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Philosophy of psychiatry after diagnostic kinds

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Abstract A significant portion of the scholarship in analytic philosophy of psychiatry has been devoted to the problem of what kind of kind psychiatric disorders are. Efforts have included descriptive projects, which aim to identify what psychiatrists in fact refer to when they diagnose, and prescriptive ones, which argue over that to which diagnostic categories *should* refer. In other words, philosophers have occupied themselves with what I call "diagnostic kinds". However, the pride of place traditionally given to diagnostic kinds in psychiatric research has recently come under attack, most notably by a recent initiative of the National Institute of Mental Health, the Research Domain Criteria Project, that seeks to exclude diagnostic categories from experimental designs and focus on other sorts of psychiatric kinds. I argue that philosophical accounts privileging diagnostic kinds must respond to this new line of criticism, and conclude that philosophers need to either counter psychiatrists' growing suspicion about the hegemony of diagnostic categories in the clinic and the laboratory, or join in redirecting their efforts toward the development of robust accounts of other sorts of psychiatric objects and processes.

Keywords Philosophy of psychiatry · Natural kinds · Classification · DSM · RDoC · Scientific repertoires

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1 Introduction

For the past several decades, a significant portion of the scholarship in philosophy of psychiatry has been devoted to characterizing the central objects of psychiatric research. Attention has focused almost exclusively on *diagnostic kinds*, that is, the categories of mental disorder with which patients are diagnosed, and which are codified in taxonomies such as the *Diagnostic and Statistical Manual of Mental Disorders* (DSM) or the *International Classification of Diseases* (ICD) (e.g., Zachar 2000; Haslam 2003; Cooper 2005; Kincaid and Sullivan 2014). Examples of diagnostic kinds include schizophrenia, major depressive disorder, or generalized anxiety disorder. The philosophical debate has been over whether types of disorder like these should be thought of as natural kinds having essences (*sensu* Ellis 2001) or as natural in some other sense, such as in terms of how they contribute to psychiatry's predictive or explanatory projects (*sensu* Dupré 1981). Debates over diagnostic kinds go beyond how they are employed in the clinic, that is, how they work as instruments for matching patients with treatment protocols. Diagnostic kinds are also invoked in analyses of biomedical research; as Tekin has put it, for some time "the scientific legitimacy of mental disorders has hinged on their status as natural kinds" (2016, p. 148). Recently, the normative case has been made that, for research purposes, psychiatric kinds should be defined in terms of the underlying mechanisms that cause these signature diagnostic profiles (Beebee and Sabbarton-Leary 2010; Kendler et al. 2010; Murphy 2014). Causal mechanisms, it is argued, can explain the co-occurrence of clustering signs and symptoms and can guide biomedical researchers toward the development of successful interventions (Tsou 2016). Philosophers have defended the pursuit of these underlying mechanisms as the right way to validate diagnostic kinds, that is, to show that they represent real entities rather than social constructions.

In other words, despite a general turn away from folk-psychiatric thinking that relies on traditional clinical entities and toward a vision of psychiatry "in the scientific image" (Murphy 2006), prominent philosophical analyses continue to take the most philosophically interesting objects of psychiatric research—that is, the most interesting *psychiatric kinds*—to be these diagnostic categories, either traditional or reimagined. This assumption is exemplified in a recent entry on natural kinds in the *Oxford Handbook of Philosophy and Psychiatry,* which assumes that the psychiatric kinds philosophers study are diagnostic kinds, for the most part those categories of disorder enumerated in the DSM (Cooper 2013). Here I argue that, given recent developments in psychiatry and psychology, if philosophers seek an accurate picture of the objects studied by researchers—one that can ground their normative assessments—it is no longer appropriate to focus our attention so narrowly on diagnostic kinds, mechanistic or otherwise. A more pluralist interpretation of psychiatric kinds would ground our analyses in the processes of explanation and discovery currently underway, and allow for more trenchant critiques of these processes.

The ontology of twenty-first century psychiatry is rich. Diagnostic kinds continue to play an integral role in clinical practice, as well as research fields such as epidemiology, psychopharmacology, public health, and healthcare policy. In the context of biomedical research, however—the context most often attended to by philosophers of science interested in psychiatry, and on which this discussion focuses—their role

is shifting. The early 2000s saw a successful effort among an influential group of biomedical researchers to abandon diagnostic kinds as objects of study and to refocus psychiatry on other sorts of objects including signs, symptoms, and risk factors, and especially the biological mechanisms that might explain them, such as genetic variants and neural circuits. As I show in Section Two, advocates of what I will call this "precision turn" in psychiatry go beyond merely advocating for mechanistic explanations of diagnostic kinds. More radically, they reject the project of validating diagnostic kinds altogether, encouraging a search for explanations unregulated by psychiatric nosology. Advocates of psychological rather than biomedical approaches to mental illness have launched analogous efforts, which also aim to redirect attention to other targets such as personality dimensions, signs and symptoms, or the first-person experiences of psychiatric service-users.

