Psychiatric kinds such as HPC: a new approach to discrete/continuous debate

Abstract

This paper aims to show that psychiatric disorders cannot be defined within an essentialist perspective – i.e. by means of necessary and sufficient properties. We introduce the Homeostatic Property Cluster model (HPC) which proves useful for addressing the question as to whether psychiatric disorders are continuous or discrete entities. From this discussion we find that psychiatric kinds are discrete. We then analyze the disease model – recognized in the medical field as an essentialist model – bringing attention to its limitations and raising objections to its applicability. Finally, we argue that the HPC model offers a good starting point for identifying and classifying psychiatric kinds, and show how it can provide a bridge be-tween the rigidly discrete and rigidly continuous perspective on kinds, bringing together aspects of both.

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Extended abstract

The HPC (*Homeostatic property clusters*) model, introduced for the first time by Richard Boyd in his (1988)'s work as a solution to the species problem, identifies a natural kind as a *cluster* of properties more or less shared by all members of this kind (see also Boyd 1999 and Wilson *et al* 2007). More specifically, the HPC model is an anti-essentialist model, because to identify species it does not use neither necessary (a *single* property is not necessary for identifying a specific kind) nor sufficient (a *single* property is not sufficient for identifying a specific kind) properties. As Wilson *et al* (2007) point out, HPC model uses "necessity" and "sufficiency" in the *cluster* in a new manner: « necessity becomes more general » (p. 14) and « sufficiently becomes more varied » (*ibid*). The reason for this is that single properties are no longer necessary and sufficient to identify a specific kind. Consequently, in the HPC model, the identification happens only through the cluster of properties, and in that cluster the necessary and sufficient conditions no longer apply. We believe that this plasticity of cluster's properties is a useful tool to classify psychiatric kinds. In a nutshell, properties of HPC clusters are properties that could (a) belong to different explanation levels (biological, psychological, cultural), (b) be a different type of entities (processes, mechanisms, dysfunctions, signs, symptoms), and (c) show a heterogeneity in the co-occurrence (namely reciprocal causality between properties). We believe that (a), (b), and (c) – namely the plasticity of properties of cluster - are useful on HPC frame for the classification of psychiatric kinds[1].

Mental disorders are represented as entities for which the internal structure is not

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[1] Our attempt to use that model for psychiatric disorders is not a novelty: Kendler (2012) and Borsboom (2008) have already taken steps in this direction.

clear. Furthermore, their relation with each other is also not clear. Are they without discrete boundaries? If so, are they in continuity with each other? Or rather, are they discrete and divisible? This is a well-known debate in philosophy of psychiatry that is called the categorical *vs.* continuous debate, or discrete *vs.* dimensional debate (see for e.g. Andrews *et al* 2007; Bjelland *et al* 2009; Broman-Fulks *et al* 2010; Brown *et al* 2005; Gold 2009; Goldberg 2000; Haslam 2003; Helzer *et al* 2006; Kendler 2005; Keshavan *et al* 2011; Kraemer 2004; McGrath *et al* 2012; Muthén 2006; Shear *et al* 2007; Widiger *et al* 2005; Zachar and Kendler 2007).

