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CARVING THE MIND BY ITS JOINTS
Culture-bound psychiatric disorders as natural kinds

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Abstract

I propound a mechanistic theory of natural kinds in the human sciences. By examining a culture-bound psychiatric disorder, bulimia nervosa, I illustrate how partially socially constructed phenomena raise a serious challenge to traditional theories of natural kinds. As a solution to the challenge, I show how the mechanistic approach allows us to include real but partly socially sustained phenomena among natural kinds. This is desirable because the theory of natural kinds supplies the human sciences with a clear normative account of concept formation. Furthermore, my theory suggests a conceptual framework for interdisciplinary research on complex phenomena. As a prerequisite for the mechanistic approach, the concept of natural kind in the philosophy of science must be distinguished from the use of the notion in other parts of philosophy.

Keywords: natural kind, mechanism, social construction, culture-bound disorder, eating disorder, bulimia

1 Introduction: Problematic natural kinds

Culture-bound phenomena such as eating disorders, depression, ad/hd, and pathological gambling are problematic topics both for the social sciences and for philosophy. On the one hand they appear to be real phenomena with painfully real psychological and societal consequences. On the other hand, they are sensitive to the socio-cultural context: the phenomena appear only in certain societies at certain times, and their symptoms mirror contemporary social norms, hopes, and fears. Because they are at least partially constituted by social factors, they have been called social constructions instead of natural kinds.

Although these phenomena clearly do not qualify as natural kinds in the same sense as quarks, bosons, and fermions do, I argue that also the human sciences ought to aim to align their concepts with the causal structure of reality. Furthermore, there are several good reasons for treating even problematic phenomena such as culture-bound psychiatric disorders as natural kinds: Despite their context-dependence, these phenomena are sensible targets for scientific investigation, and there are genuine law-like generalizations to be made about them. The concepts associated with these phenomena are far from arbitrary or conventional. Psychiatric knowledge exists primarily to allow us to understand and to help distressed members of our societies, and the knowledge stored in psychiatric concepts makes these medical and policy interventions possible. Psychiatric concepts

seem, in an important sense, to be carving reality by its joints. That is why they ought to be thought of as natural-kind concepts.[1]

I aim to show that by adopting a mechanistic theory of natural kinds (Boyd 1991, 1999), the puzzling phenomena mentioned above can be treated as natural kinds. I begin by introducing the central features of a problematic psychiatric phenomenon, bulimia nervosa. From the point of view of natural kinds, bulimia raises a dilemma: as a culture-bound disorder, it has features of both natural kinds and mere social constructions, and therefore does not nicely fall on either side of the divide. In section three, I argue that the dilemma follows from the fact that the concept of natural kind has various different meanings in different areas of philosophy. In philosophy-of-science contexts, the debates on whether a concept refers to a natural kind ultimately concern questions of scientific concept formation and revision. I claim that in these discursive settings, natural kinds should not be understood as primitive metaphysical constituents of reality, but instead a more minimalist epistemological construal of the concept is appropriate. In section four I show that once the different meanings of 'natural kind' have been pulled apart, the mechanistic theory of natural kinds suggests a promising approach to dealing with problematic human scientific kinds. The theory can be used to characterize bulimia as a natural kind that is sustained by a complex homeostatic mechanism, which consist of both biological as well as social sub-mechanisms. I conclude by arguing that my complex-mechanisms strategy can be considered as an integrative framework that could illuminate the nature of contested phenomena in the human sciences better than often-vague social constructionist rhetoric. The mechanistic approach to kinds shows that the fleetingness and context-sensitivity of these phenomena are not an impediment to a naturalistic approach and need not imply methodological dualism – contrary to what has often been thought.

