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Jennie Jiang April 9, 2019

Chemical Imbalances and Imbalanced Knowledges: The Rise and Appeal of Biological Psychiatry

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An abstract of
a thesis submitted to the Faculty of Emory College of Arts and Sciences
of Emory University in partial fulfillment
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Bachelor of Sciences with Honors

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Abstract

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At present, we find ourselves living with the biological paradigm of mental illness. In this honors thesis, I attempt to contextualize this paradigm within a variety of frameworks. First, I argue that biological explanations of mental illness are a historically specific phenomenon, and I identify the technological, economic, and political developments which made them possible. In addition, I identify the normative assumptions within biological psychiatry which aligned it with values, goals, and assumptions of modern science and medicine, which are themselves historically specific enterprises. Finally, I explore how the biomedical model of mental illness shapes conceptions selfhood and its relation to the brain and mental illness. In short, I argue that while many technological, political, cultural, and economic factors enabled the biomedical model of mental illness to gain influence during the second half the twentieth century, biological psychiatry's alliance with the normative dimensions of modern science and medicine armed it with an enduring epistemological appeal that continues to capture scientific and popular imagination today.

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Acknowledgements

I am indebted to and so deeply grateful for the many people who, through their generous and thoughtful support, have made this thesis possible. I would like to thank the following individuals in particular: my advisor, Dr. Deboleena Roy, for her invaluable guidance and invariably stimulating reading suggestions; my committee members, Dr. Kristen Frenzel, Dr. Jennifer Sarrett, and Dr. Elizabeth Wilson, whose teaching and feedback have made me and my intellectual endeavors better; my parents, Shawn and Ali Jiang, for their continuous support and sacrifice; my sisters, Jessie Jiang for her kind encouragement, and Jelena Jiang for her unapologetic silliness; and my friends, in particular Laura Briggs, Amber Harvey, Maggie Mang, Nate Sawyer, and Shannon Thomas, who make it possible for me to Be.

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Introduction

> "As I grew to understand the medical model of bipolar disorder, I was able to overcome the stigma associated with my illness and to redefine my person as it relates to my illness. I found out that the chemicals that shoot forth from my neurotransmitters are imbalanced. . . I am a whole, functioning person with defective neurotransmitters . . . I was emphatic about the fact that. . .I require medicine to make [my] brain chemicals work right" (Fekete 2004, quoted in Cohen and Hughes 2011, 177)

The idea that a person might suffer from mental illness because of defects in the brain is ubiquitous in much of the modern Western world. A 2017 study published in *JAMA Internal Medicine* reported that over 242 million U.S. adults reported filling one or more prescriptions for psychiatric drugs in 2013. They represent 16.7 percent of the U.S. population, or about one in six Americans (Moore and Mattison 2017). With up to 75 percent of consumers believing that mental illnesses are usually caused by a chemical imbalance in the brain (Cohen and Hughes 2011, 176), the patient quoted above is certainly not alone in his belief that mental illness is caused by "defective neurotransmitters" which require medication to "work right".

Patients' commitment to neurochemical understandings of their mental illness make sense in light of the current state of neuroscientific research. Scientists hoping to develop quick solutions to patients' depression, for instance, tout the experimental effectiveness of a "single dose of ketamine", a glutamate NMDA receptor antagonist, in producing "rapid antidepressant actions in treatment-resistant patients" (Duman and Aghajanian 2014, 233), but no mention is made in the article of what life stressors may have contributed to their depression in the first place. Even where mentions of psychosocial adversity are included, for example in Aan het Rot,

Matthew, and Charney's recent review of depression's neurobiology, non-biological factors such as life stressors and childhood adversity are only relevant insofar as that they produce "cumulative effects…on the brain" (2009, 305). In articles such as these, the patient either disappears from view entirely or is rendered mere biological matter. Of course, scientists do not tend to focus their attention on the non-biological aspects of issues such as trauma and poverty, leaving those to the social sciences, but the enduring prestige of science becomes problematic when scientific explanations and solutions for mental illness eclipse other forms of knowledge. When the emphasis on the biological moves from the lab to the doctor's office, it is perhaps not surprising that patients often report feeling like antidepressants were pushed on them without doctors first listening to or understanding their story (Frances 2014).

In the present historical moment, we find ourselves caught in the thick of the biomedical model of mental illness. This narrative assumes that mental illness is rooted in the biological body, especially in the brain, and it sets the terrain for how we understand our experiences of mental health and illness. The objective of this honors thesis is to interrogate this story: in a project that is partly historical, partly philosophical, and partly anthropological, I aim to unpack the contexts that gave rise to biological explanations of mental illness during the latter half of the twentieth century. I argue that while many technological, political, cultural, and economic factors enabled biological explanations of mental illness to gain influence during this period, biological psychiatry's alliance with the normative dimensions of modern science and medicine armed it with an enduring epistemological appeal. Thus, in this project, I hope to denaturalize biological explanations of mental illness so that we may recognize the historically and culturally contingent nature of their appeal.

However, the primary focus of my project is not to advance "anti-medication" critiques against psychiatry. I am aware that psychiatric medications have benefitted the lives of countless people, just as I am aware that they often produce unwanted, harmful side effects and are not always successful in treating mental illness. I am much less interested in ascertaining whether biological explanations of mental illness reflect the "truth" than I am in exploring their genealogies. Thus, most of this honors thesis is dedicated to understanding where biological explanations of mental illness come from, why they endure, and how they affect us.

Throughout this thesis, I use the terms "biological" and "innate" to refer to different, though related, characteristics of disease. I use the term "biological" to refer to that which belongs to the domain of "biology", defined by the Encyclopedia Britannica as the "study of living things and their vital processes", which "deals with all the physicochemical aspects of life" (Rogers, Joshi, and Green 2018). By "innate", I refer to the quality of being "inborn" and "natural", as defined by the Oxford English Dictionary (Oxford University Press 2019). While both terms imply that the roots of a disease or behavior are *internal* to the body, the biological may also be dynamic. The innate connotes fixedness, and in the context of modern scientific research, also implies that a disease or behavioral may congenital and inherited through the genes.

This honors thesis is divided into four sections: in the Section I, I provide a historical overview of the births of modern science and modern medicine in the seventeenth and eighteenth centuries, respectively, to articulate the discursive context into which modern biological psychiatry would eventually enter. In Section II, I turn to the second half of the twentieth century to trace the rise of biological psychiatry and the technological, political, and economic development which made it possible. In Section III, I shift to more philosophical questions to

identify the normative dimensions of biological psychiatry that allowed it to lay claims to scientific and medical legitimacy. Finally, in Section IV, I explore how biological explanations of mental illness impact our conceptions of selfhood. Through these investigations, I hope to provide a nuanced, multifaceted understanding of the biological paradigm of psychiatry in which we currently find ourselves.

I. The Births of Modern Science and Medicine

> "I was taught that psychiatry has become much more modern and scientific since the introduction of the neuroleptics [antipsychotic drugs] in the 1950's, and the enthusiasm of psychiatrists for biological explanations of mental illness was presented as being based on a solid scientific foundation…I also saw how badly biological psychiatrists want to be regarded as doctors and accepted by the rest of the medical profession" (Ross 1995, 86).