In this presentation I will use the HPC model in psychiatric kinds context to support that the psychiatric disorders' discrete/continuous controversy might be viewed as complementary approaches and not as a *real* controversy.
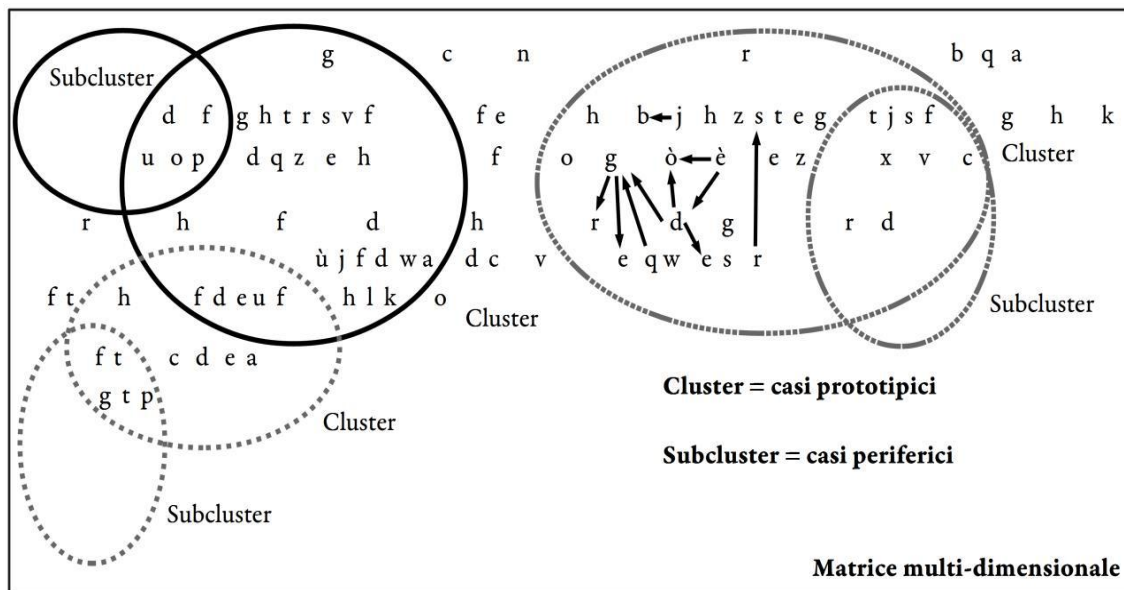

Figure 1 Sets model that set out the HPC application to the psychiatric kinds. The letters are the properties: causal mechanisms, symptoms, signs etc. The co-occurrence are the arrows (qualitatively pointed out only on the right cluster). The sets boundaries with the same mark represent the same disorder; the smaller sets with the same mark represent the *sub-cluster* of that disorder. Sets with different marks represent different disorders. Each cluster can be interpreted as prototypical cases, while each sub-cluster as outskirts cases. The three-dimensionality of the model is expressed in the heterogeneity of the

typologies of cluster's properties.

Figure 1 is an (qualitative) attempt to use the HPC model for the classification of psychiatric kinds. In this framework there are two important theoretical advantages: we can reject the continuum between disorder and disorder, and between disorder and the state of health; and we can use *discrete* and *accurate* categories but not necessarily strictly demarcated. We consider now these aspects in more detail:

(1) the *(sub)cluster* is represented by a single diagram. The sets are "constitutionally discrete" because they have the utility to border (with a closed line) some elements. This is the precise meaning of *discreteness* of the HPC model. (2) Even if the set (*cluster/sub-cluster*) is discrete, this doesn't imply that it must also be – in respect to the disorder's representation – necessarily demarcated. Indeed, the possible *overlap* (intersection) of the *cluster/sub-cluster* (different typologies of sets) enables a precise type of continuity, namely the possibility that different clusters share some elements, without leading to a confusion in the classification. This is indispensable in order to classify many disorders with the phenomena like comorbidity.

(3) The three-dimensionality of the model (understanding in psychiatric terms as causal mechanisms, and in theoretical terms as underling mechanisms of HPC model) is settled through the heterogeneous use of the term "property", that encloses different type of explanation levels, different type of entities, different type of co-occurrences.

(4) Finally, a famous question about the HPC model is the following[2]: how many cluster properties are necessary and sufficient so that a generic member X is part of a generic natural kind N? In psychiatric terms, what is the *cut point* of the disorder? To try to give an answer, we could rephrase the problem/question as follows: «

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[2] See also Ereshefsky and Reydon (2015) and Hawley and Bird (2011).

How much causal and hence explanatory integrity [co-occurrence] remains when certain properties are missing in comparison with others? » (Wilson *et al* 2007, p.17). In our perspective the answer is provided in the notion of "co-occurrence" (heterogeneity of causal reciprocity): it will not diagnose a specific pathology (namely his/her mental state is not a disorder/cluster) if and only if there is not a *substantial* causal reciprocity (co-occurrence) between the patient symptoms and signs (cluster properties). Obviously, "substantial causal reciprocity" is an *empirical* evidence that must be detected in an empirical situation.

In the light of these four evidences, we conclude that the HPC model can be (1) a valid alternative to the essentialism, (2) a possible way to resolve the psychiatric kind's continuous/discrete controversy.