

## What Neuroscience Tells Us About Mental Illness: Scientific Realism in the Biomedical Sciences

*Lo que la neurociencia nos dice sobre la enfermedad mental:  
el realismo científico en las ciencias biomédicas*

Marc Jiménez-Rolland\* ; Mario Gensollen\*\*

\*Universidad Autónoma Metropolitana, Unidad Cuajimalpa, México  
mjimenezr@cua.uam.mx

\*\*Universidad Autónoma de Aguascalientes, México  
mgenso@gmail.com

### Abstract

Our philosophical understanding of mental illness is being shaped by neuroscience. However, it has the paradoxical effect of igniting two radically opposed groups of philosophical views. On one side, skepticism and denialism assume that, lacking clear biological mechanisms and etiologies for most mental illnesses, we should infer they are constructions best explained by means of social factors. This is strongly associated with medical nihilism: it considers psychiatry more harmful than benign. On the other side of the divide, naturalism and reductionism are on the look for failures in the biological functioning of the organism whenever a genuine mental illness occurs. Psychiatry as currently practiced, accordingly, exhibits the gaps of an ongoing research programme; a yet to be completed neuroscience would link mental illnesses with identifiable biological mechanisms. Both sides of this divide claim to be fostered by scientific discoveries and advances in neuroscience, when taken at face value. Against this background, we argue instead for a modest view. To that end, we draw attention to some nuances in the scientific realism debate. While contending that neuroscientific theories and models aim to provide true representations of their target systems, and can justifiably claim to have attained some, we argue that our confidence should not be placed beforehand in specific features of these scientific representations. Hence, it would be unwarranted to extract morals for psychiatry from posits (or their absence) in



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neuroscientific explanations of mental illnesses. To illustrate our position, we examine some recent discoveries in neuroscience concerning bipolar disorder. We conclude by linking our topic to a broader issue in the philosophy of medicine: insofar as psychiatry is a biomedical specialty, its classifications of health and disease are guided by pragmatic concerns, as well as by scientific discoveries.

**Keywords:** philosophy of psychiatry, reductionism, medical nihilism, *carte blanche* realism, medical pragmatism.

### Resumen

Nuestra comprensión filosófica de la enfermedad mental está siendo moldeada por la neurociencia. Sin embargo, tiene el efecto paradójico de alentar dos grupos radicalmente opuestos de posturas filosóficas. Por un lado, escepticismo y negacionismo asumen que, al carecer de mecanismos y etiologías biológicas claras para la mayoría de las enfermedades mentales, debemos inferir que son construcciones mejor explicadas mediante factores sociales. Esto está fuertemente asociado con el nihilismo médico: considera a la psiquiatría más dañina que benigna. Al otro lado de la línea divisoria, naturalismo y reduccionismo buscan fallas en el funcionamiento biológico del organismo cuando ocurre una enfermedad mental genuina. En consecuencia, la psiquiatría como se practica actualmente exhibe las lagunas de un programa de investigación en curso; una neurociencia aún por completar vincularía las enfermedades mentales con mecanismos biológicos identificables. Ambos grupos afirman ser fomentados por descubrimientos científicos y avances en neurociencia, cuando se toman al pie de la letra. En este contexto, defendemos una posición más modesta. Para ello, llamamos la atención sobre algunos detalles en el debate sobre el realismo científico. Aunque afirmamos que las teorías y los modelos neurocientíficos tienen como objetivo proporcionar representaciones verdaderas de sus sistemas objetivo y podemos afirmar justificadamente que han obtenido algunas, argumentamos que nuestra confianza no debe depositarse de antemano en características específicas de estas representaciones científicas. Por tanto, no estaríamos justificados al extraer moralejas para la psiquiatría a partir de lo postulado (o no) por explicaciones neurocientíficas de las enfermedades mentales. Para ilustrar nuestra posición, examinamos algunos descubrimientos recientes en neurociencia relacionados con el trastorno bipolar. Concluimos vinculando nuestro tema a una cuestión más amplia en la filosofía de la medicina: en tanto la psiquiatría es una especialidad biomédica, sus clasificaciones de salud y enfermedad están guiadas tanto por preocupaciones pragmáticas como por descubrimientos científicos.

**Palabras clave:** filosofía de la psiquiatría, reduccionismo, nihilismo médico, realismo *carte blanche*, pragmatismo médico.

## 1. Introduction

Our current perception of mental illness is vividly associated with talk of neurological conditions. It is common to link psychiatric diagnoses with ‘chemical imbalance’, ‘neural damage’, ‘genetic disposition’, and so forth (Hoffman 2019). This shift, which gained momentum changing ‘quickly and completely’ the medical profession from the decade of 1980 onwards (Harrington 2019), is merely a reflection of how profoundly our philosophical understanding of mental illness is being shaped by neuroscience. However, rather than providing common ground for future research and therapeutical treatment, this upshot has spurred diametrically opposed critical responses.

One group of extreme philosophical views has reacted with skepticism and denialism about mental illness (Szasz 1961; Middleton & Moncrieff 2019). They assume that talk of neuroscience in psychiatry is just hot fuss, since to this day we lack clear biological mechanisms and etiologies for most mental illnesses. Instead, many diagnoses are better explained as social constructions (such as labeling, role-adoption, broadcasting, and imitation of stereotypes). There are reasons for concern, since even the recent history of psychiatric diagnosis is plagued with scandal by pretending to impose social and cultural prejudice as the result of scientific findings. For instance, in the mid-nineteenth century, the physician Samuel A. Cartwright coined the term ‘drapetomania’ for the supposed mental illness that caused enslaved Africans to flee from captivity. The term was still included in medical dictionaries in the first decades of the twentieth century. Even more recently, homosexuality was considered a mental illness less than half a century ago, until the American Psychiatric Association (APA), in preparation of the third edition of its official classification of mental disorders, distanced itself from psychoanalytic theory. The upshot of denialism and skepticism is strongly associated with a form of medical nihilism: it considers that psychiatry, as currently practiced, has brought more harm than good to humanity, since it has been used to repress and isolate those who do not conform to institutionalized patterns of social coexistence. Linking neuroscientific findings with psychiatric diagnosis, in these views, is just a futile attempt to validate a censurable social practice.