I demonstrate in Section Three that, even as they raise suspicions about the validity of the DSM's and ICD's categories, several prominent philosophical accounts of psychiatric explanation and discovery are unable to envision how psychiatric research might function without diagnostic kinds. I focus particularly on accounts which employ Richard Boyd's notion of a homeostatic property cluster kind, and show how despite their focus on the discovery of mechanisms, these accounts still present psychiatry's central project to be the validation of diagnostic categories. Accordingly I call the models of discovery and explanation that such accounts employ "diagnostic kind models." There may be reasons to hold on to this sort of model despite the current shift in psychiatric research practices—I consider some—but these reasons have yet to be articulated by their advocates. And none, I argue, give grounds for excluding a broader conception of psychiatric kinds. While it may have been impossible for philosophers to have anticipated the precision turn, I argue in Section Four that its growing influence now requires that diagnostic kind models be adapted, or, alternatively, that new models of psychiatric explanation that do not assume the centrality of diagnostic categories be developed.[1] Otherwise, our reliance on diagnostic kind models may mislead us as to what are the most pressing philosophical issues facing researchers working in psychiatry today. I conclude by giving an example of a sort of explanatory model that can accommodate a plurality of psychiatric kinds, the notion of the *psychiatric repertoire*.

2 The turn away from diagnostic kinds in psychiatry

According to diagnostic kind models, the aim of psychiatric research is the validation of those diagnostic categories that refer to real types of mental disorder—what Murphy has described as the "vindication project" (2014, p. 119). This vindication is often thought to occur through the discovery of underlying causal mechanisms. The aim of clinical diagnosis is viewed as matching tokens of these vindicated types with the treatments able to intervene on their underlying mechanisms. Traditionally in the

[1] Ironically, the areas where an analysis of the role of diagnostic kinds may be most fruitful moving forward are those where there is least interest in underlying mechanisms, such as epidemiology, social policy and clinical research.

United States, vindication efforts have focused on the diagnostic kinds codified in the DSM. Dissatisfaction with the DSM is widespread among clinicians of diverse orientations, and manifests as contempt for, and in some cases open rebellion against, the hegemonic authority of the manual over aspects of clinical work such as insurance reimbursements, psychopharmacological treatment, and managed care (Bowker and Star 1999; Whooley 2010). Among biomedical researchers, the focus of this paper, it also presents as a feeling of entrapment within the nosological boundaries of the DSM, and here too workarounds have been developed Poland (2015).

As the director of the National Institute of Mental Health (NIMH) in the late 1990s, Steven Hyman became frustrated by the lack of research into treatments for the cognitive deficits of schizophrenia, which are among the most stubborn and devastating symptoms that patients diagnosed with the condition experience. He describes realizing that the lack of interest in cognitive symptoms was due to the fact that studies were designed to target diagnoses according to the DSM's criteria, and cognitive deficits were not included among the criteria for schizophrenia in the manual (2010, p. 157). As recently as 2012, Bruce Cuthbert analyzed the percentages of publications in psychiatry journals that gathered test populations on the basis of DSM categories, and found that over 90% of articles in three of the top journals—the *American Journal of Psychiatry*, *Biological Psychiatry*, and the *Archives of General Psychiatry* (now *JAMA Psychiatry*)—examined a single DSM disorder, comparing patients diagnosed with the condition to healthy controls (personal communication). Few studies compared two distinct disorders, and even fewer looked at causal relationships between other types of psychiatric objects, such as specific signs or symptoms and their underlying causal mechanisms. The worry of Hyman, Cuthbert and others was that if the DSM's categories were not valid, it would be difficult to make headway in discovering the mechanisms causing psychopathology. Few causally relevant mechanisms would be universally shared by the heterogenous patients sharing a diagnosis. The role of the DSM in gathering research samples would discourage the investigation of mechanisms underlying particular signs and symptoms (Tabb 2015).

These critics were particularly concerned with the role the categories played in grant proposals for the NIMH, which depended on the DSM to provide a common language shared between grant applicants, reviewers, and the funding body itself. An early effort to move away from diagnoses in 2001, a Request for Applications entitled "Modular Phenotyping for Major Mental Disorders," encouraged researchers to begin by "dissect[ing] currently defined mental disorder syndromes into component symptom clusters or dimensions."[2] The middling response to the Request led some to conclude that a new protocol for classifying research, not dependent on the DSM, was needed in order to bring about a shift in research priorities. The result was the Research Domain Criteria (RDoC) project, an attempt to "[i]nitiate a process for bringing together experts in clinical and basic sciences to jointly identify the fundamental behavioral components that may span multiple disorders (e.g., executive function-

[2] NIMH FFA #RFA-MH-02-009. See https://grants.nih.gov/grants/guide/rfa-files/RFA-MH-02-009.html (accessed June 22, 2017).

ing, affect regulation, person perception) and that are more amenable to neuroscience approaches."[3]

RDoC allows investigators to present experimental designs targeting fundamental dimensions of mental functioning, or "research domains." These domains, borrowed from contemporary cognitive neuroscience, contribute one axis to the matrix that the NIMH has proposed to organize psychiatric research, and are divided into more specific "constructs," such as "attention," "perception," "working memory," and "cognitive (effortful) control," which are all constructs under the domain "cognitive systems." The other axis is "units of analysis," ranging from "genes" to "behavior." By encouraging the funding of research that investigates certain dimension(s) of functioning at certain unit(s) of analysis, RDoC changes the targets of validation from DSM disorders to any sort of phenomenon that may be viewed either as an extreme on a spectrum of human variation or as a dysfunctional structure or process. Research targets are not classes of mental disorder but rather cells on the RDoC matrix that identify a certain domain of functioning studied at a certain level of analysis. Instead of aiming to discover cures for "clinical endpoints that have remained unchanged for decades," within the RDoC framework researchers can use "select symptom complexes [...] as new endpoints in the development of pharmacological and psychosocial therapeutics" (Hyman and Fenton 2003, p. 351). The NIMH encourages proposals that are comparative, crossing levels of analysis to offer integrative explanations, though they prefer that RDoC proposals focus on the level of the neural circuit—the first Strategic Objective of their Strategic Plan includes "mapping the connectome."[4]