The quote above represents one psychiatrist's reflections on the indoctrination he received during medical school and a psychiatry residency around the year 1980. His writing captures the extent to which in that historical moment, it was clear that psychiatrists were eager for change. Implicit in their enthusiasm is a sense that psychiatry at the time was on the cusp of something better—that the adoption of a new biological psychiatry would usher in an age in which psychiatry (and psychiatrists) would be regarded with the scientific and medical legitimacy which it deserved. Yet nested in this enthusiasm is the unspoken supposition that scientific and medical legitimacy are natural and self-evident goods, a premise that I believe is worth interrogating: What does it mean for an explanation to be scientifically or medically legitimate in the first place? Where do these conceptions of legitimacy and epistemological

authority come from, and how do they inform what types of knowledge we believe are worth pursuing? What kind of legacy of knowledge-making practices was biological psychiatry stepping into with its claims for greater scientific and medical validity?

A historical perspective makes clear that our current understandings of science and medicine, and the goals, values, and assumptions embodied in each, are in fact historically contingent. While people everywhere have always had some knowledge of the natural world and practiced some form of healing, modern science and medicine refer to the particular forms these pursuits have taken in Western society in more recent history. Since the seventeenth century for modern science, and since the eighteenth century for modern medicine, these pursuits have adopted a set of normative dimensions that shape our conceptions of not only what kinds of knowledge about the natural world are possible and valuable, but what methods enable to us to achieve that knowledge. Sandra Harding, for example, notes that modern science is premised on the idea of a "value-free objectivity" which refuses to recognize the socially situated nature of all knowledge, including scientific knowledge (Harding 1991, 143). Taking the objectivity of science for granted masks the historically contingent nature of what goals, values, and practices we deem to be scientifically legitimate. Thus, I turn now to the discourse at the birth of modern science to examine what normative assumptions were articulated to shape the character and course of scientific investigation.

The institutionalization of modern science in the seventeenth century in England provides a solid starting point at which to begin this historical account. In tracing the contending visions for a new science articulated immediately preceding the founding of the Royal Society, historian of science Evelyn Fox Keller pays close attention to the ways in which gender ideology functioned as a crucial mediator between the birth of modern science and the economic and

political climate which surrounded it (Keller 1996, 44). Her analysis demonstrates that the traditional casting of science as the "province par excellence of the impersonal, the rational, and the general", and, importantly, as the "preserve of men" (Keller 1996, 7), is not an innate association but a product of the very gendered metaphors and visions formulated at the birth of modern science. From the start, scientists' beliefs about how knowledge about the natural world ought to be acquired has been shaped by the early conceptualization of modern science as being an objective and fundamentally masculine pursuit (Bordo 1986, 450). By this logic, masculinity and objectivity became synonymous.

To start, one of the first philosophers to articulate a vision for the new science was Francis Bacon, whose works are often credited with developing the scientific method. Writing at the turn of the 17th century, it was Bacon who first defined the aims of science as enabling the control and domination of nature. His writings make clear that in this narrative of Scientist mastering Nature, it is a male scientist who masters a feminized Nature: speaking of a "chaste and lawful marriage between Mind and Nature", he writes that "I am come in very truth leading to you Nature with all her children to bind her to your service and make her your slave" (Keller 1996, 36). For Bacon, in a marriage in which Nature herself is to be the bride, the role of the scientific mind is to subdue, domesticate, and master Nature. He elaborates that the discipline of science and the technology which it enables can not only "merely exert a gentle guidance over nature's course; they have the power to conquer and subdue her, to shake her to her foundations" (Keller 1996, 36). These metaphors cast mind and nature not only as divided along gendered lines, but also implicated in a differential relation to power: whereas Nature is feminized, subjective, and positioned to be passively known, guided, and conquered, the masculine, objective scientific mind is portrayed as active, powerful, and domineering.

While Bacon's vision may have seemed more fanatical than mainstream even for his time, his visions for a new science critically informed the debates leading up to the founding of the Royal Society in 1662. This period definitively shaped science as we know it today, for out of the chaos emerged the foundations that modern science would come to rest on. According to historians of science, the disagreement was primarily between two main competing philosophies for what the "new science" would entail, the hermetic and mechanical traditions (Rattansi 1968, 125; Faulkner and Kerr 1997, 52). In the hermetic tradition, most closely associated with Renaissance alchemists, material nature was moved by "spirits" and suffused with "mysterious and creative powers". (Faulkner and Kerr 1997, 53). In addition, marriage between male and female principles was critical: As Keller writes, "the root image of the alchemists was coition, the conjunction of mind and matter, the merging of male and female. As Bacon's metaphoric ideal was the virile superman, the alchemist's ideal was the hermaphrodite" (Keller 1996, 48). Thus, the alchemists believed that spiritual union to the universal and to Nature was the path to obtaining natural knowledge.

By contrast, proponents of the mechanical tradition rejected the erotic language of the alchemists and argued for the adoption of an explicitly masculine philosophy of science, in which nature was divorced from spirit, and mind and hand from heart. Nature, transformed from "her" to "it", was to be apprehended not through sympathy but through the very "*object*-tivity" of the "it" (Bordo 1986, 452, emphasis included). Mechanical philosophy sought to cast out feeling from natural objects, rendering them "mere inert matter, a machine" (Faulkner and Kerr 1997, 53). These divisions between feeling and science embedded in mechanical philosophy more closely aligned with Bacon's original vision. Whereas the alchemists embraced the heart as a source of scientific knowledge, mechanical philosophers like Joseph Glanvill warned against

the dangers of embracing affection. Glanvill writes: "[W]here the *Will* or *Passion* hath the casting voice, the case of *Truth* is *desperate*…The *Woman* in us, still prosecutes a deceit like that begun in the *Garden*; and our *Understandings* are wedded to an *Eve,* as fatal as the *Mother* of our *miseries"* (Keller 1996, 53, italics in original). The early Royal Society fellow concluded "True philosophy" could not progress where "the Affections wear the breeches and the Female rules" (Faulkner and Kerr 1997, 52). Implicit in Glanvill's commentary is an association of the scientist with masculinity, and passion with femininity. In contrast to hermetic philosophy, which advocated for the unification of male and female principles, the mechanical tradition implored scientists to actively expel passion and "the Woman in us" to protect themselves from their destructive effects on the pursuit of truth.

Thus, in the debates leading up to the Royal Society's founding, gender ideology played a key role in delineating an exclusive, privileged domain for the "new science". The metaphors employed by hermetic and mechanical philosophers not only allowed them to articulate their visions for the "new science" through the language of gender, but also enabled contemporary social anxieties surrounding gender to enter the debate on modern science: Notably, the birth of modern science emerged against a backdrop of significant anxiety surrounding witchcraft, a form of magic that appeared to many as something adjacent to Hermeticism (Hoppen 1976, 16). The fear associated with witchcraft bolstered mechanical philosophers' arguments that delineating science as an exclusively masculine domain would protect against the dangers represented by female power, passion, and heresy (Keller 1996, 61). As a result, the contemporary political climate likely also played a large role in enabling the eventual victory of mechanical philosophy. While competition between the two philosophies was fierce (though not always clearly delineated) in the mid-seventeenth century, by the time the Royal Society was established in

1662, many recognized it as marking the realization of the Baconian program for a new science (Keller 1996, 46).

