable in healthy and diseased individuals. Such a continuous phenotype implies that the same psychotic symptoms that are seen in patients with a psychotic disorder can also be observed in non-clinical populations (Van Os *et al.* 2009).

Non-clinical psychotic phenomena are generally assessed with the aid of standard questionnaires, such as the Peters Delusion Inventory (PDI; Peters *et al.* 1999), the Launay and Slade Hallucination Scale (LSHS; Larøi *et al.* 2004) or the Diagnostic Interview Schedule for Children (DISC-C; Costello *et al.* 1982). When applying these scales, cohort studies observe a majority of the population scoring on none of the items, a relatively large minority scoring on only one item, a smaller group scoring on several items and finally a very small group scoring on many items. For

example, in the Dunedin cohort, 85% of the children did not score on any item of the DISC-C, 13% scored on one item, 1% scored on two items and 0.3% scored on three or more items (Poulton *et al.* 2000). When the total scores of such questionnaires are evaluated, the impression is that of a perfect continuum of psychotic experiences. However, it remains illusive if the 13% scoring affirmative on one item of this scale is phenotypically similar to the 0.35 scoring on three or more items.

These questionnaires do not explore the phenomenology of psychotic experiences and thus provide only little information about the exact phenotype. For example, an item assessing auditory verbal hallucinations of the DISC-C asks 'Have you heard voices other people can't hear?' In a clinical situation, an affirmative response to this item would lead to further questions regarding the perceptual quality of this experience, frequency, associated distress and verbal content of this voice. For cohort studies, assessing hundreds of individuals, this is often not feasible. As a consequence, it is currently not known if psychotic experiences in non-clinical individuals have the same quality as those in psychotic patients. This information can only be obtained by assessing detailed phenomenology of individual cases in a clinical psychiatric interview. At the University Medical Centre Utrecht, we made an effort to do so by studying non-clinical individuals who experienced auditory verbal hallucinations at least once a month during at least 1 year. These individuals were assessed by a psychiatrist, using the Comprehensive Assessment of Symptoms and History (CASH; Andreasen *et al.* 1992) and the Structured Clinical Interview for Personality Disorder (SCID-II; First *et al.* 1995) interview (for details, see Sommer *et al.* 2008). Auditory hallucinations of 111 individuals who did not meet diagnostic criteria for axis I or II disorders were described in detail, and

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compared with hallucinations in 118 psychotic patients. Based on the continuum theory of psychosis, we expected to find auditory verbal hallucinations similar to those in psychotic patients in the non-clinical group, but of lower severity, for example less real, or less loud than in psychosis.

However, while loudness and reality of the voices were rather similar in both groups, we found large qualitative differences, with hardly any overlap in the verbal and emotional content of these hallucinations. Almost all non-clinical individuals had a neutral or pleasant emotional content of hallucinations. The verbal content was frequently an advice about daily hassles or encouragements. Examples of these voices experienced by non-clinical individuals were: 'don't be late, or you'll miss your train', 'try to practise what you've learned' and 'don't be intimidated by big words'. Although these phenomena definitely had perceptual qualities, distinguishing them from thoughts, the typical content was more alike to normal inner speech, i.e. one could imagine a person saying these phrases to himself. In contrast, the auditory hallucinations in the psychotic patients had a more classical, stereotyped content, either consisting of insults (i.e. 'you lazy fat bastard'), commands or running commentary. The overlap between the groups was remarkably low: seven of 111 non-clinical individuals experienced voices with a negative content, while only two of the 118 patients had voices with a predominantly positive content (Daalman *et al.* in press). Another contrast between the non-clinical voice hearers and the patients with hallucinations was the age of onset. Mean age of onset in the healthy subjects was 12 years, while patients had a mean age of onset of 21 years. Such a large difference in onset of symptoms could imply a difference in aetiology, as the pre-pubertal brain in which the non-clinical hallucinations first arise differs in many aspects from the adolescent brain which gives rise to psychotic hallucinations.

So, while standard questionnaires suggest a continuous phenotype of hallucinations throughout the population, detailed study of the phenomenology of these 'non-clinical psychotic phenomena' suggests that they are qualitatively dissimilar from the symptoms encountered in psychosis. While the first requirement for the continuum theory of psychosis – the presence of psychotic experiences in the non-clinical population – is beyond reasonable doubt, the second prerequisite of a similar phenotype in clinical and non-clinical individuals needs further study. David's critique (David, 2010) is important and timely; before we can embrace the continuum theory of psychosis and start to think about revisiting our diagnostic classification, further detailed study of the clinical

and especially of the non-clinical phenotype is warranted.

#### Declaration of Interest

None.

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