The criticism of the DSM by advocates of RDoC is frequently presented in terms of validity, a convoluted concept borrowed from psychometrics whose meaning has changed through its history (Schaffner 2012). While traditionally used to measure the accuracy of tests in relation to a gold standard, the referent of the term has shifted from tests to diagnostic constructs, and has taken on a weighty metaphysical valence. A handbook on psychometrics for the American Psychiatric Association, for example, defines "valid" as "accurate in representing the true state of nature" (Blacker and Endicott 2000, p. 7). Hyman has concisely captured the perceived validity crisis in his analysis of psychiatric nosology as having a "problem of reification." He presents the issue in starkly metaphysical terms: "Disorders within the DSM-IV or ICD-10 are often treated as if they were natural kinds, real entities that exist independently of any particular rater" (2010, p. 156). Hyman warns that such reification is problematic when psychiatry has failed to find even one underlying mechanism, causal pathway or biosignature unique to a specific disorder, such as a proteomic biomarker or genetic anomaly.

While Hyman's strong language has garnered a good deal of attention, the problem of reification is only part of the issue. As Hyman himself makes clear, a more pragmatic concern is the role that DSM categories play in the generation and presentation of research studies. These two issues are often equated. For example Kupfer, First and Regier write, "reification of DSM-IV entities, to the point that they are considered to

[3] http://www.nimh.nih.gov/about/strategic-planning-reports/strategic-objective-1.shtml (accessed June 22, 2017).

[4] http://www.nimh.nih.gov/about/strategic-planning-reports/strategic-objective-1.shtml (accessed June 22, 2017).

be equivalent to diseases, is more likely to obscure than elucidate research findings" (2002, p. xix). However, the compromise of research designs, test populations, and targets due to the role of the DSM can continue apace whether the manual's categories are considered as real entities or operationalized heuristics. The purported crisis that motivates the RDoC effort is the continued employment of diagnostic categories in the research setting, rather than the metaphysical heft given to or withheld from those categories (Tabb 2015). The difference is important, since metaphysical accounts could be revised to avoid natural kind talk without any diminishment of the problems that diagnostic kinds can cause for research. In other words, the problem that RDoC aims to solve is not reification, or at least not reification *only*; its "intent is not to explain current disorders in terms of RDoC dimensions, but rather to support the development of studies that enhance our knowledge of these fundamental dimensions (which cut across multiple diagnostic categories) across the range from normal to abnormal" (Cuthbert and Insel 2010, p. 313). It follows that resolving the philosophical question of what kind of kind diagnostic categories are will not settle these worries about their role in psychiatric research.

The RDoC's proximate goal is to classify proper targets for psychiatric research, and its distal goal is to inform diagnostics: "While the hope is that a new way forward for clinical diagnosis will emerge sooner rather than later, the initial steps must be to build a sufficient research foundation that can eventually inform the best approaches to diagnosis and treatment."[5] The NIMH's lack of interest in reforming psychiatry's traditional nosologies is part of a larger trend, formalized in a National Research Council of National Academies (NRC) report commissioned in 2011 by President Obama to address "a truly historic set of health-related challenges and opportunities associated with the rise of data-intensive biology and rapidly expanding knowledge of the mechanisms of fundamental biological processes" (National Research Council 2011, p. 1). While the group was tasked with assessing the possibility of creating a "New Taxonomy of human diseases based on molecular biology," they determined that "a creative period of bottom-up research activity, organized through pilot projects of increasing scope and scale" was required first (3). The report cites approvingly Clayton Christensen's application of the term "precision medicine" to describe this "point where pharmacogenetics and personalised medicine meet," (125) that is, the point where large data sets identify genetic or other biomarkers which allow for stratifications of the patient population that can replace traditional diagnostic categories. These biomarkers are either mechanisms of disease or indicators of underlying disease processes that reliably correlate with treatment response. By relying on unprecedented data sets, this new approach to medicine would have "the ability to classify individuals into subpopulations that differ in their susceptibility to a particular disease, in the biology and/or prognosis of those diseases they may develop, or in their response to a specific treatment." Barack Obama's administration cut the ribbon on its $215 million Precision Medicine Initiative in 2015.

Thomas Insel, the Director of the NIMH during the conception and execution of RDoC, explicitly made the connection with precision medicine in a 2014 paper enti-

[5] https://www.omicsonline.com/open-access/letter-to-editor-Psychiatry-1000249.php?aid=41351 (accessed June 22, 2017).

tled "The NIMH Research Domain Criteria (RDoC) Project: Precision Medicine for Psychiatry." Insel lauds the NRC for capturing "the critical need for deconstructing current diagnostic groups with biomarkers to predict and improve response to treatment" (Insel 2014, p. 395). He considers the possibility of retooling symptom-based diagnoses on the basis of new biological discoveries, but concludes that "we may never have a biomarker for any symptom-based diagnosis because these diagnostic categories were never designed for biological validity" (ibid.). Instead he envisions a new mode of care where biomarkers are themselves diagnostic, allowing for the stratification of current clinical populations into much smaller subgroups known to respond to specific interventions. According to this vision diagnostic categories will not be objects of study for some time, and if they ever are again, they might be hard for a twentieth-century nosologist—or philosopher of psychiatry—to recognize. Insel sees this as a good thing: "RDoC," he writes, "is already freeing investigators from the rigid boundaries of symptom-based categories" (ibid., p. 396). In other words, the aim is not to replace the DSM's kinds with newer, better diagnostic kinds, but to exclude diagnoses from the set of objects psychiatric researchers study.