The equations of modern science with masculinity, reason, and power therefore emerge from a particular historical moment. As Bordo writes, "Here 'masculine' describes not a biological category but a cognitive style, an epistemological stance. Its key term is detachment: from the emotional life, from the particularities of time and place, from personal quirks, prejudices, and interests, and most centrally, from the object itself" (Bordo 1986, 451). Science's epistemological stance of masculinity, and its equation with social and emotional detachment, thus emerges from the invocation of gender ideology at the birth of modern science (Faulkner and Kerr 1997, 52). It is possible to conceive that had it not been for Francis Bacon and the antagonism between alchemists and mechanical philosophers, science may have developed under a different set of normative dimensions. Instead, modern science, as it has developed since the seventeenth century, prevails in its values of objectivity and rationality, and in its goals of subduing, mastering, and dominating nature; these values and goals continue to inform what constitutes scientifically legitimate knowledge even today.

Finally, in addition to this set of normative dimensions, Keller examines one more key development from the birth of modern science—the idea that what is scientifically legitimate is that which can be observed. Bacon included in his vision for a "new science" a critique of past natural philosophers who sought to "create the universe out of the human mind" (Keller 1996, 39); in contrast to Plato, whose approach to natural knowledge did not require truth to enter the mind from without, Bacon emphasized that the mind must allow for unobstructed receptivity to the "true native rays of real things" in order to achieve natural knowledge (Keller 1996, 38). Accordingly, proponents of the mechanical tradition later argued that the proper path to true

knowledge was through experiment with technical instruments rather than by theory (Faulkner and Kerr 1997, 52), reflecting the time's pervasive emphasis on illumination derived from direct experience (Keller 1996, 45). In short, the assumption that direct experimentation and observation are the legitimate pathways to natural knowledge were as foundational to modern science as the values and goals articulated by Bacon and his followers.

The idea of illumination through observation is also essential to modern medicine. Following on the heels of the "new science", modern medicine emerged at the turn of the eighteenth century with a new philosophy that focused on unprejudiced observation, as well as major social and political changes in medicine's administration. This new medicine rejected the causal interpretations of Galenic, Cartesian, and other theories which had "provided a speculative foundation for a nonverifiable physiology and pathology" (Starobinski 1976). Instead, it turned to the body as the site of disease, so that all conceptions of illness necessarily followed from what could be observed, and especially visualized, on the material terrain of the human body.

In *The Birth of the Clinic,* Foucault argues that it is during this period in the history of medicine that an "essential mutation in medical knowledge" produced a new way of seeing and understanding, which took as its object of knowledge the material human body (Foucault 1973, xviii): The role of the doctor came to be subjecting the patient to a "gaze" in which the medical eye penetrates the patient's body. Foucault interrogates the historically contingent nature of this relation between doctor and patient, between seeing and knowing, and between disease and body through his analysis of medical discourse at the turn of the nineteenth century. Separate from the social, economic, and political factors which transformed medicine in France during this period, he is primarily interested in how an epistemological shift at the beginning of the nineteenth century reoriented doctors' conceptualization of disease. To delineate the contours of this

paradigm shift, Foucault differentiates between the two manners of spatialization which doctors used to configure disease, before and after the birth of modern medicine.

Prior to the nineteenth century, Foucault argues that doctors' configuration of disease was primarily two-dimensional, confined to the tables of diseases which appeared in medical school textbooks (Philo 2000, 12). Foucault terms this manner of understanding disease "primary spatialization". He writes:

> "Before it is removed from the density of the body, disease is given an organization, hierarchized into families, genera, and species…But at a deeper level than this spatial 'metaphor', and in order to make it possible, classificatory medicine presupposes a certain 'configuration' of disease…Just as the genealogical tree…presupposes a space in which kinship is formalizable, the nosological picture involves a figure of the diseases that is neither the chain of causes and effects nor the chronological series of events nor its visible trajectory in the human body." (1973, 4-5)

Several important factors regarding the primary specialization of disease are articulated here. First, the mapping of diseases during the seventeenth and eighteenth centuries was an activity that took place not on the body, but in the branches of tables and diagrams that categorized diseases into complex nosologies. Second, learning about diseases during this period was a rather abstract and removed process, one in which medical practitioners often exerted greater effort in memorizing tabulated medical knowledge than in dealing with real human bodies (Philo 2000, 12). Finally, the creation of tables of diseases assumed and depended on an underlying configuration of disease; in order to determine the distances at which diseases should be placed on the table, doctors had to draw upon notions of their kinship—kinship which preexisted perception. Yet Foucault also notes that such relationships were not informed by sophisticated

knowledge about diseases' causes and effects, nor by their "visible trajectory[ies] in the human body". Rather, the primary spatialization invoked only surface resemblances between diseases, and the focus was always on understanding their place not in the space of the body, but in the space of the table.

By contrast, the "secondary spatialization" which characterized nineteenth century medicine rejected all preconceptions which were anterior to perception and turned to the material body as the space in which disease must be learned and understood. This paradigm called for an understanding of disease that bore a much more intimate relation to the material, three-dimensional space of the human body, delving into the deep space impermissible under primary spatialization. In secondary spatialization, disease has moved out of its "*place* on the table" to its "*seat* in the body", where it meets the "the concrete space of perception" (Foucault 1973, 10). Under this configuration, the emphasis is on the way in which disease manifests itself within the body, how it is "articulated upon the thick, dense volume of the organism and becomes *embodied* within it" (Foucault 1973, 10). In contrast to primarily spatialization, secondary spatialization visually maps disease onto the body; it dismisses the validity of medical knowledge that preexists visual perception, focusing on the doctor's attention instead on the tissular, three-dimensional space physically within the patient.

Furthermore, the bodily mapping of disease then gives way to a visual method of obtaining medical knowledge. Foucault argues that it is from the secondary spatialization of disease in the nineteenth century that the "medical gaze" is born, the gaze in which the doctor peers not just at, but *into* the patient's body. The doctor's task becomes making visible the invisible (Foucault 1973, 149); only by diving deep into the dark recesses of the human body can the doctor observe how disease manifests itself in the human body:

> "The gaze plunges into the space that it has given itself the task of traversing…the medical eye must see the illness spread before it, horizontally and vertically in graded depth, as it penetrates into the body, as it advances into its bulk, as it circumvents or lifts its masses, as it descends into its depths. Disease is no longer a bundle of characters disseminated here and there over the surface of the body and linked together by statistically observable concomitances and successions; it is a set of forms and deformations, figures, and accidents and of displaced, destroyed, or modified elements bound together in sequence according to a geography that can be followed step by step." (Foucault 1973, 136)

It is difficult not to hear in Foucault's description echoes of Bacon's initial vision for a science which actively illuminated and subdued nature, for the medical gaze here takes on the role of a powerful surveyor capable of interrogating and appraising its object of study: the body. Indeed, Foucault notes that doctors often turned to "open[ing] up a few corpses" to practice on the dead the gaze which would then be applied to the living (Foucault 1973, 124). For in the new medicine, only through visually appraising the embodied nature of disease—its appearance within a fleshy geography of organs, tissues, and membranes—could doctors truly understand it.

Thus, at the beginning the nineteenth century, modern medicine identified as its principal domain the material space of the body. Because of this normative shift, only that which could be mapped onto the body would then be considered medically legitimate, and the medical gaze emerged as the proper method of attaining knowledge. Thus was born modern medicine's essential task of making the invisible within the body visible. These were the foundational assumptions and goals developed at the birth of modern medicine, and they continue to shape medicine in more recent history.