Another group of views with a radically opposed philosophical vein sees the integration of neuroscience and psychiatry with optimism, as an expected result of the naturalist and reductionist programme of unifying the human and natural sciences (Wakefield 1992; Insel 2009; Tsou 2021). They recognize there are significant hurdles and gaps in our knowledge of the human organism and the failures in its biological functioning that befall whenever a genuine mental illness occurs. Nevertheless, that is to be expected in an ongoing research programme: a yet to be completed neuroscience would revolutionize psychiatric practice by linking mental illnesses with identifiable biological mechanisms. There are reasons for optimism, since the last decades have witnessed a surge in diagnostic tools with enhanced specificity to identify major and mild neurocognitive disorders (previously known as ‘dementias’); these include biological markers identified by means of imaging techniques as well as through molecular genetic mapping (APA 2022, xxv-xxvi). This enthusiastic assessment by naturalists



and reductionists calls for doubling down on this intellectual enterprise (and on its financial funding), expanding neuroscientific research on mental illness. According to these views, we should expect an overall integration of neuroscientific discoveries with psychiatric clinical practice.

Of course, in each of these sides of the divide there is room for nuance. Skeptics and constructivist can (and often do) recognize that a few psychiatric conditions are genuinely caused by biological disfunction (Middleton & Moncrieff 2019, 48, 53; Tsou 2021, 11 n. 10). Similarly, naturalists and reductionists can anticipate massive changes in our classification of mental disorders (Hyman 2007, 731). Thus, both extreme positions would coincide in considering that psychiatry, as currently practiced, is deeply flawed. Instead of mediating between these extreme positions, in this paper we question a shared assumption of both of these approaches, and we argue for an alternative framing of the issue. Taking neuroscientific discoveries into account should be useful to calibrate the appropriate level of confidence in psychiatric diagnosis, but that does not grant strong warrant for singling out biological mechanisms or etiologies for mental illnesses. Although we can cast doubts about psychiatric diagnosis, these should be guided by (the lack of) evidence and not by an overall view about ontological commitments of scientific theories. This is an application of what we have elsewhere called ‘*Carte Blanche* Realism’ (CBR) (Gensollen & Jiménez-Rolland 2021). We explore some of its consequences for the philosophy of neuroscience.<sup>1</sup> In this setting, we argue that CBR has implications for the division of cognitive labor in scientific research, as well as in the attitudes of both consumers and producers of scientific representations.

In order to support our stance, we start by presenting some general issues surrounding the relevance of neuroscience to address questions about the objectivity and classification of mental illnesses. After a brief general overview of the debate, we identify an assumption about the ontological commitments of scientific representations that looms largely unexamined. By questioning that assumption and offering an alternative framing of the scientific realism debate, we argue for a modest view of the relevance of neuroscientific discoveries to psychiatric practice. In a second section, we illustrate and provide support to our position by examining discoveries in neuroscience concerning bipolar disorder –which is usually deemed as a clear example of an illness caused by biological disfunction–. In the third section, we link our topic to a broader issue in the philosophy of medicine: insofar as psychiatry is a biomedical specialty, its classifications of health and disease are guided by pragmatic concerns, as well as by scientific discoveries. While subscribing a broadly realistic stance towards the mechanisms

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<sup>1</sup> Although this label is often used interchangeably with ‘neurophilosophy’ for describing philosophy inspired in the methods and discoveries of neuroscience (Bickle, Mandik & Landreth 2019), we use it instead for referring to the philosophical inquiry into problems of neuroscience: its concepts, methods and posits, different levels of explanation, and its relations with other kindred disciplines such as psychology and psychiatry, and so forth.

underlying human pathologies, we do not dismiss the relevance of this pragmatic dimension of medical classifications. We conclude by pointing out some of the consequences of our position for institutional scientific practice and its societal role.

## 2. Objectivity in neuroscientific basis of psychiatric diagnosis

One of the central problems in the philosophy of psychiatry concerns the objectivity and classification of mental illnesses (variously called ‘disorders’, ‘pathologies’, ‘diseases’, ‘syndromes’, ‘conditions’, ‘disabilities’ or ‘differences’). Although forecasts are rather diverse, it is widely acknowledged that neuroscience provides relevant insights to this issue. In this section, we present some of the major positions in the debate over the objectivity of psychiatric classifications *vis à vis* neuroscientific discoveries. We argue that, by questioning a common assumption of these views that is deeply entrenched in the scientific realism debate, it is possible to reframe the issue and support a modest position.

### 2.1 Informing psychiatry with neuroscience

The field of neuroscience is a rapidly growing area of research, with plenty of promising applications: from improving education and fostering creativity to treating addiction and developing healthier relationships. The discipline is characterized by an abundance of empirical data, though it lacks a unique unifying theoretical framework; instead, it takes a piecemeal approach, providing different models for distinct mental functions such as perception or memory (Gouveia 2022, 19). Although several alternative research agendas seek to remedy this lack of unity, there is broad scientific consensus in the general claim that brain activity is relevant for understanding mental functions, as well as in the use of certain imaging techniques for gathering evidence, and in the quest for a smooth integration with physics, chemistry, and biology.