While the national Precision Medicine Initiative is mostly focused on genomic medicine, the RDoC effort celebrates neuroscience. Given the enormous influence of the NIMH over psychiatric research in the United States, its agenda is presently the most prominent challenge to the diagnostic kinds model. But it is worth noting that beyond these "beneath the skin" objects such as genes, molecules, circuits, and brain regions, efforts are also underway to refocus attention on new psychiatric kinds "above" the level of the diagnostic category. Phenomenologically-oriented psychiatrists argue for the importance of the subjective experience of people with mental illness, and new assessment tools have been developed that evaluate "anomalies that may be considered as disorders of basic or 'minimal' self-awareness," features of psychopathology that are excluded from the DSM and ICD and which may cross-cut their categories (Parnas et al. 2005). Mezzich and colleagues have developed the more expansive Person-centered Integrative Diagnosis (PID) model, which also eschews traditional diagnostic categories in favor of measures that take seriously the individual's "experience and life context," including their personal goals, ideas about human flourishing, and psychosocial weaknesses and strengths as objects of assessment. This effort is part of a larger push for person-centered care promoted by the World Health Assembly and the World Medical Association, which emphasizes positive health and in which diagnosticians are less concerned with etiopathiogenic validity than clinical validity. Accordingly, the goal of research is to discover the therapeutic implications of classification, instead of the mechanisms underlying purported disease entities. PID is compatible with the rehabilitation paradigm advocated for by psychiatrists throughout the twentieth century and most recently by Spaulding et al. (2003), who envision a model for sound clinical practice without diagnosis and sound psychiatric research without diagnostic categories.

A more recent rejection of the diagnostic kind model has emerged from the Hierarchical Taxonomy of Psychopathology (HiTOP) Consortium, which has introduced a new quantitative classification system for psychopathology (Kotov et al. 2017). The HiTOP project is motivated by recognition that the "imposition of a categorical nomenclature on naturally dimensional phenomena leads to a substantial loss of infor-

mation and to diagnostic instability" (Kotov et al. 2017, p. 4). The Consortium's aim is thus also in line with the goals of precision medicine, since it aspires to restratify the patient population using new instruments and techniques in order to improve psychopathological research and, ultimately, treatment practices. Assessment in the HiTOP system focuses on maladaptive behaviors, which are represented as continua from the normal to the severely pathological. Unlike the RDoC domains, the objects HiTOP focuses on are drawn not from more basic sciences like neuro- and cognitive science but from psychopathology: they range from behaviors, to the "constellations of closely related symptom manifestations" that constitute pathological personality traits, up to broad groups of related syndromes constituted by these traits. In contrast with traditional nosologies, syndromes are understood to be dimensional, rather than categorical. Advocates of the HiTOP system argue that its quantitative classification will avoid the problems of heterogenous test populations introduced by the reification of DSM categories in biomedical research, and maintain that it can "effectively summarize information on shared genetic vulnerabilities, environmental risk factors, neurobiological abnormalities, illness course, functional impairment, and treatment efficacy" (14). In other words, it can fruitfully integrate research on a broad range of psychiatric kinds, without relying on diagnostic kinds. But unlike the RDoC system, HiTOP is also intended to reshape diagnostic procedures, rather than just facilitate future nosological revision; the Consortium argues that "early adopters would benefit from a diagnostic formulation that is more flexible, informative, and accurate than traditional diagnoses" (16).

Van Loo et al. have noted that if psychopathology is not viewed in terms of symptom clusters caused by discrete underlying mechanisms, and if instead the space of clinical presentation is seen as continuous, comorbidity rates will contribute to, rather than undermine, psychiatric explanations (2013). From this perspective comorbidity becomes an invitation to investigate the different ways causal pathways can manifest in the clinic, rather than an indication of a failure of validity (see also Weiskopf 2017). Ultimately, seeing comorbidity in this positive light requires abandoning the quest to validate diagnostic kinds in favor of attention to relationships between signs, symptoms, and patterns (Olbert et al. 2014). Another example of a model that eschews the vindication project for the sake of explanatory power is that of Borsboom and his collaborators, which models how symptoms can form complex causal networks between themselves in the absence of an underlying disease entity. The network model provides another alternative to the diagnostic kind model; the authors argue that "meaningful relations between symptoms not only exist and should be acknowledged, but in fact are the very stuff of which mental disorders are made" (Borsboom and Cramer 2013, p. 96). Here, instead of diagnostic categories guiding research, symptoms and their relations become the objects of psychiatric explanation, and in turn form the basis for modeling syndromes.

3 Diagnostic kind models in philosophy of psychiatry

The central question in philosophy of psychiatry at the turn of the twenty-first century was whether diagnostic kinds are natural—that is, whether the similarities between

their members are caused by a shared essence, as opposed to being constructed by social practices [for an overview see (Radden 2003) and (Cooper 2005)]. Despite the popularity of the natural kinds view with laypeople (Haslam and Ernst 2002), most philosophers have been pessimistic about whether diagnostic categories track objective divisions in nature. Short of this, diagnoses have been proposed to be human kinds (Hacking 1999), practical kinds (Zachar 2000, 2003) or kinds sharing "determining properties" (Cooper 2005).