Finally, I add to this historical overview of modern science and medicine one more development, which is the formulation of an ideological divide between nature and nurture. The nature-nurture debate is assumed to be about genes and the environment, and both supposedly contribute to producing the sum of a behavior or trait. While the nature versus nurture divide suffuses our understandings of human traits today, it was only since the contributions of Charles Darwin, and later Francis Galton, that nature and nurture came to be viewed as disjunct and increasingly oppositional (Cowan 1972, 390). Notably, the separation of nature and nurture made it possible to envision that all human traits, even those which may not be intuitively be labeled as disease, may also include a natural component. The natural component enabled the inheritance from one generation to the next: Darwin first writes of the "transmission" of qualities, physical or mental, as the passing on of an *internal* substance (Keller 2010, 21), which geneticists and biologists later identified as the gene. Thus, the divide between nature and nurture was also a divide between the internal and external, between "different kinds of things found in different spaces" (Keller 2010, 22).

This division has interesting implications for science and medicine because it expands the category of what can be appropriate objects of medical and scientific inquiry. For a phenomenon like mental illness, which may not be as intuitively recognizable as disease as, for example, tuberculosis, the ideological divide between nature and nurture presumes that there is still a natural component (however strong its influence) that is directly implicated in its manifestation. Moreover, since the gene is internal to the body, it must act within the body to produce its effects. This means that a whole host of human traits, from tuberculosis to mental illness, contain a material component that can then be taken as an object of scientific inquiry and medical attention. Even where the embodied nature of a disease is rather vague, presuming that a natural

component underlies it still produces the desire to *see* it in the body. Thus, the ideological framework of nature versus nurture creates the space to explore potential biological, bodily underpinnings of a diverse array of diseases and behaviors.

The point of this historical overview has been to demonstrate that our current conceptions of what constitutes as scientifically and medically legitimate are in fact historically situated. While I do not intend to argue that scientists and doctors today continue to endorse all the ideas articulated at the births of modern science and medicine, I do suggest that the normative assumptions embedded in each continue to hold sway. For example, scientists today may not all share Bacon's enthusiasm for "conquering Nature", but they do continue to benefit from the gendered associations of scientific knowledge that both reflect and contribute to the elevation of the masculine and devaluation of the feminine. In other words, part of the reason that adherence to scientific standards is taken to be a self-evident good may be that science has enjoyed a centuries-long association with masculinity. It is therefore important to recognize the sources from which claims to scientific and medical claims of legitimacy derive their power.

Interrogating the historically specific nature of modern science and medicine is especially important in the face of science's enduring claims to "value-free objectivity" (Harding 1991, 143), which help it gain credibility among the lay public. The perception of science in the late nineteenth century United States, for example, illustrates how the Baconian and mechanical emphases on truth and rationality allow science to occupy a privileged position of epistemological authority. On the perception of science in America in the late nineteenth century, Barbara Ehrenreich and Deirdre English write:

> "[Science] is the embodiment of disinterestedness…It is rational and calculative, but only in the interests of *truth*. Ideally, neither whimsy nor wishful thinking nor the desire for fame can becloud the scientist's deliberations: the judgment of the 'results'—the graphs, columns of figures, comparative measurements—is final. It is this image of uncompromising disinterestedness and objectivity which gives science its great moral force in the mind of the public" (2005, 85)

To this description, doctors, too, can be added, for both are associated with a commitment to disinterested truth that fortifies their credibility in the public eye. Thus, while the assumptions, values, and goals which inform their versions of truth are in fact historically contingent, the truths that scientific and medical investigation produce always purport to be, and are continuously perceived to be, both objective and historically invariable.

From this broad historical analysis, we can move forward with a more critical eye. When claims are made that an idea is scientifically or medically legitimate, it is not immediately obvious that its legitimacy is contingent upon the normative dimensions of science and medicine *as they have been constructed* in the past few centuries. It seems only natural to believe that for something to be scientifically and medically legitimate makes it more real. Thus, only by interrogating and historicizing our conceptions of what is scientifically true and medically legitimate does an understanding emerge of how the meanings of both are not essential, natural, or historically invariable. Following this denaturalization, we can consider how the meanings of science and medicine, as we understand them now, affect how much value is attached to different forms of knowledge, as well as which pursuits regarding the understanding and treatment of disease we find worth undertaking. To return to the rise of biological psychiatry, we might ask: How do the normative dimensions of science and medicine come to bear on our

understandings of mental illness? How do they impact which explanations we find most appealing? What characteristics of biological psychiatry allowed it to lay claim to scientific and medical legitimacy? It is to these questions that I turn to in Section III. First, however, I provide a brief history of the paradigm shift to biological psychiatry in order to examine the technological, social, and economic contexts in which these claims arose.

II. From Talking It Away to Swallowing It Away: The Rise of Biological Psychiatry

> "The doctor that I've been seeing was the first doctor to actually say, 'Listen, you're never going to feel normal…you have a brain imbalance…you're going to go up and down for the rest of your life unless you correct it with medication'."
>
> - Bryan, a patient (Buchman et. al 2013, 72)

Centuries after the births of modern science and medicine, the idea that mental illness stems from neurobiological roots abounds in the American cultural imagination today. Like Bryan and his doctor, for most of us the connection between mental illnesses like depression and a causal neurochemical substrate appears as a scientific and medical truth, one substantiated by decades of scientific research. Such explanations have been promoted in peer-reviewed articles, textbooks, direct-to-consumer-advertisements for psychiatric drugs, media, first-person accounts of psychological distress, and popular discourse (Cohen and Hughes 2011, 176). Given the ubiquity of biological explanations, it is likely not surprising that a 2007 survey of 262 students found that over 90% had seen or heard the chemical imbalance theory of depression (France, Lysaker, & Robinson 2007, 416). This perspective of mental illness has vast implications for not

only how we diagnose and treat mental illness, but also for how we view psychiatry, how we allocate funds for research and support services, and how we understand ourselves.

Seventy years ago, the idea that mental illness stems from physical differences in the brain would have struck most Americans as dubious. Over the course of the second half of the twentieth century, several technological, political, and economic developments had to be in place before biological explanations of mental illness could enjoy the reputation of pristine scientific validity that they often do today. Indeed, masked under this perceived objectivity is a history marked by scientific experimentation that was often more questionable than conclusive, political and personal battles among psychiatrists, and heavy-handed involvement from the pharmaceutical industry. Here I provide a brief history of the rise of biological psychiatry to contextualize the modern biological paradigm within its historical developments, and hopefully turn on its head the notion that a biological approach to mental illness is self-evident, natural, and should be taken at face value.

First, modern biological psychiatry largely grew out of a history of haphazard experimentation with drugs and patients with mental disorders. In the 1920s and 30s, psychiatrists experimented with opiates, barbiturates, and insulin as supposed cures for schizophrenia and metrazol as a treatment for depression (Valenstein 1988, 16). These drugs were not sophisticated tools of treatment: often they only mildly reduced symptoms after inducing violent convulsions and unconsciousness in patients, with crude effects likely closer to "banging a watch on the table to get it going for a while" than correcting specific physiological processes in the brain (Valenstein 1988, 19). In the 1950s, the introduction of chlorpromazine marked the beginning of the modern era of psychopharmacology as the first chemical solution to be viewed as a treatment for mental illness rather than simply a tool with which to calm patients

down or alleviate their symptoms (Rose 2003, 47; Shorter 1997, 255; Valenstein 1988, 15; Whitaker 2010, 48). French psychiatrists Jean Delay and Pierre Deniker published widely on the drug's psychiatric applications after administering it to a group of psychotically agitated patients in Paris (Rose 2003, 47; Valenstein 1988, 24), and the clinical reports that followed emphasized its utility for relaxing disruptive psychotic patients who troubled staff in psychiatric wards. (Valenstein 1988, 24; Whitaker 2010, 50; Shorter 1997, 251).