It is widely expected that this field of scientific research will transform several aspects of public health, especially in psychiatry. Since 1986, the former director of the National Institute of Mental Health (NIMH) in the United States, Herbert Pardes, claimed that information, technologies, and approaches steaming from neuroscience would have crucial clinical implications for psychiatry (Insel 2009, 129). In a brief note from 1992, *Science* also reported great expectations from the results in neuroscientific research for addressing mental disorders, while identifying some major challenges (1992, 1867). Fifteen years later, Steven Hyman expressed similar enthusiasm for incorporating neuroscience into psychiatric diagnosis, while acknowledging

... the difficulty of characterizing the circuitry and mechanisms that underlie higher brain function, the complexity of the genetic and developmental underpinnings of normal and abnormal behavioural variation, and the unsatisfactory nature of current animal models of mental disorders. (2007, 725)

Adopting a naturalistic standpoint, Thomas Insel, director of the NIMH from 2002 to 2015, summarized four specific opportunities to inform psychiatry with neuroscientific discoveries. First, understanding mental disorders as brain disorders could help in finding their distal causes (*e.g.*, through genomic investigation and epigenetics). Second, understanding mental disorders as developmental brain disorders could potentially allow for interventions preventing their most disabling aspects. Third, recognizing the individual traits associated with treatment response could help in the design of personalized treatments. And finally, research on, and training for, evidence-based select psychosocial treatments could provide effective treatment for many people (2009, 130-132). While acknowledging that the gap between basic biological knowledge and effective mental health care is all too common in all medical specialties, Insel noted that “the problem is more acute in psychiatry because so much of mental health care takes place outside the health care system” (2009, 132). Although this is not specifically addressed by Insel, this outsider condition of psychiatric diagnosis from the health care system could be an offspring of the dispute about the objectivity of mental illnesses.

These are all instances of the ‘biological revolution’, that aimed to align with the mainstream traditions of medicine conceived as applied biology. In a completely different sense, neuroscience has also ignited critical reactions towards psychiatry, viewed as a medical specialty. For instance, many in the critical psychiatry movement expect some major changes in their field emerging from neuroscientific discoveries. After decades of intensive research there is no conclusive evidence associating mental disorders to neurological conditions; this, they argue, provides solid grounds to question the conceptual assimilation of neuroscience into psychiatry’s therapeutic practice. Rather than conceiving it as a branch of biology, modelled to adopt a scientific approach towards the study of the natural world, they view psychiatry as directed towards social constructions. It should be regarded as an irreducibly social science with a humanistic approach that seeks to understand mental disorders construed as human reactions that do not simply occur in individuals, but exhibit patterns in interpersonal and social interactions (Middleton & Moncrieff 2019, 47-51). Thus, in their view, the cutting-edge developments in neuroscience help to identify psychiatric conditions with “real social problems to be addressed, [...by recognizing that] the most important contribution any practitioner can make to patients’ well-being is to provide and engage in a supportive, accepting, understanding and appropriately bounded relationship” (2019, 53).

## 2.2 Objectivity in psychiatric diagnosis

At the heart of these appraisals of the relevance of neuroscience for psychiatry are diverging conceptions of the nature of mental illness. Although we will resume our discussion of illness and kindred medical concepts in the next section, a brief history of contemporary institutional classifications can provide some insights at what is at stake in the controversy and how neuroscience comes into the stage.

The institutional recognition and effort to classify mental disorders was initially driven by the need of policy makers to identify their prevalence in different localities; as such, it was included in a US census in the mid-nineteenth century (Hyman 2007, 725). This effort was followed by the publication of the *Statistical Manual for the Use of Institutions for the Insane*, in 1918, which through its ten editions provided a standardized classification of psychiatric conditions assumed to correspond to biological disorders. A next step to grapple with these conditions was the *Diagnostic and Statistical Manual of Mental Disorders (DSM)*. In its first two editions, it listed mental disorders relying heavily on theoretical aspects of Freud's psychoanalysis to group them and identify their causes (Tsou 2019, 178). When the scientific credentials of Freud's theories came into question, the third edition of the *DSM* replaced its theoretical approach with descriptive 'diagnostic criteria' for mental disorders, advocating for a biologically inspired psychiatry on which "mental disorders ought to be classified on the basis of their observable symptoms, rather than on the basis of speculative inferences regarding their causes" (Tsou 2019, 181).

Given the fact that, in addition to help clinical practice, the *DSM* aims to facilitate research on mental disorders, in its fourth and especially in the current fifth edition (first published in 2013), it claims to provide a classification "informed by recent research in neuroscience and by emerging genetic linkages between diagnostic groups" (APA 2002, xxv). A sense of urgency to scientifically inform psychiatric clinical practice and research is attributed to "the explosion in neuroscience, neuropsychology, and brain imaging over the past 20 years" (APA 2022, xxv). However, there is a growing concern that, even if the *DSM* categories are reliable for clinical treatment, they do not significantly correspond to discrete units in reality. The concern is that, instead of providing a principled system of classification, the *DSM* has reified and entrenched artificial kinds of mental illness. Even if it provides an operationally useful guide to treat patients, it does not define mental disorders by means of identifiable biological mechanisms. Thus, the National Institute of Mental Health has undertaken the more ambitious task of developing an alternative psychiatric classification system, the Research Domain Criteria (RDoC), to guide research on psychopathology. It intends to provide a more direct mapping of psychiatric conditions with new findings from genetics, behavioral science, and neuroscience (Tsou 2019, 182).

The idea that neuroscience should inform psychiatric diagnosis and treatment seems sensible. Just as other medical specialties (such as urology) are dependent upon biological knowledge of organs (*e.g.*, the kidneys and bladder), so psychiatry seems to depend on knowledge of the brain and nervous system (Thagard 2008, 338). Even if it is centered in describing how the brain and other relevant organs operate in normal conditions, neuroscience would provide solid grounds for diagnosing mental illness. By unraveling the biological mechanisms that account for the normal functioning of this complex system –which allows us to operate in our environment–, a disease could be identified with "a breakdown in normal functioning that impedes the organism's performance" (Thagard 2008, 340). The precise description of different kinds of breakdown could involve both internal and external factors, as well

as failings in their interactions that preempt the regular mental functioning necessary to interact with the environment. In order to sort out conceptual messiness, neuroscientifically informed psychiatry might replace current diagnostic categories “by more precise concepts tied to causal explanations. Then psychiatry would undergo something like the substantial conceptual change experienced by medicine in the wake of the germ theory of disease” (Thagard 2008, 344).