Over the past decade a tentative optimism has emerged about the possibility of finding, if not traditional essences, at least underlying mechanisms that could justify a realist view of mental disorders (Murphy 2006; Tsou 2012; Kendler 2012). This philosophical project can be traced back to Carl Hempel's 1959 address to the American Psychopathological Association, in which he argued that after strengthening its descriptive taxonomy, psychiatry should "permit the establishment of general laws or theories by means of which particular events may be *predicted* and thus *scientifically understood*" (Hempel 1994, p. 317; italics in original). While this positivist ideal has fallen away, the philosophical interest in theorizing how psychiatry might find natural kinds has continued (for further discussion see Sullivan 2017). One popular avenue has been to adopt Boyd's metaphysically permissive account of homeostatic property cluster (HPC) kinds, in which kinds are called "natural" when they contribute to the accommodation of the causal structure of the world by our linguistic, classificatory, and inferential practices (Boyd 2009). Boyd's theory of HPC kinds is friendly toward diagnostic categories because it allows polythetic membership conditions, just like the DSM. Instead of metaphysically-demanding underlying mechanisms, Boyd's account only requires that the unity of the properties be causally explicable, at least in theory. Accordingly, it has been adopted by philosophers eager to show that a causal account of diagnostic kinds is possible, even without underlying essences.

Kendler, Zachar and Craver, for example, suggest that psychiatry "follow the lead of the philosopher Richard Boyd and shift from the quest for essences of psychiatric kinds [...] to a quest for the complex and multi-level causal mechanisms that produce, underlie, and sustain our psychiatric syndromes" (2010, p. 15). They argue that Zachar's practical kinds model, which describes psychiatric classifications as lacking essences and being determined solely on the basis of utility, "may describe accurately how classifications are developed" but "provides limited guidance about how to build a classification." The authors continue that "if psychiatry seeks to move toward a causally based classification, in line with most of the rest of medicine" it should conceive of psychiatric disorders as what the authors call, after Boyd, "mechanistic property cluster (MPC) kinds." This account keeps Boyd's basic picture but makes it less permissive by incorporating the rigorous account of mechanism provided by Craver and his collaborators (Machamer et al. 2000). The aim of the MPC kind account is prescriptive as well as descriptive; it aims to facilitate the development of a causally-based classification system. The authors proffer "an injunction to link psychiatric nosology as closely as possible to our emerging knowledge of the causal structures that play a key role in producing, sustaining and (we hope someday) preventing or treating these disorders."

Advocates of RDoC would no doubt be happy for nosologists to be so enjoined. They would balk, however, at the authors' tacit insistence on the place of diagnostic kinds

in research: "The MPC view encourages the thought that there are robust explanatory structures to be discovered underlying most psychiatric disorders" (Kendler et al. 2010, p. 4). The authors do not respond to the criticism summarized above, that psychopathological structures might be better approached independently of diagnostic categories. Similarly, Beebee and Sabbarton-Leary argue that "given the HPC account, there are, at least *prima facie*, no principled metaphysical reasons to deny that psychiatric kinds can be natural kinds," while leaving open the possibility that "a significant amount of reclassification will occur in the future" (Beebee and Sabbarton-Leary 2010, p. 12). Throughout their paper, the authors assume that psychiatric kinds are interchangeable with the disorders categorized in the DSM, or some improved iteration thereof. Their analysis of whether some psychiatric kinds are natural kinds thus is actually an analysis of diagnostic kinds, that is, of those diagnostic categories employed in the clinical setting. In writing that "the very *point* of psychiatric classification is that it aids treatment," the authors ignore the role of diagnostic kinds in the research setting. This matters because the authors maintain that "if psychiatric kinds are not natural kinds, the status of psychiatry as a *bona fide* scientific discipline might be brought into question" (ibid.). But the rejection of diagnostic kinds (in favor of other kinds of psychiatric kinds) is precisely the NIMH's strategy for *improving* the status of psychiatry as a *bona fide* scientific discipline.

The mechanistic approach to diagnostic kinds has been developed most thoroughly by Murphy. In his *Psychiatry in the Scientific Image* (2006) Murphy uses the term "exemplar" to signify the target of psychiatric explanations, "an idealized theoretical representation of a disorder" (2006, p. 206).[6] The project of psychiatry is to model exemplars by advancing the understanding of their causal mechanisms in order to better approximate the "final theory" of the clinical entity. However, the role of exemplars in Murphy's account is problematic. On the one hand, he writes that "an exemplar is a set of symptoms that can be abstracted from the data and studied together as a *target* of explanation" (2006, p. 209), while "the *model* explains the relations between features of the exemplar in terms of representation of causal processes that occur in the patient" (2008, p. 113, italics mine). On the other, he writes that "an exemplar is a faithful depiction of causal relations in nature" (2006, p. 209). Exemplars seem to provide both the targets of psychiatric explanation and its ideal taxa, doing double duty in the account as the starting materials and the ultimate products of nosology: "I understand exemplars as not only the objects of psychiatric explanation, but also the taxa employed in psychiatric classification. Nosology […] is the sorting of explained exemplars into classes that reflect causal-historical structure, a blend of proximate (neural) and distal (developmental and environmental) causes" (2006, p. 202). But whence the unexplained exemplars?

It may be that Murphy's exemplars, which have "*room for* specifications of symptoms and a variety of *possible* explanatory structures" (2006, p. 364, italics mine), are none other than the diagnostic kinds already embedded in contemporary psychiatric practice, such as those codified by the DSM. Murphy's repeatedly condemns the

[6] Murphy's use of the term differs from its usual usage in the philosophy of psychology, in which it is not a summary representation of a class of objects, but a representation of an illustrative individual that belongs to a class (Murphy 2004).