2 Bulimia – the dilemma

Bulimia is an eating disorder characterized by episodes of binge-eating, compensatory behavior (e.g., self-induced vomiting or laxative abuse), and over-concern with weight and shape (APA 2000; WHO 2007). According to the DSM criteria, the prevalence rate of bulimia for young females in the Western countries is approximately 1%. However, subclinical forms of the disorder are much more common: it has been estimated that more than 5% of individuals in the population in question have manifested some symptoms of bulimia. (Hoeken et al. 2005.) Bulimia is noticeably less frequent in developing countries, and although recent research has suggested that genetic factors and abnormalities in central serotonin mechanisms play a role in the pathogenesis

[1] I follow a common usage and employ 'concept' to refer to a mental or linguistic entity that represents a 'kind' or 'category,' something in reality corresponding to the concept (cf. Murphy 2004, 5).

of the eating disorder (Steiger et al. 2001; Bulik & Strober 2004), bulimia is clearly a psychiatric illness whose explanation has an important social component.[2] The disorder is much more common in contexts where there is strong socio-cultural emphasis on thinness, and often negative comments from family members or peers play a significant role in the etiology and maintenance of the disorder (Hoeken et al. 2005). Therefore, it is reasonable to characterize bulimia as a culture-bound disorder (Keel & Klump 2003). This culture-bound nature of the phenomenon has important methodological consequences. To satisfactorily explain bulimia, one has to pay attention to a heterogeneous group of factors: social practices maintaining norms regarding beauty; individual psychological mechanisms for becoming aware of the norms; and psychological and physiological factors that explain why people inherently have different susceptibilities of becoming bulimic.

From the perspective of the notion of natural kind, culture-bound phenomena like bulimia raise a dilemma. One either has to claim that bulimia is not a natural kind, but a social construction, or one has to defend the counter-intuitive idea that culture-bound disorders could be natural kinds. Both options appear unappealing.

Several considerations suggest that bulimia cannot be a natural kind. As described above, it is a local rather than universal phenomenon: Bulimia was recognized as a separate disorder only in 1980 in the DSM-III classification. Although the rising prevalence rates of bulimia can largely be attributed to improved diagnostic practices, the disorder obviously requires a specific socio-cultural niche to exist. And as described above, it is sensitive to changes in background conditions that are social in nature (norms), and the disorder is often triggered by a social event. However, bulimia also manifests properties that are characteristic of natural kinds. Most importantly, psychiatric disorders are phenomena with painfully real social and psychological consequences. Moreover, as mentioned above, there are physiological factors that make certain people susceptible to the eating disorder. Hence, there is an important biological – and hence natural – aspect in the phenomenon. There are also genuine law-like generalizations to be made about bulimia, and the disorder is a target of successful scientific inquiry (cf. Klein et al. 2003; Fairburn & Harrison 2003). Treating bulimia as a mere social construction would overlook these considerations.

[2] Eating disorders are targets of intensive psychiatric research. Their etiology and pathological mechanisms are highly debated topics in psychiatry, and the objective of this article is not to participate in such debates. Instead, my aim is methodological: I use bulimia as a challenging test case for my conceptual framework of scientific concept formation.

The other horn of the dilemma is equally unattractive. Although the factors mentioned above suggest that bulimia should perhaps be treated as a natural kind, it does not meet most of the traditional criteria for natural kindhood: There are no exceptionless generalizations to be made about it, and it is not governed by a law of nature. Moreover, as a culture-bound phenomenon, bulimia is sustained by non-intrinsic environmental properties, and there are likely to be different "cultural phenotypes" of the disorder that occur in different social contexts. By focusing on these features, bulimia appears as a paradigmatic contrast case to mind-independent natural kinds.

In sum, bulimia does not nicely fall on either side of the natural–constructed dichotomy. As I suggest in section five, several significant phenomena in the human sciences resemble bulimia in the sense that they depend on a mix of natural and social and sustaining factors. In the next section I argue that the dilemma raised by these phenomena results from a loaded conception of natural kinds, and it can be avoided by distinguishing the different uses of the notion.

3 Various kinds of natural kinds

The concept of natural kind has gained a lot of attention since the 1970s when Saul Kripke (1972/1980) and Hilary Putnam (1975) brought it back into the philosopher's toolkit. Their writings concerned primarily the philosophy of language: Kripke and Putnam introduced semantic externalism as a plausible alternative to descriptivist approaches to the semantics of natural kind terms. Kripke's seminal insight was that

(L1) natural kind terms are rigid designators.