Despite observations that the drug also produced Parkinson's-like symptoms in patients, chlorpromazine was heavily marketed throughout the U.S. and Canada. Smith Kline and French obtained a license from Rhone-Poulenc to sell chlorpromazine, marketed as Thorazine, in the United States in 1954 (Whitaker 2010, 58). While Thorazine had been administered to fewer than 150 patients prior to the drug's application to the FDA, the president of Smith Kline and French, Francis Boyer, assured his audiences that Thorazine had gone through the most rigorous testing possible, and that it had been "proved safe and active for human administration" (Whitaker 2010, 58). Boyer's emphatic insistence on Thorazine's efficacy paid off: less than three months after Smith Kline and French obtained their license to sell, a *Time* magazine article titled "Wonder Drug of 1954?" pronounced chlorpromazine a "star performer" (Whitaker 2010, 58). The drug spread rapidly through crowded psychiatric hospitals and earned the pharmaceutical industry $75 million in 1955 alone (Rose 2003, 47).

There was no scientific basis for a credible theory about how chlorpromazine worked, but its enormous financial success led other pharmaceutical companies to try to develop and patent similar drug treatments (Valenstein 1988, 35; Shorter 1997, 255). In addition to schizophrenia and other psychotic disorders, researchers and pharmaceutical companies also began to focus their attention on emotional disorders such as depression. Iproniazid, marketed as Marsilid by the

Hoffman-La Roche company, soon became the first monoamine oxidase inhibitor (MAO-I) used to treat depression. Imipramine, marketed as Tofranil by the Geigy Company, then followed as the first tricyclic antidepressant (France, Lysaker, and Robinson 2007, 411; Valenstein 1988, 40). These drugs then ushered in a whole class of tricyclic antidepressants throughout the 1960s (Rose 2003, 47; Shorter 1997, 261; Valenstein 1988, 41), and early studies on MAO-Is and tricyclic antidepressants appeared to offer promising results (Whitaker 2010, 153). However, in a more strictly controlled 1969 conducted by the National Institute of Mental Health, a review of all antidepressant studies found them to be only marginally more effective than placebos (Whitaker 2001, 154).

Still, the widespread adoption of these early antidepressants helped spawn interest in developing chemical theories on the origin of mental illness. In 1966, Julius Axelrod and his colleagues presented research that suggested both classes of antidepressants, the monoamine oxidase inhibitors and tricyclic antidepressants, worked by enhancing the action of norepinephrine: monoamine oxidase inhibitors blocked its enzymatic degradation, and tricyclic antidepressants interfered with the reuptake process that removed it from the synapse (Valenstein 1988, 76; Healy 2002, 186). In addition, researchers also derived a neurochemical explanation for depression from observations that the drug reserpine produced depressive behavior in rats by manipulating levels of norepinephrine and serotonin (Valenstein 1988, 79). These findings helped to inform a norepinephrine-based theory of depression, which held sway in the 1970s and early 1980s before giving way a theory which substituted serotonin for norepinephrine (Healy 2010, 209). Consequently, the serotonin theory depression enjoyed dominance from the mid-1980s to the turn of the millennium, which Healy credits almost entirely to the marketing of Prozac and its selective serotonin reuptake inhibitor (SSRI) sisters (Healy 2010, 209).

A few notable insights emerge from this historical account so far: first, contrary to what our current biological paradigm might imply, medications for depression and other mental illness were not engineered from a preexisting biological understanding of mental illness; they were popularized among doctors and patients long before scientists understood what they were even doing. Second, the pharmaceutical industry and its economic interests have been closely intertwined with biological psychiatry from the start. And third, scientific justification for the use of psychiatric medications was, and always has been, questionable at best. In addition to the litany of troubling side effects which were conveniently ignored by pharmaceutical companies, the scientific validity of a theory of depression based on norepinephrine and serotonin was undermined by multiple inconsistencies. For example, while a theory of serotonin or norepinephrine deficiency depended on studies that administered reserpine to rats as an animal model of depression, reserpine rarely produces symptoms even suggestive of depression in humans (Valenstein 1988, 97). Similarly, other drugs alleviate depression despite having little or no effect on either norepinephrine or serotonin, and most antidepressants also produce many other effects in addition to increasing norepinephrine and serotonin activity (Valenstein 1988, 99). Thus, even if antidepressant drugs alleviated symptoms for some depressive patients, without more sophisticated knowledge of what these drugs were doing in the brain, their success does not necessarily lend support to biological causal explanations of depression.

Biochemical theories developed to explain depression sustained themselves only through selective perception of the evidence by researchers, psychiatrists, and pharmaceutical companies who were committed to a biological revolution in psychiatry. Yet they nevertheless continued to gain momentum: by the early 1970s, some researchers, such as psychiatrist Ronald Fieve, went as far to say that because mental disorders such as mania and depression were “correctable so

rapidly by chemical rather than talking therapy", they "must be due to biochemical causes handed down through the genes" (Valenstein 1988, 51). Given the arguably questionable and certainly incomplete scientific evidence supporting these ideas, Fieve's confidence about the biological underpinnings of mental illness appears rather premature. Indeed, his overconfidence in the evidence was likely at least partly influenced by enthusiasm for what new biological explanations of mental illness could offer the field of psychiatry.

This is not to say that the notion that mental illness has biological roots was entirely new. In fact, in the asylum-based brand of psychiatry that was practiced up until the late nineteenth-century, somatic theories which linked mental illness to biology and genetics were influential (Shorter 1997, 69). Unfortunately, early forays into biological explanations of mental illness eventually produced the notion of degeneration, the idea that inherited mental illnesses worsen over generations (Shorter 1997, 69). This legacy made mentally ill patients living in asylums appear to be prime candidates for forced sterilization during the eugenicist projects of the early twentieth century, in which the nation-state and medical establishment colluded to eliminate undesirable social groups as a strategy for promoting a healthy society (Esposito and Perez 2014, 423). Thus, notions about the biological underpinnings of mental illness were not unheard of in the first half of the twentieth century. They were only new in the sense that during the decades in which modern psychopharmacology first developed, the dominant psychiatric paradigm was not biological, but psychoanalytic.

In the 1950s and 60s, the Freudian model of psychoanalysis enjoyed near-hegemonic influence in American psychiatry: virtually all university psychiatrists and private-practice psychiatrists demonstrated a psychodynamic orientation, and psychodynamically oriented psychiatrists filled the seats of leading academic departments, residency training programs,

research and funding agencies, and editorial boards (Shorter 1997, 172). The *American Journal of Psychiatry (AJP)* was also oriented towards Freudian psychoanalysis in the mid- to late 1950s, and it was filled with the first-person articles and full-page images of the white, male psychiatrists who practiced it (Metzl 2003, 37). The Freudian model of mental disorders presumed that they were the result of early-life experiences with fathers and mothers, which then became internalized through the binary of conscious and unconscious. Accordingly, the practice of psychoanalysis involved regular, forty-five to fifty-minute talking sessions through which the unconscious was made conscious (Metzl 2003, 38; Shorter 1997, 154).