DSM's categories, which have "developed haphazardly" (2006, p. 333) in what he calls "an intellectual and therapeutic disaster" (2006, p. 331). However, while he does not believe that research into the mechanisms underlying psychopathology will leave our contemporary categories unchanged—far from it—his account leaves intact the central role of diagnostic kinds in research. While highly critical of the DSM's demarcations, his aim is to see the categories redrawn on etiological grounds, rather than abandoned as a laboratory instrument. This is a common, though often implicit, stance among philosophers [for another explicit example see (Tsou 2012) and (Tsou 2016)].

In later work Murphy describes the diagnostic kind concept that guides research as a "causal signature"—the "distinctive pattern showing through the diversity and leading us to an underlying causal mechanism" (2014, p. 119). This vocabulary can help make sense of his earlier example of schizophrenia, where he describes the first step toward an understanding of the disorder as sketching "an exemplar of schizophrenia that represents a consensus on its main features" (2006, p. 228). The next step is to explain this diversity of signs and symptoms of schizophrenia taken to be "canonical" in terms of one or more causal mechanisms, and to use these mechanisms to differentiate schizophrenia from its taxonomic relatives like schizoaffective disorder and uni- and bipolar depression. In considering attempts to model the schizophrenia exemplar, Murphy uses the exemplar itself to evaluate the merits of theoretical approaches: modular models, he argues for example, are less promising because they "fail to explain all the symptoms of schizophrenia" (2006, p. 247). The causal signature sets the parameters for the vindication project.

But as Murphy recognizes, all attempts to vindicate current diagnostic kinds rely on "the wager that folk attributions of mental disorder track genuine causal signatures, rather than just imposing a unity dictated by how other people strike us" (2014, p. 119). While Murphy remains open to the possibility that there are natural kinds represented by genuine causal signatures and constituted by genuine causal mechanisms, he acknowledges that "it may not be folk psychology that detects them" (2014, p. 121). And none of the prescriptive diagnostic kind models offered up by philosophers do better in making clear what *will* detect them in the absence of diagnostic kinds. Nonetheless, enthusiasm for vindication projects remains strong. As Weiskopf has noted, this can result in a bad habit that has been "bequeathed to us by the tradition of natural kinds," wherein we "perseverate in insisting on a model of scientific categories as homogeneous even when the phenomena repeatedly say otherwise" (2017, p. 186).

Advocates of precision psychiatry can be seen as in step with these recent philosophical efforts when, for example, they refer to psychiatry as "applied clinical neuroscience" (Insel and Quirion 2005). But NIMH's diagnosis of the problem, and ensuing prescription for recovery, is more radical than those offered in the philosophical literature. Rather than simply challenging the DSM's explicit operationalist stance and implicit essentialism, the RDoC vision rejects the central role diagnostic categories have played in setting the targets of validation—that is, it rejects the vindication project. Accordingly, RDoC's defenders would not be pleased with Murphy's recent characterization of their project as validating diagnoses through understanding their causal structure, even though they might agree that "a diagnosis is valid if it rests on a biological process that can be identified by experimentation and observation using the methods of the biological and cognitive sciences" (Murphy 2015). While

such discoveries would be, in their view, all to the good, the NIMH is no longer in the business of vindicating diagnostic kinds. It is interested in funding the translational research that will render exemplars obsolete by providing biomarkers that can act as better targets for psychotherapeutics. It is in this sense that RDoC is part of the emerging turn toward precision; its goal is that future psychiatric interventions will directly target the mechanisms that cause psychological suffering, without mediation from diagnostic kinds (Insel 2014). Despite its profoundly different orientation, HiTOP is similarly impatient with the vindication project.

Insofar as diagnostic kind models may be normative as well as descriptive, their advocates might argue that, if they no longer describe psychiatric research as envisioned by the NIMH or the HiTOP Consortium, so much the worse for these efforts. In other words, it might be maintained that diagnostic categories have an important place in psychiatric research as it *should* be practiced. Philosophers as well as psychiatrists have raised numerous challenges to the RDoC framework [for an overview see (Faucher and Goyer 2015)], and a further line of defense for advocates of the diagnostic kind model would be to argue that sticking with their approach would avoid these pitfalls. As noted above, a rejection of the DSM's role in research has gone hand in hand with the rejection of categorical approaches and the embrace of dimensional ones (see also Widiger and Clark 2000; Eaton et al. 2011). However, there are repercussions for this turn away from the conceptual architecture of traditional psychopathology, due to the longstanding problem of demarcating the boundary between the normal and the pathological (Wakefield 2014). If psychiatric research moves forward without a singular focus on diagnostic kinds, it risks haphazardly pathologizing variations in functioning that have traditionally been below the clinical threshold monitored by the DSM. Furthermore, diagnostic categories have played a growing role in identity politics from the mid-20th century onwards, and recent shifts in the manual have shown how traumatic it can be to service-users when a category is omitted or altered in revision, changing its extension (Frances and Widiger 2012).

A related reason for holding onto the diagnostic kind model might be that the embrace of basic science by the NIMH will cause less of their budget to go toward clinical research themes such as the efficacy of different treatment modalities, the impact of sociological and economic factors on prevalence rates, or the effects of changes in healthcare policy on patient outcomes. Indeed there is evidence that this sort of shift in funding priorities is already underway.[7] Medicine is a practice, and a normative one at that, so the turn away from a research focus on patients towards underlying mechanisms is an ethically loaded act. Those who believe that the best explanations in psychiatry will be found at the level of the person or their environment condemn this shift, and psychiatrists and psychologists have objected to what might be called the NIMH's "neurocentrism" (Parnas 2014; Lilienfeld et al. 2015). They worry that without careful attention to the phenomenology of mental suffering, psychiatric research will fail to locate *medical* objects at all, and psychiatry will fail to meet its imperative to cure the sick.