The reference of a kind term is not sensitive to changes in the descriptive content of the concept across possible worlds. That is, the reference remains the same despite differences between the descriptions that are used to pick out members of the kind. Furthermore, Kripke's classic examples suggest that

(L2) natural kinds have essential properties.

Kripke claims that it is the task of science to uncover these essences (Kripke 1980, 138). Here it must be noted that although Kripke's and Putnam's work is most plausibly described as

explication of semantic intuitions, it has been common to draw metaphysical conclusions based on their work.[3]

As Alexander Bird and Emma Tobin (2009) point out in their careful review of the notion of natural kind, most of the more recent discussions on natural kinds have occurred in metaphysics and the philosophy of science. In metaphysics, the concept features in discussions concerning laws of nature, natural necessity, and essentialism. In these contexts, natural kind terms are often supposed to refer to the fundamental building blocks of reality, in a sense. They tell us what kinds of objects, substances, events, and processes there really are in the world, as opposed to things referred to by more superficial classifications. Many metaphysical theories of natural kinds are wedded to the idea that kinds are individuated by their intrinsic dispositional properties (Ellis 2001). Hence, the members of a natural kind share an essence – their common microstructure. According to such microstructural theories, natural kinds are scarce: they can only be found in physics, maybe chemistry, but certainly not in the human sciences, where interactions between an individual and environment give rise to explanatorily important relational properties.

Accordingly, Bird and Tobin summarize the most central features of metaphysical natural kind classifications in the following way:

(M1) Members of a candidate natural kind should have some (natural) properties in common. Natural properties here are often taken to be intrinsic properties.
(M2) Natural kinds should permit inductive inferences.
(M3) Members of natural kinds should participate in laws of nature.

In addition to the use of the notion in the philosophy of language and metaphysics, natural kinds have been a prominent topic in the contemporary philosophy of science. The main motivation for this strand of theorizing about natural kinds has been the attempt to characterize the nature of scientific concepts. As Thomas Reydon (2009) has suggested, this *epistemological tradition* of natural kinds is conceptually distinct from the more metaphysically oriented approaches to the topic of natural kinds.

The epistemological tradition was established by John Stuart Mill in his *System of Logic* (1891) when he contrasted natural kind concepts[4] to terms whose meaning is exhausted by linguistic

[3] For a critical assessment of this transition from the philosophy of language to metaphysics, see Salmon 1982.
[4] To be precise, Mill originally employed the phrase 'Real kind' instead of 'natural kind.'

conventions. Natural kind concepts refer to genuine phenomena that are sensible targets for scientific investigation. Mill's now classic example of the distinction was to compare the class of white objects to biological classifications: the members of the class of white things share no interesting properties other than whiteness, whereas generations of research have not exhausted the set of logically independent common properties of typical natural kinds such as animals and plants (Mill 2002, I, vii, §4).

After Mill, the epistemological theory of natural kinds has been advanced by Peirce (1903), Russell (1948), Goodman (1983), and Quine (1969), among others. Importantly, the epistemological tradition has been fueled by motivations that are quite different from the ones in the metaphysical theories. According to the epistemological tradition, the paramount feature of natural kind concepts is that unlike conventionally defined concepts, they cannot be given closed-form definitions. Instead,

(P1) the semantics of natural kind terms is such that it makes sense to attempt to clarify their meaning through empirical inquiry
(Griffiths 2004; Griffiths & Stotz 2008).

In the now prominent scientific realist theories of natural kinds, it has also been argued, that

(P2) natural kind concepts should track the causal structure of reality
(Harré & Madden 1975; Fodor 1987, Ch. 2; Boyd 1999).

The clusters (L1, L2), (M1, M2, M3), and (P1, P2) are not meant to be complete, or definitional features of the concept 'natural kind,' nor could they be, given the plurality of different theories of natural kinds. My aim is more modest. By dividing the features of natural kinds into partly separate clusters, I suggest that the notion of natural kind serves several distinct roles in different philosophical discussions, and that in order to escape the dilemma presented in the previous section, these different argumentative contexts should not be conflated.