However, there is also room for questioning the reality of mental disorders on the basis of *bona fide* scientific practice. Using a methodological tool developed by Crispin Wright, Anthony Wrigley (2007) has suggested that we can probe if the objects and properties posited in diagnosing mental illness pass a test of objectivity. According to that test, deeming those objects and properties as objective correlates with having ‘cognitive command’ of the area of discourse in question. What cognitive command implies is that there is a link between elements of discourse that purport to represent how the world is and our judgements about there being a domain of facts that make our claims true or false (2007, 387). The hallmark of cognitive command is *scientific consensus*: when there is explicit agreement over a wide variety of statements in a discipline, there is a strong case for the objective reality of the entities and features that would make those statements true. However, if disagreement about the truth emerges, according to the realist about that domain of discourse there should be a cognitive shortcoming to account for that disagreement. This may be due to *divergent inputs*: one of the parties has incurred in perceptual error or is ignorant of some of the evidential details. Another cause of disagreement might be *unsuitable conditions*: someone made an inferential error, was faulty of miscalculation or oversight. Additionally, the cognitive shortcoming involved might be a case of *malfunction*: there is a flawed assessment of the evidence. The list of potential cognitive failings may be open ended; however, if disagreement occurs and no cognitive shortcoming can explain it, that points to the antirealist conclusion that there is no objective state of affairs to agree over. To put it more plainly: If there is a genuinely objective state of affairs concerning an area of discourse, then there is an ideal set of circumstances that would resolve the disagreement (Wrigley 2007, 389).

For skeptics and denialists of mental illness, the test of cognitive command can shed new light into the relevance of neuroscience for psychiatry. After all, disagreement among experts in diagnosing mental illnesses is all too common. That, in and by itself, gives us no reason to cast doubts about their reality, if an explanation of the disagreement due to cognitive shortcomings can be provided. However, in many cases arguing about the physicians’ credentials seems futile: even if they are not epistemic equals, their merits and competence are not called into question. Even more telling is the fact that –and they will tell you this– no blood test, neuroimaging technique, or DNA test can provide conclusive evidence to resolve the disagreement (Hoffman 2019, 62). No ideal set of circumstances providing relevant information would resolve the disagreement. Hence, there is reason to doubt that there are neurological states of affairs responsible for mental illnesses. An alternative assessment commonly found in naturalists and reductionists is pointing out to our general lack of



understanding of the biological basis of mental illness as our shared cognitive shortcoming that explains the disagreement. Enthusiasts of this approach often acknowledge that the research program of identifying the neural processes responsible for abnormal behavior and aberrant conscious experience could require decades or even centuries (Thagard 2008, 342).

In what follows, we argue that reframing the issue could allow for a more tempered stance. As Wrigley points out “there might be further routes open to a realist in light of a failure of cognitive command. [...For instance,] agreeing there is no such property as *being mentally ill* but to still assert there are other, particular, properties of mental illness” (2007: 392 n. 45). We provide one of such alternatives to account for illustrative cases in the debate over the relevance of neuroscience for psychiatry.

### 3. Scientific realism in neuroscience and psychiatry

As we have seen, granting that neuroscience has made significant advances in the last decades does not automatically translate into accepting that it provides accurate descriptions of mental illnesses. Instead, the failure to associate both domains by allowing for irresolvable disagreement might urge us to abandon the posit of psychiatric conditions as discrete units of reality: perhaps the nosology of mental illnesses does not cut reality at its neurobiological joints. In this section we frame this debate as relying on an assumption that permeates the discussion of scientific realism. We also urge for another framing of the issue, one that allows for a modest position. In order to illustrate and provide support to our position, we examine a psychiatric category.

#### 3.1 Scientific realism in the neuroscience of mental illness

Aspiring to bestow some conceptual order upon the issues surrounding the objectivity of mental illness and its relation to neuroscientific discoveries, we will represent them as an instance within the more general debate surrounding scientific realism. This requires some previous clarifications. The dispute between scientific realists and antirealists concerns whether, and to what extent, we are justified in believing that our scientific theories are true. Although there are several ways of taking a realistic stance, they all agree in asserting that our (best, most impressive, or empirically successful) scientific theories are (probably, approximately, or partially) true, even when they make claims about entities, processes, and mechanisms that go beyond our perceptual capacities. This involves an *axiological claim* about science, considering that it has (perhaps among others) the aim of providing true representations. Scientific realism has also as a component an *epistemological claim*, deeming it rational to accept that (at least some of) our current scientific theories provide true beliefs about the world. Additionally, scientific realism is committed to a *semantic claim*, asserting that scientific theories should be interpreted literally. In denying realism, antirealistic positions take many diverging forms: (1) they can resist the axiological claim by providing an alternative, perhaps more attainable,

aim for scientific inquiry, such as empirical adequacy or successful application; (2) they can also resist the epistemic commitment, perhaps advocating for caution in belief about the unobservable posits of our theories; and finally, (3) they can relinquish the semantic claim, perhaps by denying that scientific theories —especially concerning unobservable aspects of reality— are truth-apt, considering instead they are mere instruments for prediction or useful fictions.

Within this framework, the positions we outlined above concerning the relation of psychiatric conditions and neuroscientific descriptions can be seen as taking a specific stance in the scientific realism debate. Naturalist and reductionist seem to be committed to the claim that, insofar as neuroscience uncovers the biological mechanisms that account for the normal functioning of the human brain, it can bridge the gap between certain kinds of neural, biological, or chemical dysfunction and the mental experiences and particular behavioral patterns that are part of psychiatric illnesses. Thus, it would provide true representations that allow us to classify psychiatric disorders, and to generate effective treatments (Thagard 2008, 336). Denialists and skeptics, even if they grant that neuroscience has accomplished to some extent the task of providing a more complete and accurate description of the nervous system, may claim that accounting for mental illnesses is not part of that task: correlations between neural and mental descriptions do not support a stronger ontological liaison (identity, dependence, supervenience, and the like); hence, psychiatric diagnosis might be contested and even discarded as a mere *façon de parler*. Thus, the debate seems to reach a stalemate between two extremely radical positions, even granting some substantial common ground.