[7] Insel, Thomas, "Anatomy of NIMH Funding," available at http://www.nimh.nih.gov/funding/funding-strategy-for-research-grants/the-anatomy-of-nimh-funding.shtml.

This is a powerful and persuasive criticism; but it is not clear that the focus on diagnostic kinds has done much to stop this shift in research priorities, nor that it is the best way to do so moving forward. With respect to RDoC, a critical assessment of the NIMH's Strategic Plan by ethicists, service-users, public policy experts and tax-payers may address this concern better than a defense of diagnostic kinds by philosophers of science, since antireductionism can be defended without or without the diagnostic kind model. This is apparent in person-centered, rehabilitation-oriented paradigms and the HiTOP initiative, both of which eschew diagnostic kinds but do not reduce the psychological to the biological. These efforts are the work of psychiatrists who are keenly aware of the importance of keeping psychopathology as the target of psychiatric research, who find neurocentrism otiose, and yet who still reject diagnostic kinds.

4 Philosophy of psychiatry after diagnostic kinds

Haslam has argued that adopting a pluralist approach to the question of what kind of kind diagnostic categories are will reap dividends. He has offered a taxonomy of diagnostic kinds that, he argues, can help differentiate between the normal and the pathological, distinguish latent structures, suggest appropriate measurement techniques, and otherwise guide research and practice (Haslam 2003). In this section I argue for an expansion of Haslam's pluralistic approach, sharing his pragmatic intuition that bringing a broader set of clinical and laboratory objects into view will not only enrich our characterizations of psychiatric practice, but also contribute to its development. I conclude by suggesting that it will also lay bare the challenges of the philosophical project of characterizing discovery and explanation in psychiatry, which is masked by diagnostic kind models. Once the diversity of psychiatric objects is recognized, the daunting task of showing how they are identified, manipulated, utilized, and integrated into explanations across the diverse clinical and laboratory settings in which they are employed comes into view.

In a critique of Murphy's exemplars Mitchell writes, "How levels and causes work together to produce the disorder in a single idealized case is the goal of exemplar explanation." From the perspective of her contrasting account of integrative pluralism, on the other hand, "the theoretical work [is] directed to determining how each level or cause could contribute alone, and the integrative work of putting them together [is] left for the application of multiple models simultaneously to a specific concrete case" (2008, p. 130; Mitchell 2008). Sullivan has proffered reasons to doubt that this integrative work will be at all straightforward in practice, however, since the diversity of scientific approaches required to investigate psychopathological phenomena "is an important contributing factor to the instability of mental disorders as kinds of phenomena insofar as each area of science has different assumptions about the best way to operationalize mental disorders (e.g., which measurement techniques to use), where to look for the mechanisms (i.e., where in the brain or world and at what level of organization), how to look for them (i.e., different methodological strategies), and where to intervene so as to determine causal relationships (e.g., which neurotransmitter system, which receptors)" (Sullivan 2014, p. 261).

A discussion of the integrative challenges RDoC in particular faces in combining psychiatric kinds from different sciences (such as psychology and neuroscience) can be found in Sullivan (2016). Here Sullivan takes as exemplary the construct of attention, which in psychology is explained through an analysis of its function as a short term storage system but which in neuroscience is described mechanistically in terms of the activity of dopamine receptors and the medium spiny neurons of the nucleus accumbens. For RDoC to serve as a catalyst for new discoveries about attention, she argues, these diverse approaches must be integrated into a stable construct that can function as a research target across disciplines. If and how explanatory integration is possible is a traditional question within philosophy of science, and is one the philosopher can attend to without reference to diagnostic kinds—though the ontology of other psychiatric kinds will be pertinent. The precision medicine turn has seen funding pour into behavioral genetics and clinical neuroscience, but a central question is whether accounts at the level of the gene and the circuit can be integrated, and translated to the clinic.

Indeed, it may be that the focus on diagnostic kinds has led to an unjustifiable optimism, in which the challenges of integration are underestimated and the dangers of what Sullivan (2017) has referred to as "self-defeating" or "uncoordinated" pluralism are masked. Twenty-first century psychiatric objects—from genetic risk factors to abnormal behaviors to harmful social configurations—are requiring new assessment tools, new experimental techniques, and new theoretical constructs. Making descriptive arguments about contemporary psychiatry will require that philosophers familiarize themselves with these diverse aspects of psychiatric practice. But a close attention to the actual targets of current research will also be required for normative projects. Critics have argued that diagnostic categories have harmed rather than helped, not (or not only) because they operationalize psychopathological constructs, posit essences or rely on folk psychology, but because they focus investigation on the level of the syndrome. Insofar as philosophers aim to assess whether this claim has merit, a central project will be to critically analyze the research and discovery of other sorts of psychiatric kinds besides diagnostic categories, and to consider whether this work may be integrated into a unified science of biomedical psychiatry (for recent evaluations of the promises and challenges of this sort of translational research see, e.g., Simmons and Quinn 2014; Wong et al. 2010). Among clinicians, there is widespread agreement on the signs and symptoms that cause the most desperate clinical distress among patients, and transdiagnostic studies focusing on these features have been rewarding (e.g., Rauch and Carlezon 2013). These results complement epidemiological and sociological studies that target higher-level factors implicated in the causation of mental illness that crosscut diagnostic categories, such as poverty and domestic violence (Bentall et al. 2009).