For the use of the notion in the philosophy of science, P1, P2, and M2 are the crucial commitments: P1 articulates the agreement among philosophers and scientists alike that scientific concepts are a medium of storage for knowledge that originates in empirical research. P2 in turn explicates the scientific realist idea that our classifications should mesh with explanatory knowledge concerning the causal structure of reality. M2 in turn makes explicit the *epistemic*

benefit gained when P1 and P2 are satisfied: scientific concepts whose clusters of projectible properties result from empirical research on causal structures are reasonably reliable sources of inferential potential. This is the primary role of kind concepts in the grand scheme of scientific knowledge production: natural kind concepts support theoretical inferences that are involved in prediction, explanation and manipulation of phenomena.

The other clusters are somewhat distinct from the one pertinent to scientific concepts. L1 does mesh nicely with P1 as it articulates the idea that the meaning of a natural kind term is not exhausted by the descriptive content of the concept. By having their reference fixed independently of particular descriptions, natural kind concepts can latch on to their targets in reality in such a way that they can be used as revisable stores of knowledge of the properties of the target. However, although L1 and L2 might accurately describe the way in which scientific concepts often function, they are mere explications of linguistic intuitions, and hence a poor source of insight for a normative account of scientific concept formation (Mallon et al. 2009).

Most importantly, the strict metaphysical conditions do not form an indispensable part of the epistemological notion of natural kind. M2 is a central part of the epistemological notion, but M1 and M3 articulate metaphysical intuitions that are overly restrictive for the scientifically salient notion of natural kind. Although M2 has traditionally been considered as resulting from M1 and M3, in the next section I argue that while perhaps sufficient, M1 and M3 are not necessary conditions for M2 to obtain. Especially in the special sciences, natural kinds are not necessarily characterized by crisp sets of essential properties flowing from the kind's intrinsic properties, but instead the explanatory factors sustaining a robust natural kind can be relational properties of its members. Likewise, the phenomena in the special sciences are hardly supported by universal and exceptionless laws of nature, but still the scientific concepts employed in these sciences are rich sources of theoretical inferences.

Thus opens a solution to the dilemma: From the epistemological point of view, there is no reason why spatially local and historically contingent phenomena could not be natural kinds, as long as they satisfy the criteria P1, P2, and M2. Downplaying the distinction between kinds in the natural and human sciences appears reasonable because they share the same epistemic goals: reliable inductive inference and explanation of phenomena.

In the next section I introduce a mechanisms-based approach to natural kinds. I argue that mechanistic natural kinds satisfy (P1, P2, M2), and although the theory offers a permissive, anti-

reductionist view of natural kinds, it is substantive enough to function as a normative framework for scientific concept formation.[5]

4 Kinds and mechanisms

There is rarely complete agreement between philosophers. However, as Richard Samuels and Michael Fereira (2010) observe, in recent years philosophers of science have come close to a consensus according to which natural kinds are homeostatic property clusters. The HPC theory of natural kinds was originally introduced by Richard Boyd (1989, 1991, 1999), and since then there have appeared various interpretations of the theory (cf. Millikan 1999; Reydon 2009). The most prominent interpretation is a view that I call the *mechanistic theory of natural kinds* (Griffiths 1997, 2004; Machery 2005, 2009; Murphy 2006; Craver 2009; Samuels forthcoming). According to the mechanistic theory, a natural kind consists of two elements:

(α) a cluster of regularly co-occurring properties, and
(β) a homeostatic causal mechanism that brings about their co-occurrence (Boyd 1999, 67).

In short, the instances of a kind are similar, because there exists a causal mechanism that governs the co-occurrence of the typical properties of the kind.

Boyd's classic example of a homeostatic property cluster kind is a sexually reproducing biological species. Members of a species share a number of morphological, physiological, and behavioral properties (cluster α) because of the exchange of genetic material: The homeostatic mechanism (β) supporting the cluster of shared properties is interbreeding of conspecific populations combined with reproductive isolation from contraspecific ones. Members of the species produce offspring only with each other, not with individuals from other species.