One might be tempted to hint that the situation is merely an instance of an irresolvable philosophical conundrum. This pessimistic assessment could be mitigated if there were no practical consequences emerging from the outcome of the debate. However, in this case at least, there are clear pragmatic implications steaming from both groups of positions. A useful way to cash out the implications of the scientific realism debate is by focusing on our trust in science (Curd & Tulodziecki 2020). In the current context, there are at least two key roles performed by our confidence towards scientific representations:

- For *consumers* of scientific representations (e.g., psychiatrists and patients, informing or being informed of the potential basis for a diagnosis), it is important to consider which (aspects of) theories can be relied upon as a guidance for action. Taking current scientific consensus or dissent about what the evidence is and to what extent it supports (aspects of) a theory, trust in its representations of how things are might be crucial to decide whether to follow a course of treatment or another.
- For *producers* of scientific representations (e.g., researchers in the potentially relevant fields, such as neuroscience), it matters which (aspects of) theories should be preserved in case future research requires theoretical change. Taking current scientific consensus

or dissent about what the evidence is and to what extent it supports (aspects of) a theory, trust in its representations of how things are might be crucial to decide what theoretical avenues for further research are worth exploring.

In the setting that we have outlined, a common assumption of both realists and antirealists is that, in order to adopt a realistic stance towards scientific theories, one should be able to declare in advance the specific object of the realistic commitment, that is: to isolate the representational elements of discourse (i.e., those that purport to represent how the world is) from artifacts and idealizing elements. As selective realists often put it, to argue for realism there has to be a distinction between the working posits (responsible for its empirical success, and worthy of a realistic commitment) and the idle components of a theory. In our case, both naturalists and reductionists as well as skeptics and denialists assume that in order to link talk of neurobiological dysfunction and that of mental illness one should be able to produce a mapping that singles out the representational elements (i.e., the working posits) deserving of trust. Lacking such a mapping, subscribing the realistic commitments is an empty claim.

This assumption of representational specificity, call it the ‘prior ontology thesis’, signals to a general pattern in the scientific realism debate: that support for realism towards a theory can only come in a piecemeal fashion, by supplying clearly identifiable elements of a previously describable furniture of the world. But that assumption is itself very controversial. Elsewhere, we have suggested an alternative realistic position: *Carte Blanche* Realism (CBR). As a form of scientific realism, it subscribes its axiological, epistemic and semantic claims, by holding that “science is a practice that aims at truth, and we are justified in claiming it has been attained, to a certain degree” (Gensollen & Jiménez-Rolland 2021, 70). However, in rejecting the prior ontology thesis, CBR allows that “our credence in scientific representations should not be placed invariably in some specific feature of theories [...], our commitment to scientific theories should be strong, but not declared in advance by the flavor of our (philosophical) realism” (Gensollen & Jiménez-Rolland 2021, 70-71).

Questioning the prior ontology thesis is not the same as suggesting that the problem lies in the temptation to reify mental illnesses from neuroscientific descriptions. After all, some disorders might be (and presumably are) identifiable with neurobiological conditions (e.g., neurocognitive disorders). CBR has further implications in our collective scientific enterprise. Before summarizing them, we illustrate our position concerning the objectivity of mental illnesses with an example: the case of bipolar disorder.

### 3.2 The case for CBR from bipolar disorder

As Anne Harrington engagingly narrates in her recent history of psychiatry (2019, chap. 7), the institutional recognition of what we now call ‘bipolar disorder’ began in the mid-nineteenth century, when clinicians identified patients of asylums that exhibited intermittent manic (being furious, raving, and agitated) and melancholic (being distressed, discouraged,

or indecisive) periods. The condition of these patients was variously described as ‘circular’, ‘intermittent’, ‘periodic’, or ‘double form’ insanity. In 1882, Karl Ludwig Kahlbaum coined the term ‘cyclothymia’ for one of these kinds of conditions that, while affecting moods, did not lead to permanent dementia. In 1899, based on a series of longitudinal studies, Emil Kraepelin concluded that beneath surface differences, all these disorders were merely different expressions of ‘a single morbid process’. He also conjectured that the underlying condition was a disease caused by a biological dysfunction.

Strong evidence for that biological approach came from therapeutic diagnosis and positive response to a lithium-based treatment. Its initial serendipitous discovery is credited to the Australian psychiatrist John Cade, late in the decade of 1940. In the process of trying to isolate a toxic metabolite from the urine of manic patients, he discovered that they improved (in some cases, very dramatically) under a regime of lithium carbonate or lithium citrate (which he initially used merely as a solvent for what he thought was the active component of his formula). Although lithium treatment was far more effective than talking therapy (e.g., Freudian psychoanalysis) for this kind of patients, its widespread use for the pharmacological treatment of patients with manic-depressive symptoms would have to wait until the 1970s. While the chemical mechanism was not understood, several studies confirmed that lithium acted preventing both psychotic manic attacks as well as psychotic episodes of depression. This provided confirmation that the drug neither tranquilized nor energized the patients, but instead it treated an underlying condition responsible for these intermittent mood phases.

Another source of evidence that provided solid ground for the validity of the psychiatric construct came from studies on the inheritance of manic-depression. These studies strengthened the distinction of this condition from depression, and eventually lead to its inclusion in the third edition of the DSM as ‘bipolar disorder’. Later editions broadened this category as something resembling a spectrum. Through an intergenerational study of an Amish community, the sociologist Janice Egeland provided what in the 1980s was considered as ‘the strongest evidence’ that serious mental illnesses might have a genetic basis (Harrington 2019, 217-244).

Bipolar disorder, as currently understood, is thought to provide a paradigmatic example of a psychiatric condition clearly underwritten by biological mechanisms (e.g., Tsou 2021, 2-4, 14-17, 47-51). As we have seen, there are at least three highly reliable indications that its behavioral manifestations are caused by a specific neurological profile. First, while it has a low prevalence among the general population (around 1.1%), this condition is highly heritable, with heritability estimates around 90% (Tsou 2021, 14-17). This suggests that the particular neural setting responsible for its symptoms is due to genetic factors. Second, epidemiological evidence shows that some of its behavioral manifestations relevant for diagnosis remain fairly consistent across different cultures; which suggests that it is not obviously dependent on social factors that vary in diverse contexts. And third, it has a very specifically positive response to some pharmacological courses of treatment: lithium, ‘mood stabilizers’, and antipsychotics (Harrington 2019, 243; Tsou 2021, 49). This brief assessment seems to support a decisively

realistic stance towards the neurological underpinnings of bipolar disorder. It would seem that it is undergoing a successful reduction that selectively identifies the neuroscientific basis of a mental illness.