Given this framework for understanding mental health, it is easy to see how out-of-step early chemical treatments for mental illness were with their contemporary dominant paradigm: as Metzl writes, "the very notion of a chemical quick fix or a treatment that ablated tension and anxiety manifestations of deep, psychological processes read against the concept of illnesses that developed over lifetimes and treatments guided by specially trained clinicians over years of fifty-minute hours" (2003, 40). Unsurprisingly, the popularization of psychotherapeutic drugs was met with heavy skepticism and even hostility from leading psychiatrists throughout the 1950s and 60s. The *AJP* published numerous articles and editorials which questioned the use of psychotropics and the qualifications of those prescribed them, and pharmaceutical companies only marketed medications as treatments which could assist, but not replace, traditional psychotherapeutic and psychoanalytic practices (Metzl 2003, 42; Rubin 2004, 374; Whitaker 2010, 60). The consensus was that the usefulness of chemical compounds extended only insofar as they could be used to assist or enhance psychotherapeutic intervention.

Yet the rise of the biological paradigm of mental illness was imminent, and it was aided by growing discontent regarding the objectivity, efficacy, and scientific validity of the

psychoanalytic method. In 1957, British psychologist Hans J. Eysenck published a damning report that evaluated nineteen studies of psychoanalytic and psychotherapeutic treatment from leading journals and discovered "little agreement among psychiatrists relating even to the most fundamental concepts and definitions" (Metzl 2003, 43), as well as little evidence that psychotherapeutic methods' efficacy in patients (Shorter 1997, 306). Others pointed to the lack of comprehensive criteria for establishing improvement in a patient and criticized the method for its lack of scientific evidence and uniformity. In 1961, psychiatry's appropriateness as a discipline altogether came under fire with the publication of Thomas Szasz's *The Myth of Mental Illness,* in which he very frankly contended that there is "no such thing as mental illness". According to Szasz, ever since its birth in Jean-Martin Charcot's misnaming of women's social ills as a bona-fide medical affliction (so-called hysteria), psychiatry had been in the business of misusing claims to scientific and medical validity to address what were in fact social and personal issues (Benning 2016, 293; Szasz 1961, 31).

Two decades later, by the 1970s, these concerns had amplified into intense criticism of psychoanalysis and by extension, psychiatry. Because its debatable etiological theories were impossible to verify, psychoanalysis seemed out of keeping with the standards of medical practice and in need of a reboot that would catapult it to scientific legitimacy. Doubt regarding the ability of psychotherapeutic methods to meet the standards required of science and medicine went so far that some patients and psychiatrists questioned whether practice of psychoanalysis alone constituted malpractice (Shorter 1997, 310). Prominent psychiatrist Gerald Klerman wrote that psychiatry should aim to become "scientifically oriented, should focus on the biological aspects of mental illness, and should attend explicitly to the codification, reliability, and validity of psychiatric classifications" (Metzl 2003, 53). Similarly, British psychologist Eysenck

concluded in 1985 that psychology and psychiatry would have to "abandon the pseudo-science of psychoanalysis…and undertake the arduous of transforming their discipline into a genuine science" (Shorter 1997, 313). In doing so, the renewed focus on empiricism would push psychiatry away from the theoretical concerns of psychoanalysis, and towards an approach that seemed more objective, biological, and medically legitimate.

By the late 1980s, Klerman's vision for psychiatry had come true. He had several social, political, and economic factors to thank. First, politics among psychiatrists played a large role in driving psychoanalysis out from its seat of prominence with the publication of the third revision of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-III)* in 1980. Dr. Robert Spitzer led the push for the *DSM* to primarily emphasize systematic, atheoretical diagnostic criteria which could be used to reliably identify illnesses (Lane 2004, 61). Despite assertions that he did not support any school of thought over another, Spitzer effectively cemented his vision for a more empirical psychiatry by only appointing like-minded, "kindred spirits" to his task force (Lane 2004, 52) and coming up with "all kinds of ways of muting [the] concerns" of other psychoanalysts throughout the revision process (Lane 2004, 56). His insistence that the *DSM* should only list explicit symptoms departed significantly from the developmental theories of psychoanalysis, while his decision to completely remove the word "neurosis", psychoanalysis's most notorious diagnostic category, infuriated many psychoanalysts who viewed it as a blatant signal of disregard for a century's worth of psychiatric insight (Lane 2004, 50; Shorter 1997, 304). To Spitzer, a "mental (psychiatric) disorder [was] a medical disorder" (Lane 2004, 63), so a *DSM* which fit with new developments in neuropsychiatry and pharmacology while casting aside psychoanalysis represented not a loss, but the creation of a "pristine scientific entity" (Lane 2004, 49).

From an economic standpoint, attacks on the legitimacy of psychoanalytic methods coincided with changes in U.S. healthcare system in the 1980s which sought to eliminate costly and inefficient practices. This put psychoanalysis at a strong disadvantage compared to the much more time- and cost-effective new pills (Barnett 2013, xix; Rose 2003, 51, Lane 2004, 40). In addition, the pharmaceutical industry's portion of total U.S. spending on health research and development increased dramatically throughout the 1980s, so that by 1995, pharmaceutical companies, and not the federal government, provided most of the funding for health research and development (Rose 2003, 51).

Pharmaceutical companies also employed several other strategies which vastly expanded their ability to influence psychiatric thought. For example, they regularly sponsored symposiums for continuing education for psychiatrists. While these symposiums were not run for the explicit purpose of selling drugs, companies were much more likely to support speakers who emphasized drug treatment and downplayed adverse side effects (Valenstein 1988, 185). In addition, pharmaceutical companies often funded patient advocacy groups which produced pro-drug material to disseminate to other patients (Valenstein 1988, 177). For instance, after receiving an education grant from the Wyeth-Ayerst pharmaceutical company, the National Alliance for Research on Schizophrenia and Depression (NARSAD) widely circulated pamphlets that grossly overestimated the effectiveness of antidepressant drugs while glossed over the efficacy of cognitive-behavioral therapy (Valenstein 1988, 177). Third, pharmaceutical companies funded so-called disease awareness campaigns, which sought promote education about mental illnesses treatable by their products in the hopes of convincing more people that they were sick (Rose 2003, 56). Examples include Pfizer's promotion of the new disease entity of "female sexual dysfunction" and Roche's promotion of social phobia (Rose 2003, 56). Finally, companies

regularly ran ads for their products, some of which appealed directly to the brain-based model of mental illness, in psychiatry's leading journals (See Figure 1). All these efforts gave the pharmaceutical industry considerable power not only in guiding new product development, but also in shaping the paradigms of psychiatry received by psychiatrists, patients, and the public.