Philosophers will need new models that can capture how explanation works in such complex cases. One promising approach is the idea of *repertoires* of psychiatric practice. Scientific repertoires have been defined by Leonelli and Ankeny as "distinctive and shared ensemble[s] of elements that make it practically possible for individuals to cooperate, including the norms for what counts as acceptable behaviors and practices together with the infrastructures, procedures and resources that make it possible to implement such norms" (2015, p. 701). To get the full picture of entities, concepts, methods, skills, instruments and processes that come together in the research

and clinical practices of psychiatry, attention to the logistical dynamics that shape what is considered an appropriate psychiatric kind will be necessary. The notion of a repertoire can help philosophers assess the ontological status of the entities around which methods, practices, and norms cluster, regardless of what kind of kind they are (Sterner, unpublished).

A starting point for thinking about the different repertoires employed by psychiatrists is to distinguish between the central constructs employed in the clinical and research settings. Diagnostic kind models have masked the growing divergence between the objects of interest for these two broad constituencies within psychiatry, and encouraged the problematic assumption that the terms used in the clinic refer to the objects of laboratory study. In fact, the vastly different research methods, professional conventions, reward structures and explanatory aims of these settings means that even when they are using the same terms, they are not likely to refer to the same phenomena. The collaboration—and lack thereof—between healthcare practitioners, basic science researchers, clinical researchers, and service users will generate a range of psychiatric kinds that are critical to discovery and explanation in the field, broadly conceived.

Repertoires are an especially appropriate way to model the socioeconomic, intellectual, and political contexts out of which psychiatry's diverse ontology emerges under the precision turn; Ankeny and Leonelli envision the model as fitting "the contemporary context of 'big science' carried out through multidisciplinary projects occurring within international networks" (2016, p. 19). As the authors note, an important moment in the establishment of a repertoire is the development of a strategic vision. I described above how the NIMH's strategic vision for RDoC encourages particular funding priorities, certain modes of data collection and analysis, and preferences between diverse measurement instruments, scales, experimental subjects and levels of explanation (see also Sullivan 2017). It encourages certain sorts of collaboration and discourages others, and develops new relationships between consumers and tax-payers through its original modes of communication (e.g., RDoC's twitter account, message boards, relationship with the media, etc.). This repertoire is the context for the psychiatric kinds that the NIMH is urging researchers to focus on, and the successes and failures of their initiative will only be explicable once it is understood. While the RDoC initiative is very recent and may well not ultimately take hold, its implementation has led to substantial discussion among psychiatrists over the role of the DSM in the research setting (see, e.g., the February 2014 issue of *World Psychiatry*). Local projects like HiTOP as well as more global shifts like the precision medicine turn suggest that even if RDoC itself fizzles out under administrative changes at the National Institute of Mental Health, psychiatry will continue to move away from diagnostic kinds, supported by new repertoires. These provocations seem to warrant engagement by philosophers concerned with describing, and prescribing, psychiatric classification, explanation, or discovery.

5 Conclusion

I have argued that our best philosophical accounts of psychiatric kinds continue to focus on diagnostic kinds, even as they emphasize the role of causal mechanisms in psychiatric discovery and explanation. If the call to reorient psychiatric research away

from diagnoses continues to be influential, diagnostic kind models may no longer be the most appropriate, or the most interesting, site for analysis by philosophers of psychiatry. As noted above, diagnostic categories remain crucial to clinical practice and many fields of psychiatric research. There is no doubt that they will also remain as objects within the repertoire of biomedical psychiatry. But their role is shifting, and settling their metaphysical status without a careful consideration of how they are actually employed by researchers will compromise philosophical efforts. While generating an account of diagnostic kinds after the precision turn is outside of the scope of this paper, an example of a more realistic assessment which views diagnostic categories functionally is the theory of epistemic hubs, according to which psychiatric taxonomies "need to uphold a certain degree of fuzziness in their descriptions of disease and mental disorders in order to allow different actors to connect their more restrictive classification systems to the epistemic hub and thus to other actors" (Kutschenko 2011, p. 586). A compatible analysis is offered in Tabb and Schaffner (2017), where we maintain that diagnostic kinds are best conceived of as "robust patterns" revealed by the juxtaposition of diverse stratifications of the patient population produced by different theoretical perspectives. Viewing diagnoses as dense nodes in networks of theoretical information highlights that their place in psychiatry is relational and contingent; as Weiskopf has put it in his defense of this sort of model against mechanistic cluster kind approaches, "disorder becomes a territory that interested parties compete over in an attempt to reclaim what it means" (2017, p. 185).

Whatever account of diagnostic kinds is adopted, however, it must be accompanied by attention to other psychiatric objects such as risk factors, neurological mechanisms, psychosocial or environmental influences, phenomenological states, genetic or chemical biomarkers, personality dimensions, clinical regimens, and the rich assortment of persons who administer, receive, and research psychiatric care. It also must be open to the possibility that psychiatry is increasingly functioning with a diversity of diagnostic systems, some categorical and some not, that are evolving to fit the profession's manifold and diverse demands (Lilienfeld 2014). Traditional questions about the metaphysics of psychiatry's objects may be pertinent in the evaluation of psychiatric kinds moving forward; but posing them will only become possible when diagnostic kinds are put in their proper place.

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