However, there is a risk of scientifically pernicious overreaching in this kind of optimism. Asserting to have found the neural basis of bipolar disorder goes beyond what the current evidence allows. To this day, results from gene driven research (such as genome-wide association studies) remain inconclusive (Harrington 2019, 234-237; Tsou 2021, 14). To claim that behavioral anomalies associated with bipolar disorder are due to ‘chemical imbalance’ is not warranted by actual data. In fact, contrary to popular belief, the use of lithium as a treatment is not supported by evidence from laboratory studies suggesting that this condition is due to biochemical causes (e.g., alternating surplus and deficits of neurotransmitters). Furthermore, although there are recognizable diagnostic signs across times and cultures, there has been a significant broadening of the clinical description of bipolar disorder; and at times there have been clear incentives for diagnosing it and overmedicating, thus raising legitimate concerns about data supporting the efficacy of pharmacological treatment. To assert that any of these indications gives us access to the underlying nature of bipolar disorder would be unjustified; besides, it would incentivize abandoning avenues of research still worth pursuing. While the specificity of various treatments is very well supported, the details concerning its biological underpinnings still require investigation. Even if we assume that there is something to be said about there being a distinct (biological) unit in reality corresponding to the clinical category, its identification at the relevant level of description (genetic, neurochemical) has not yet been provided. However, in light of its successful pharmacological treatment, to abandon or cast doubts about it as a psychiatric condition seems foolish, at best.

And something like the previous assessment is in fact what CBR would recommend. Insofar as we have evidence about the objective basis of a mental illness, we should be willing to acknowledge its reality. In such a scenario, there may be various alternatives worthy of scientific exploration concerning what aspects of our representation of the brain and the human organism truthfully describe the entities, properties, processes, or mechanisms that are involved in bringing it about. CBR encourages us to follow the evidence, and to pin down various potential candidates in the world that are tracked by our representations. However, it is not committed to the further claim that, in order to trust that a theory gets (some) things right, we should be able to isolate the representational elements of discourse (*i.e.*, those that purport to describe how the world is) from artifacts and idealizing elements. Further support for CBR can be provided by considering the realism debate in psychiatry from the medical perspective.

#### 4. Realism about mental illness and the goals of medicine

The philosophy of medicine critically analyzes both the concepts and the basic assumptions that health professionals use daily. As such, it deploys some tools from the philosophy of science to understand the presuppositions and implications of biomedical research and clinical practice. Its specificity lies in its marked transdisciplinarity, since it combines both theoretical and practical knowledge, as it seeks to apply knowledge about the functioning of the human body and how it interacts with the environment and other organisms to cure and prevent diseases and other ailments. Unlike bioethics, and more specifically clinical ethics, philosophy of medicine is concerned with the metaphysical and epistemological aspects of medical research and practice. Beyond its mere theoretical interest, health and illness are relevant objects for philosophical reflection –since all of us at some point in our lives have been or will be ill. Healing, when we have lost our health, is one of the central goals of both individuals and societies. That is why the identification, prevention and treatment of diseases responsible for illnesses can be traced back some tens of centuries in the history of our species. It is also because of this practical relevance that one of the central concepts of the philosophy of medicine is that of disease. Since medicine is centrally concerned with diseases, how they are generated, how they behave, and how they are controlled, a philosophical understanding of medicine requires an analysis of the nature of diseases. What are diseases? Are they out there in the world? Or are they inseparable from individuals and the society in which they live? Philosophy of medicine can ask both what characteristics something must have to be rightly called ‘disease’, and what is the nature of things that are already considered diseases. Let us turn our attention to the latter question.

##### 4.1 The nature of disease

There are two antagonistic positions in the literature regarding the nature of diseases: medical realism and anti-realism (Simon 2011; 2017). Briefly, realists hold that, in order to make a clinical judgment, a physician selects a set of symptoms in her patient that she believes belong to a type of disease, and this selection responds to the way in which the natural world is in fact already organized. Therefore, realists usually consider that diseases are natural kinds and, therefore, the medical work consists in discovering them. The anti-realist position, on the other hand, holds that the physicians’ selection of symptoms as belonging to a type of disease does not respond to what the underlying natural world is like, but is made based on different criteria of their own choosing. For this reason, anti-realists do not consider different types of diseases to be natural kinds, much less that it is the job of physicians to discover them. Thus, for anti-realists, diseases are invented for certain purposes of intervention, prevention, or control. As will be seen below, there are several versions of both medical realism and anti-realism concerning diseases, and each has intuitions in its favor.

A first version of realism, concrete realism, identifies diseases with concrete entities separable from patients. As such, it is a realism about tokens and not about types of disease.

For the concrete realist, diseases are identified with their causes. For example, the disease called poliomyelitis is identified with its cause, the poliovirus (or, to mention a more recent example, the disease called Covid-19 with the SARS-CoV-2 virus). Although it is true that the germ theory of infectious diseases represented a significant, perhaps decisive, advance in the biomedical sciences, today it is not very plausible to continue to identify diseases with their causes, since sometimes we do not know them and yet we identify diseases; furthermore, we know many diseases are not the result of a single cause, but of a complex causal tree. Thus, other realisms view diseases as identifiable parts of patients' sets of signs and symptoms, underlying physical states of their body, or as bodily processes situated in time. Most arguments in favor of medical realism, mirroring scientific realism in general, are sophisticated versions of the so-called no miracles argument. In short, it claims that the best explanation for the success of medicine is that we have generally correctly identified parts of the world, diseases, whose characteristics are fixed by nature and are the same in each case. Anti-realists, according to the realist, are quite incapable of accounting for the success of medicine from their position. Additionally, Rather (1959) argued that certain diseases persist over time and continue to be recognized, despite cultural changes, such as epilepsy and mumps, for which only medical realism could account. Moreover, Temkin (1961) considers that anti-realists are unable to account for how people who were not in contact with patients and who were not physicians—think of Louis Pasteur or the development of the rabies vaccine—achieved decisive advances in medicine, since they were unaware of the conventions of clinical practice and biomedical research.