Similar considerations apply to other paradigmatic examples of natural kinds such as gold and chemical compounds. The micro-level properties of gold (i.e., metal lattice) constitute the underlying structure that supports the reliable occurrence of its observable properties. In the case

[5] In order to avoid unnecessary proprietary conflicts over the term 'natural kind', it might be useful to employ Ingo Brigandt's (2003) phrase 'investigative kind' to refer to the epistemological notion of natural kind discussed in this paper.

of chemical compounds, the relevant mechanism could probably be identified at the level of chemical bonds between the atoms and molecules (cf. Kornblith 1993, 36).[6]

A comprehensive assessment of the mechanistic theory is beyond the scope of this article (cf. Hacking 1991b; Craver 2009), but the approach has several features that make it a useful framework for characterizing natural kinds especially in the special sciences.

Firstly, the mechanistic theory offers a naturalistic and anti-essentialist account of classification. Properties of kinds are not in any substantial sense explained by the kind membership itself, but instead inquiry into the causal mechanism supporting the kind explains the make-up of the property cluster. Mechanistic natural-kind concepts thus satisfy the requirements P1 and P2, according to which the contents of natural-kind concepts are revised based on empirical research on causal mechanisms.

Secondly, the theory is non-reductionist about higher-level phenomena. As noted above, much of the recent discussion about natural kinds in the sciences has revolved around the question of how to account for the natural kinds in the special sciences (Fodor 1974). Although explicit discussions of the nature of mechanisms have been largely absent in the literature (Craver 2009 being an exception), the HPC theory is not committed to *causal fundamentalism*: not all real "causal action" has to go on at the lowest levels, but even relatively coarse-grained upper-level variables can be considered genuinely causal (Woodward 2008). Several contemporary theories of causal mechanisms are compatible with this non-fundamentalist approach (cf. Woodward 2002; Machamer et al. 2000; Glennan 2002).

Boyd's example of a HPC kind, biological species, illustrates the non-fundamentalist nature of the mechanistic theory. Homeostatic mechanisms of kinds can be abstract descriptions of causal structures, and the analysis need not iterate all the way down to physical or chemical levels. Consequently, the theory allows capturing regularities that are characteristic of the levels of description of the special sciences, and the mechanistic approach is not committed to M1, according to which natural kinds are individuated based on the intrinsic properties of the members of the kind. A further advantage of employing the notion of mechanism is that it also replaces the

[6] Most contemporary accounts of mechanisms remain agnostic about the scope of mechanistic explanation. Regularities in fundamental physics cannot perhaps be adequately described in terms of causal structures (Price & Corry 2007). However, for the present purposes it is enough that the mechanistic approach applies at the levels of description pertinent to the human sciences.

problematic notion of law of nature (M3), on which many traditional accounts of natural kinds still rely (Bird & Tobin 2009).

The considerations above suggest that the mechanistic theory could account for many challenging phenomena in the special sciences. As I propose in the next section, even partially socially constructed phenomena such as bulimia can be adequately described by the theory. On the other hand, this liberal nature of the mechanistic theory is also the one feature that is likely to draw the most critical attention. Many theorists of natural kinds want to retain the difference between natural science kinds that are sustained by the common microstructure of their members, and special science kinds, which are supported by mechanisms often extending into the environment. I agree with these theorists in that too permissive a conception of natural kinds would ultimately become conceptually useless. However, for the purposes of science (prediction, explanation, and intervention) it is not directly relevant whether a phenomenon type is sustained by an internal or extended mechanism. If a social phenomenon is robust and it is characterized by a cluster of reliably extrapolable properties, it should be treated as a natural kind worthy of scientific attention just like phenomena in the natural sciences. In the following, I will characterize such partly socially sustained kinds as *weakly socially constructed phenomena*.[7]

If understood as a candidate for an epistemological theory of natural kinds, the value of the mechanistic theory ultimately comes down to its consequences for scientific concept formation and revision. In this usage, the theory has a promising track record: Paul Griffiths (1997) used his interpretation of the HPC theory as the normative basis for arguing that 'emotion' is not a useful concept in psychology. Likewise, Edouard Machery's (2005, 2009) concept eliminativism is based on the mechanistic theory. Such eliminativist arguments stem from the findings that the to-be-eliminated concepts are not supported by well-delineated causal mechanisms.