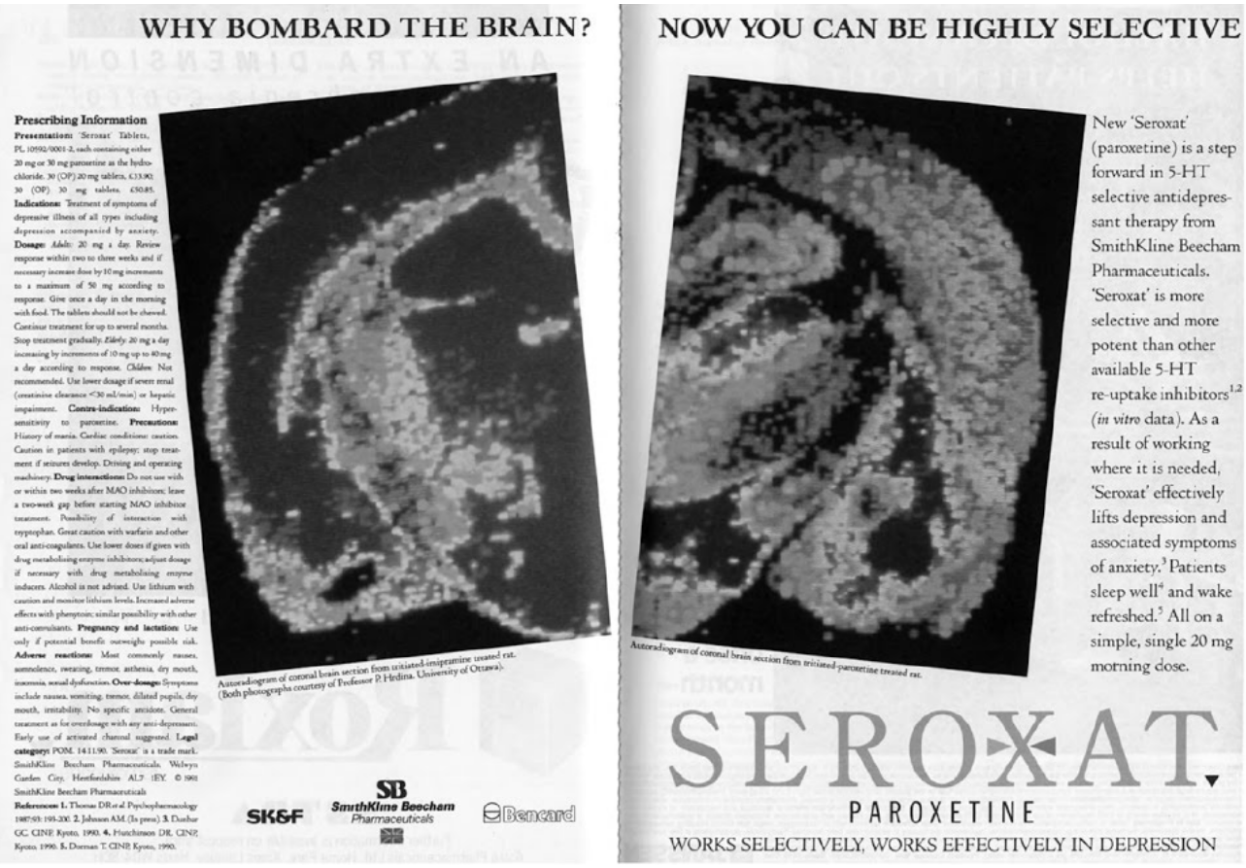

Figure 1: Advertisement for Seroxat/Paxil in *British Journal of Psychiatry* 159, October 1991 (reprinted from Lane 2002, 122)

The combined influence of these factors propelled biological psychiatry to a decisive victory over psychoanalysis by the 1980s and have secured its appeal since then (Metzl 2003, 56; Shorter 1997, 145). Moreover, after the defeat of psychoanalysis in the 1980s, additional developments in the 1990s only bolstered the dominance of the biological paradigm of psychiatry. The development of new drugs continued: Antidepressants including Eli Lilly's Prozac, released to the market in 1987, and Zoloft, released in 1992, for instance, both enjoyed

phenomenal sales and widespread adoption. The FDA's removed of restrictions on direct-to-consumer advertising (DTCA) in the United States in the late 1990s, and national spending on pharmaceutical promotion skyrocketed (Rubin 2004, 378). And brain-based models of mental illness have only received even more attention throughout the so-called "Decade of the Brain" in the 1990s, in which scientific and technological developments like the PET scan sparked enormous new interest in neuroscientific research (Dumit 2003, 36).

Thus, we now live in a society saturated with messages about the biological nature of mental illness—from television to the doctor's office. Through a half-century's worth of technological, political, social, and economic developments, we have reached an age in which to be mentally ill is to have an abnormal brain.

This historical account casts a more nuanced light upon the idea that current understandings of mental illness represent a pristine scientific enterprise. As should be clear by now, the notion that mental illness is rooted in neurochemical substrates, that depression is—as the patient Bryan put it—a "brain imbalance", is a relatively recent phenomenon. Moreover, biological psychiatry's rise in popularity over the last several decades has been characterized less by a straightforward accumulation of natural truth and more by scientific experimentation that tripped and stumbled along, while subject to the politics of leading psychiatrists and prematurely deployed for the profits of pharmaceutical companies. Thus, we have explored in this section how technological development, political interests, and profitability all played a role in biological psychiatry's rise to prominence in the second half the twentieth century. In the next section I turn my attention to more philosophical matters, examining how in addition to these

factors—or perhaps, underlying all these factors—biological psychiatry offered an epistemological advantage over psychoanalysis that armed it with a rather powerful internal momentum. For once the notion of the biological roots of mental illnesses were established, it gained a force that, like that of a speeding train, soon made it very difficult to jump tracks.

III. This is Your Brain on Depression: The Philosophical Appeal of Biological Psychiatry

> "Well, so much of it is subjective, and that's why I'm actually interested in the brain scanning, because I want to see how many of these things that are subjectively diagnosed have an objective, physical reality."
>
> - Anjali, a patient (Buchman et. al 2013,74)

Despite the popularity of biological explanations of mental illness today, their scientific foundations—the very "objective, physical reality" which Anjali seeks—remains tenuous. This is true even after taking into account the immense proliferation of research in neuropharmacology since its birth in the 1950s: reviewing scientific literature biological theories of mental illness, Beacon is emphatic in his assertions that "scientists have not identified a biological cause of, or even a reliable biomarker for, any mental disorder" and that "there is no credible evidence that mental disorders are caused by chemical imbalances, or that medicines work by correcting such imbalances" (Deacon 2013, 846). Scientists may have better tools at their disposal and more data to work with, but major holes in connecting medical symptoms with physical causes persist and are unlikely to be filled soon (Lane 2007, 28).

Writing about the nature of scientific revolutions, Thomas Kuhn argued that at the level of perception, change often takes shape only when there is a desire for change (Metzl 2003, 112).

Perhaps one way of understanding our premature conviction in a biological approach of mental illness is to examine how its normative dimensions made it the kind of explanation that psychiatrists, patients, and the public alike *wanted* to hear. What factors allowed biological psychiatry to sustain itself even where the scientific evidence wasn't fully on board? What is it about biological psychiatry that allowed it to lay claims to greater scientific and medical legitimacy? What values, goals, and assumptions were embedded in the new paradigm which made it so appealing? In this section, I build on the historical accounts of sections I and II to explore connections between the normative dimensions of biological psychiatry and modern science and medicine. As biological psychiatry gained dominance in the 1970s, the values and goals it assumed resonated strongly with those established in seventeenth and eighteenth centuries by early scientists and doctors. Thus, in this section I argue that the new biological paradigm allowed psychiatry to step into well-established traditions in science and medicine, making it appear as both a more legible and legitimate way of looking at mental illness.