Some arguments have sought to either qualify or undermine the hopes of medical realists. One version of the pessimistic meta-nuance argument, imported from the scientific realism debate, points out that the success of medicine does not constitute a good reason to believe that its theories are correct or the entities they postulate are real. Paradigmatic examples in this regard are often fever, which was long considered a disease rather than a symptom, and homosexuality, which until relatively recently was considered a mental illness. In addition, and beyond a possible pessimistic meta-induction against realism, other diseases that are now recognized are very difficult to consider as natural classes, because they differ from a healthy state only quantitatively. For example, it is not clear how the presumed natural class normotension can easily pass into a different natural class such as hypertension (the same is true for anemia). Some diseases could also be considered at most as extraneous entities, for beyond the infectious diseases that concrete realism seems to account for, many diseases are neither physically contiguous nor seem to have an independent existence. Finally, it is difficult to accept that many of the diseases that biomedical theories postulate are real entities or natural classes, since they do not behave or exhibit the same regularity that other natural classes exhibit, as physicians are usually unable to predict how a particular patient will respond to a treatment or clinical intervention. For these reasons, many believe that there is

no objective or correct way to select a set of symptoms that belong to a type of disease, since they deny that there really are types of diseases or that specific examples of a disease form a natural class.

Medical anti-realism, unlike the different versions of scientific anti-realism, is usually constructivist in nature. For this position, diseases are nothing more than creations of the human mind that serve certain purposes, i.e., the criteria used to identify diseases acceptable to the community of health professionals depend on a diagnostic category. There are at least four possible versions of medical antirealism. First, it might be thought that a disease is legitimate if it allows us to understand and manipulate the situation in which patients find themselves; second, it might be thought that diseases are not categories that allow us to understand what the world is like, but allow us to help patients with their conditions and ailments; third, there are those who conceive that the goal of clinical practice is not to benefit individuals, but to benefit society as a whole (e.g., a potential disease whose treatment is too costly to treat); and fourth, there are those who conceive that the goal of clinical practice is not to benefit individuals, but to benefit society as a whole (e.g., a potential disease whose treatment is too costly to treat), a potential disease whose treatment is very costly, and which would make it impossible for the individuals allegedly suffering from it to contribute to social welfare, might not be recognized as a disease); and finally, there are those who think that health professionals are the arbiters of disease, and their motivations may be both theoretical (e.g., understanding) (King 1954) and practical (e.g., social and legislative arrangements, and the diagnosis and treatment of patients) (Gräsbeck 1984).

Most cases in favor of medical anti-realism are versions of Engelhardt's (1984) famous argument: since the goals of medicine are pragmatic, the criteria for disease identification should also be pragmatic. Engelhardt points out that medicine does not seek to establish a catalog of diseases *sub specie aeternitatis*, which would be utterly useless if its decisions were not profitable and did not achieve various welfare goals. Thus, he concludes that clinical categories are linked to the likelihood of useful treatment and intervention and to the severity of suspected conditions (1984, 36). Various counterarguments have also been offered against medical antirealism. For example, Temkin (1961) points out that medical antirealism could put us in danger of perpetual disease: if any physiological state can constitute a disease if the relevant authorities so decide, then any individual could discover at any time that he or she has a disease. For their part, Grene (1977) and Nordenfelt (1987) consider that medical discourse presupposes that diseases are natural kinds. If they were not, they think, communication between health professionals and scientific progress in medicine would be impossible. Finally, it seems that medical anti-realism is not historically plausible: if diseases are nothing more than conventions adopted by the relevant authorities in health, we could not account for how medicine has gone on without too many affectations despite the historical rise and fall of different power groups in health.



#### 4.2 The nature and classification of mental illness

Despite the appeal of medical anti-realism, one might also ask: Does the fact that the goals of clinical practice, even biomedical research, are pragmatic preclude the possibility of biomedical theories selecting real entities or other aspects of the world? No version of realism seems to account for what it is that our best biomedical theories *inevitably and always* select from the world. But, as we have seen, that does not exclude that such theories do in fact select different aspects of the world to achieve their pragmatic goals successfully. In other words, neither the best arguments against medical realism, nor the best arguments for medical anti-realism, undermine the claims of CBR regarding disease.

In this context, mental illness is particularly interesting and problematic for realists. Concerning mental health, there are huge discrepancies about what should be considered pathological and what its nature is.<sup>2</sup> First, from a reductionist perspective that identifies illnesses with failures in the biological functioning of organisms (Cryle & Stephens 2017), many presumed mental illnesses would not be such because they go beyond the somatic. Second, etiological criteria for the identification of mental illnesses are not very useful, since mental illnesses are not usually identified by their causes: individuals with the same illness often have developed it from different causes, and the same cause may have different effects on people's mental lives. Thirdly, mechanistic criteria are not usually useful either, since mental health professionals do not identify mental illnesses based on a specific failure in the biological mechanism of the organism; if one exists, they are often unaware of it. Finally, neuroscience, as we have seen, has promising forecasts based on some functionalist assumptions: although we accept that the mind is nothing more than a function of the brain, we often do not know what, if anything, is malfunctioning in the brain causing a particular mental illness.