A similar distinction between mechanistically sustained concepts and mere stipulations applies also between bulimia on the one hand, and erroneous or radically socially constructed theories and concepts on the other. For instance, drapetomania was a racist construct put forward by the physician Samuel Cartwright in 19th-century United States. A central symptom of this putative illness that some American slaves were claimed to suffer from was the desire to flee captivity (Murphy 2006, 27). The malady was allegedly caused by too compassionate treatment of slaves by their masters, and whipping was suggested as a form of treatment. The difference between bulimia

[7] 'Weak social construction' corresponds roughly to what Ron Mallon (2007) refers to as 'social dependence constructionism.'

and drapetomania is clear. Bulimia is a real phenomenon sustained by complex physiological, psychological, and social mechanisms (see section five), but there never was a unitary pathological mechanism that would have correctly explained the properties of the alleged mental illness drapetomania. The apparent plausibility of the drapetomania diagnosis must have stemmed from the fact that the construct is trivially behaviorally adequate: many slaves undoubtedly shared the desire to be free and by means of violence they could be prevented from expressing this desire. However, the concept of drapetomania radically misrepresented the phenomenon by claiming that the quite rational fleeing behavior was caused by a mental pathology, a dysfunctional psychological structure. In contrast, correct explanations of the phenomenon would probably refer to normal psychological functioning under severe social oppression.

Franz Joseph Gall's phrenological classification of psychological capacities can be conceived as another example of a psychological theory now discredited by improved mechanistic knowledge. Phrenology was based on a simplistic account of cognitive architecture; the psychological capacities postulated by phrenological theories cannot be matched with neurocognitive mechanisms and localized in parts of the brain, and thus the classifications produced by the theory are not natural kinds (cf. Marshall & Fink 2003).

These considerations suggest that although the mechanistic theory relaxes many of the requirements made by the traditional theories of natural kinds, it is robust enough to function as a normative picture of scientific concept formation. It suggests that by anchoring kinds in mechanisms, we get natural-kind classifications that carve reality by its joints – also the social ones.

5 Culture-bound disorders as natural kinds: bulimia nervosa

This part of the paper concludes the argumentational line of the previous sections by suggesting how a culture-bound phenomenon such as bulimia nervosa could be characterized as a mechanistic natural kind. The fundamental challenge that culture-bound disorders present to realist theories of classification is that they appear to be supported by a heterogeneous mixture of biological and social factors. Although bulimia is a typical psychiatric kind in that there is no general agreement about the etiology of the illness or a comprehensive description of the pathological mechanisms behind it, the eating disorder has been shown to be correlated with altered serotonin neurotransmission in the brain (Fairburn & Harrison 2003; Steiger et al. 2001). Moreover, impaired executive function system might play a role in the pathogenesis of the disorder (Marsh et al. 2009). At the conscious psychological level, bulimic behavior is a consequence of body

dissatisfaction and the person's problematic relationship to eating and its control. Furthermore, at the socio-cultural level, the ready availability of (high calorie) food combined with idealized media images and norms regarding beauty strongly affect the prevalence rate of bulimia. Consequently, a complex combination of neurobiological, psychological, and social factors has a role in sustaining bulimia.

Dominic Murphy (2006, Ch. 7) has emphasized the role of mental representations as mediators between neurobiological and socio-cultural factors behind bulimia: cognitive mechanisms of mental representation are the interface between the brain and society. Social properties (norms regarding beauty) are materially represented in the brain by information stored in mental representations. It could therefore be tentatively suggested that the mechanism behind bulimia consists of at least three different sub-mechanisms:

(A) Socio-cultural mechanisms of norm maintenance and transmission
(B) Motivational or physiological mechanisms that make some people unable to live up to the norms
(C) Cognitive mechanisms of mental representation that mediate between A and B
(Murphy 2006, 269–277.)

In Murphy's account, the characteristic feature of culture-bound disorders is that they involve two-way interactions between social factors and the individual. From the point of view of my mechanistic framework, these interactions can be conceptualized as feedback connections between the different sub-mechanisms. These connections result in the socially constructed flavor characteristic of these phenomena.[8] An important consequence of the existence of the feedback connections is *complex causation* (Clark 1998). The different sub-mechanisms are not parts of a linear process, in which they would simply act as inputs and outputs for each other. Instead, the states of the components in intentional, physiological, and social mechanisms are affected by the functioning of the other mechanisms, and this results in complex crisscrossing causation (Fig. 1).

[8] Ian Hacking (1995b) has called kinds based on such feedback connections *looping kinds*.

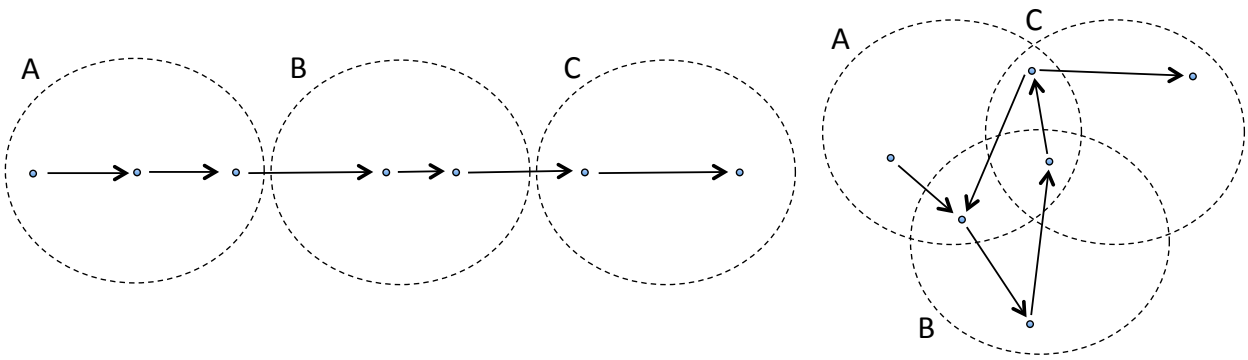

Figure 1. Linear vs. complex causation

The division into separate sub-mechanisms suggests a piece-wise classification strategy: Perhaps bulimia does not correspond to a genuine natural kind, but it should be divided into parts along the lines of different sub-mechanisms. It seems prima facie plausible to isolate the physiological pathology as the natural kind that constitutes the core of the disorder, and to claim that the *cultural phenotype* of bulimia (the contingent form that the phenomenon takes in a particular social setting) is a mere social construction. However, for both understanding complex phenomena as well as for manipulating them, it is crucial to know how the different sub-mechanisms interact. Particularly in the case of bulimia, privileging the physiological level of description seems unwarranted, given that currently the only clearly effective form of treatment for the disorder is cognitive-behavioral therapy (Shafran & Silva 2005). The relevant levels of description that guide treatment interventions are the psychological and social level, not the physiological one.

The general lesson to be learned from this is that decomposing the macro-phenomenon into parts will not make it disappear. Strict divisions of phenomena into "social" and "natural" are often artificial and an impediment to interdisciplinary knowledge production.[9] Satisfactory explanations of bulimia must take the reciprocal interactions between the different sub-mechanisms into account and study the complex phenomenon as a whole. The suggestion that emerges from the framework introduced in this paper is that the complex mechanism that consists of the sub-mechanisms A–C above should be considered as the homeostatic mechanism of bulimia nervosa (β). Accordingly, the natural kind in question is the cultural phenotype of bulimia. The complex mechanism sustains its projectible property cluster (α) that includes the characteristic etiology of the disorder, the cluster of symptoms, and response patterns to treatments.[10]

[9] In psychiatry the debates between supporters of a pharmacological approach and more therapy-oriented practitioners often reflect the unfruitful dispute about whether the mind is fundamentally a biological or socio-cultural thing. The need for an integrative conceptual framework for psychiatry has recently been recognized (e.g., Westerman 2007; Kendler 2005).

[10] In the philosophy of psychiatry, a view that emphasizes the importance of interactions between the individual and the environment has been called *moderate externalism* (Zachar & Kendler 2007).