A closer look at the practice of mental health professionals shows that they tend to identify many mental illnesses based on symptomatology. It is clinical—not etiological nor mechanistic—criteria that allow them to intervene in the mental lives of their patients. If psychiatry were to do its job properly, mental illnesses would be sets of symptoms leading to behaviors considered unhealthy. But this characterization is problematic enough: it has led some to consider psychiatry a form of social control and repression (Foucault 1963). In more extreme versions, others have pointed out that mental illness is a myth, an invention with the sole objective of stigmatizing and isolating certain types of people (Szasz 1961). It is true that psychiatry has often fallen into excesses, such as overcategorization and overdiagnosis, often promoting diseases and encouraging the excessive use of psychotropic drugs (Gotzsche 2013). These excesses are well documented, which has led some to claim that medicine has caused more harm than good to humanity in the past, or even in the present, due in part to incentives that pharmaceuticals have in directing biomedical research to justify the use of their drugs (Stegenga 2018). Medical nihilism is a threat to the trust we can place in medicine

<sup>2</sup> Perhaps it is also for this reason that the philosophy of psychiatry has become the most important subdiscipline of the philosophy of medicine, which can be confirmed by looking at the number of publications in the area.

and currently takes psychiatry as a paradigm of the harm it can inflict on us. However, this is not an exclusive characteristic of psychiatry as a medical specialty, and if we must take psychiatry as a paradigmatic example, it is to point out that medical classifications in general are methodological tools, that the concept of illness is normative and that this does not go against medical realism (at least not against a non-selective one), and that medicine is a science of design.

Diseases are usually classified according to various types of criteria: etiological, mechanistic, and clinical. Although some reductionist positions might see this as a problem, it is not necessarily so. We can also see medical classifications as methodological tools, and we can evaluate them based on their usefulness for biomedical research and clinical practice. Thus, the categorization of certain states as diseases is often done with a central focus on pragmatic issues. The three types of criteria commonly used to classify diseases address different aspects of pathologies. Mechanistic criteria are currently used to classify most diseases, although etiological criteria are central and decisive for the treatment and prevention of infectious diseases (i.e., the aim is to eliminate or isolate an infectious agent), and, as we saw at the end of the previous section, mental diseases are usually identified based on clinical criteria. Therefore, different diseases can be classified on the basis of their clinical manifestation, their cause, the underlying mechanism, or a combination of two or all three. In any case, the use of one or more of these criteria is intended to facilitate diagnosis and clinical intervention, as well as our better understanding of the diseases.

The potential usefulness of combining different criteria for disease classification is most clearly seen in mental illnesses. These are not independent entities, they cannot be reified, and it is common that they cannot be separated from each other (i.e., psychiatric patients often show cases of comorbidity: symptoms of several simultaneous diseases). They also leave us with a useful lesson for the rest of medicine: since we should not succumb to the temptation to reify diseases, and since it is problematic to consider them as natural classes, any medical classification should be subject to constant revision. This is the case, with respect to mental illnesses, of the current DSM-5, which is considered a tool that can be adapted as deemed appropriate: from a more sophisticated knowledge of psychiatric symptoms to political or social transformations.

This brings us directly to a central point about the very nature of disease. As such, our concept of *illness* is normative. In the case of mental illness, this is clear enough: What leads us to consider a set of symptoms as *unhealthy*? It does not seem to be the symptoms themselves that tell us, and it is at least difficult to ignore the perspective of both patients and society in favor of the perspective of the medical community alone.<sup>3</sup> The personal approach and the societal approach, as well as the various subjective and cultural values, are especially important when shaping the various psychiatric categories. It is the practitioners of psychiatry especially,

<sup>3</sup> That is why there is currently talk of the need for a biopsychosocial approach to illness, and in particular to mental illness. Hofmann (2002) bases it on the distinction between disease, illness and sickness.

but perhaps also all other health professionals, who must determine the distinction between health and illness both in general and particular. In this respect, their work is delicate. Even if the various mental illnesses had a biological basis, determining which symptoms should be treated as unhealthy, and which patients should be treated with psychotropic drugs, would not be something that could be determined based on biological normality alone. However, that does not undermine realistic aspirations: our best theories still hint at what is appropriate for the prevention and treatment of disease.

Finally, one of the reasons for embracing a certain pragmatism in medicine is that it is a science that straddles biomedical research and clinical practice. Medicine, we might say, is a science of design (Simon 1969). On this notion, Niiniluoto (1993) made a distinction between descriptive sciences—which tell us what the world is like—, design sciences—which tell us what is required to transform it—, and technology—which is the instrument for its transformation. Thus, medical classifications should always be evaluated for the service they provide to both patients and society.

## 5. Concluding remarks

We have argued for a modest position about the relevance of neuroscientific discoveries for psychiatry. Against skepticism and denialism, we have argued that the study biological mechanisms and etiologies for mental illnesses is a worthy subject for inquiry. In contrast with naturalism and reductionism, we should not expect to find one single kind of neurophysiological pattern across all mental illnesses. Instead, CBR recommends that, as consumers of neuroscientific representations (e.g., psychiatrists and patients), we guide our belief in theories supported by evidence (without being selective about their content). For their part, *producers* of neuroscientific representations (e.g., researchers in neuroscience), are free to explore several theoretical avenues that question different aspects of the mainstream. In light of this, what are the prospects for the development of psychiatry as a biomedical specialty?

Jeffrey Goldsmith, professor of medical psychiatry, lamented that “nearly forty years after the biological ‘revolution’ in psychiatry, there is no replicable evidence [...] for a molecular basis for the diseases and no valid physiological models of the disease mechanisms. [They are] not linked in an empirically defensible manner to either underlying physiology or biochemistry” (2020, 165). This could be seen as providing evidence that psychiatry’s “‘biological revolution’ has now run into the sand” (Harrington 2019, 271). However, contrary to Anne Harrington’s glass-half-empty sounding description, there are clear continuities in psychiatric practice. Instead of giving “the impression that psychiatry is directionless and fundamentally inept”, CBR allows us to take a glass-half-full outlook:

The asylum movement did not fail. It constituted a sustained advance over previous desperate and barbaric responses to severe mental illness [...] The neuroanatomical

psychiatry that followed did not fail. Neuroanatomical research became a permanent and increasingly important aspect of psychiatric science, and it continues to progress along with the rest of neurobiology. / Kraepelinian psychiatry—a longitudinal and symptomatic perspective on nosology— continues to be fundamental for psychiatric diagnosis and will remain so until neurobiological disease categories replace it. Psychodynamic (Freudian) psychiatry continues to thrive, along with numerous other scientifically validated psychological treatments. Biological psychiatry did not die or even fade during the last decade. It continues to progress, as even a casual glance at any recent issue of a major psychiatric journal will show. / All these approaches have continued to advance and become parts of a larger whole. (Morehead 2022)

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