To recapitulate, the solution that the mechanistic theory offers to the dilemma presented in section two is to find a middle-way between its horns: for the purposes of scientific concept formation, weakly socially constructed phenomena can be regarded as natural kinds. The conception of socially supported natural kind is bound to be counter-intuitive. However, it must be borne in mind where these intuitions often come from. As was discussed in section three, 'natural kind' has several distinct conceptual contrasts. Natural kinds can be contrasted to kinds whose properties are non-natural in some sense: historically contingent kinds, social kinds, mind-dependent kinds, or kinds whose properties are simply not intrinsic but relational. However, as I have argued, for the epistemological notion of natural kind, the relevant contrast class is conventionally defined kinds, whose clusters of projectible properties (if existent) are not supported by well-delineated causal mechanisms. Although weak social constructions are partially sustained by social mechanisms and therefore they are neither mind nor theory-independent, they differ from conventional kinds in the crucial sense that we cannot change them by simply altering our concepts. As genuine phenomena, they can be intervened upon only by manipulating the underlying causal mechanisms.

My solution does not imply that there are no important differences between weak social constructions and "genuinely natural" kinds (e.g., microstructural kinds): physical phenomena are surely more universal, and their associated property clusters often more robust. However, in the absence of successful large-scale intertheoretic reductions, science cannot do without the kind-terms of the special sciences. Different disciplines capture phenomena at various levels of abstraction and complexity, and the aim of the mechanistic theory of natural kinds is to apply the same very general criteria of conceptual adequacy to theorizing across different disciplines.

A central motivation for the mechanistic approach is to aim to offer a meta-level framework that would help in creating more comprehensive explanations of complex phenomena in the human sciences. As has been suggested in the literature, it appears that such a diverse group of phenomena as dissociative personality disorder, depression, the maximizing behavior of economic actors (homo economicus), and various 'extended mind' phenomena all rely on complex interactions between neurobiological, affective, cognitive, ecological, and social factors, and *could therefore be approached as complex kinds like bulimia* (cf. Hacking 1995a; Satz & Ferejohn 1994; Clark 2008). In all these cases, broadening the gaze across several levels, and outside the single individual to social mechanisms, could reveal new aspects of the target of research and thus produce better explanations of the phenomena in the human sciences. As William Wimsatt (2007) has argued, although focusing on intrinsic properties of targets has been an immensely successful

heuristic in modern science, explanations of complex phenomena sustained by intricate feedback loops would benefit from a less reductionist approach. Explanations of these phenomena must articulate dependencies between the different kinds of factors, and resists the reductivist temptation to attribute causal primacy to the lowest level. The mechanistic theory provides an encompassing conceptual framework within which interdisciplinary research on such complex phenomena could proceed.

6 Conclusions

In this paper I have defended the view that targets of research in the human sciences should be considered as natural kinds. By examining a dilemma raised by a problematic case, a culture-bound psychiatric disorder, I have argued that some rethinking of the notion of natural kind is needed in order to include such complex phenomena in the class of natural kinds. The two main observations underlying my account are that the concept of natural kind serves many masters in philosophy, and that the metaphysical construal of the concept is too restricting for its use in the philosophy of science. A lighter, epistemological notion of natural kind is sufficient for the purposes of scientific concept formation. From the perspective of naturalistic philosophy of science, the metaphysician's intuitions about natural kinds are not worth saving. Instead, the epistemological notion of natural kind should illuminate the nature of conceptual change and the practices of scientific induction and explanation.

The mechanistic theory of natural kinds that I have outlined in the paper is a promising contender for an epistemological theory of natural kinds. It offers an integrative framework that could replace the crude division between traditional natural kinds on one hand and social constructions on the other (Hacking 1999). There is no clear-cut division between social and natural causation, and hence reality does not split into natural and social spheres. Rather, targets of investigation in the human sciences are supported by complex mechanisms, and by investigating the properties of their homeostatic mechanisms, judgments regarding the robustness, scope, and sensitivity of phenomena can be made. I believe that a naturalistic mechanism-based approach to both biological and social phenomena is the best recipe for scientific success in the human sciences.

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