We begin with the widespread notion that biological explanations of mental illness are more objective and rational than psychoanalytic explanations, perhaps the most popular argument advanced by psychiatrists in the 1970s and 80s. Recalling Joseph Glanvill's warning that truth doesn't stand a chance when "the Affections wear the breeches and the Female rules" (Faulkner and Kerr 1997, 52), one of the ways in which biological psychiatry better fits the framework of modern science is that the "Affections" play a much smaller role in causal explanations of mental illness. While a psychoanalytic therapist might spend years of fifty-minute hours helping a patient work through repressed feelings, biological psychiatry traffics in the world of things—there are no emotions in the material world of neurotransmitters, synapses, and neurons. Ironically, even though depression is itself a mood disorder, a biological theory of

depression which focuses on a chemical imbalance in the brain effectively erases the affect from the disorder by translating it into an object: molecules of norepinephrine or serotonin. While psychoanalysis focused on early childhood, parental relationships, and other developmental experiences that could help explain why a patient feels the way they do, in biological psychiatry, the focus shifts away from understanding the feeling itself, and turns instead to the neurotransmitter which stands in for the feeling.

Once affect has been replaced by object, mental illness no longer requires—as alchemists would have it—the "joint and integrated effort of heart, hand, and mind" (Keller 1996, 44)—to understand and treat. The paradigm shift effectively removes "heart" from hand and mind, and the perspective of mental illness that results appears more scientifically legitimate because it more strongly resonates with the Baconian, mechanical vision which came to define modern science. By removing feeling from the picture of mental illness, biological psychiatry succeeds in expelling its femininity and securing itself within the masculine domain of rationality. Thus, one way to understand psychiatrists' calls for a biological revolution to bolster the field's scientific legitimacy is that they effectively encourage psychiatry to step out of the domain of femininity, feeling, and subjectivity, and into the privileged domain of masculinity, rationality, and objectivity. Of course, objectivity in psychiatry is in fact a myth, for even biological psychiatry "simply substitutes the subjectivity of the *observer* for the subjectivity of the *patient*" in evaluating whether a patient is "normal" (Lane 2007, 66). However, the appearance of objectivity is crucial, for it allowed the new psychiatry to benefit from the system of associations between gender, knowledge, and power established at the birth of modern science.

The translation of feeling into object is also crucial because it redefines mental illness in terms of the material, and specifically, the material human body. By locating the site of mental

illness as within the physical structure of the human brain rather than, as in psychoanalysis, as part of the immaterial unconscious, biological psychiatry also makes mental illness more legible within the normative dimensions of modern science. Recall Foucault's description of the "secondary spatialization" which characterizes modern medicine, in which disease is linked to anatomical substrates and can be mapped out onto the three-dimensional geography within the human body. For this paradigm of modern medicine, "it is the body itself that has become ill" (Foucault 1973, 136); for biological psychiatry, it is the brain itself that has become ill. When a patient like Anjali states her desire to use brain scanning to reveal the "objective, physical reality" of mental illness, she is operating within Foucault's secondary spatialization and its brand of visually penetrative, bodily focused medicine.

Interestingly, some of the revisions to the *DSM-III* implemented by Spitzer's team reflect the ideological shift which Foucault describes in the shift from primary to secondary spatialization. Just as Foucault argues that nineteenth century medicine rejected all preconceptions that were anterior to perception, Spitzer, too, emphasized that the *DSM* ought to remain atheoretical. His decision to remove traces of psychoanalytic theory and focus mostly on listing systematic diagnostic criteria emptied the symptoms of mental illness of deeper meaning, causing some critics to complain that the new *DSM* transformed psychoanalysis's "castles of neuroses to diagnostic Levittown" (Lane 2007, 65). This did not mean that the new psychiatry would be entirely atheoretical, as biological causal theories of mental illness soon replaced those of psychoanalysis, but the important distinction is that biological theories were only formulated through scientific observation of a natural object, the human body, rather than through speculation about a non-object, the unconscious. In this manner, the distinctions between psychoanalysis and biological psychiatry also echo Bacon's critique that prior natural

philosophers' mistake was to attempt to "create the universe out of the human mind" rather than seek knowledge through experimentation.

Spitzer's insistence that the *DSM* remain atheoretical was enacted through changes such as the removal of the category "neuroses" and the word "reaction" from diagnostic labels; for example, "schizophrenic reaction" became merely "schizophrenia". While these revisions eliminated any hint of causal theory in the diagnostic labels themselves, they also erased the sense of dynamism in the patient's struggle which was prominent in psychoanalytic theory (Lane 2007, 38). Neuroses, for example, were thought to be present-day manifestations of earlier crises in subjugating unconscious desire, while the word "reaction" in diagnostic categories implied that the patient's condition may be the effect of an external cause. In both examples, the configuration of the illness recognized a variable, chronological component to the patient's experience. Removing this sense of temporality shifted the meaning of illness so that it increasingly defined the patient's identity. Thus, once revisions were made in newer versions of the *DSM*, psychiatric conditions came to seem more like permanent, even innate conditions (Lane 2007, 38).

These subtle shifts in language facilitated the transition to thinking about mental illness as biologically determined; if, according to the diagnostic labels themselves, psychiatric diseases were not reactions to external events or conflicts within the unconscious that played out over time, it was easier to think of them as stable traits carried within the body. Then the natural next step was to assume that they have genetic roots: recall psychiatrist Ronald Fieve's enthusiasm in the late 1970s that mental illnesses "must be must be due to biochemical causes handed down through the genes". The conceptual associations between embodied, innate, and genetic are the legacy of Darwin's and Galton's nature-nurture divide, which made it possible not only to

consider behaviors and emotions as having a natural component, but also established a divide between "different kinds of things found in different spaces" (Keller 2010, 22). The nature-nurture divide made it possible for the shift from psychoanalysis to biological psychiatry to reposition mental illness within a preexisting network of associations. Since mental illness appeared more like permanent conditions in the new *DSM,* the assumption was that they must also be innate, genetic, and due to internal causes. In other words, the conceptual framework provided by nature versus nurture infused biological psychiatry's belonging to "nature" with a network of related meanings, and this served to further secure its place under the purviews of science and medicine.

Having examined the connections which made biological psychiatry appear more in keeping with the standards of modern science and medicine, it is now important to explore how this paradigm shift changed what scientists and doctors aimed to do. Redefining mental illness as a biological, medical disorder altered the methods and goals that psychiatry pursued, producing a desire to visualize and then intervene in the inner workings of the brain. Along with the new conceptualization of mental illness as seated in the brain came the Foucauldian desire to peer into the body, but where visual knowledge *of* the brain wasn't accessible, scientists also produced visual knowledge *about* the brain.

Indeed, Catherine Waldby argues that the scientific enterprise is characterized by the movement from living object to visual text *about* the object (Waldby 2000, 29). She writes:

> "…the purpose of science is to transform masses of natural objects into standardized trace representations…which summarize objects in ways that are intelligible to scientists, and which can easily be reproduced and manipulated. The objects of the scientific gaze is not the natural object but the visual text produced about the object, which does the crucial

work of acting as a standardized, cooperative surrogate for the object under consideration." (Waldby 2000, 28)

As a material object in the human body, the brain served for biological psychiatrists as such a natural object that could then be transformed into and summarized by visual text. This text might include, for example, visual diagrams created to represent cellular mechanisms underlying the serotonin and norepinephrine hypothesis of depression (see Figure 2 below). It might also include diagrams of the chemical structures of neurotransmitters or active ingredients in medications. Especially where the natural objects of mental illness themselves, such as neurons and molecules, are too small to be rendered visible by the unassisted human eye, visual text serves as a crucial surrogate which allows scientists and doctors to sustain the fantasy of the objective medical gaze.

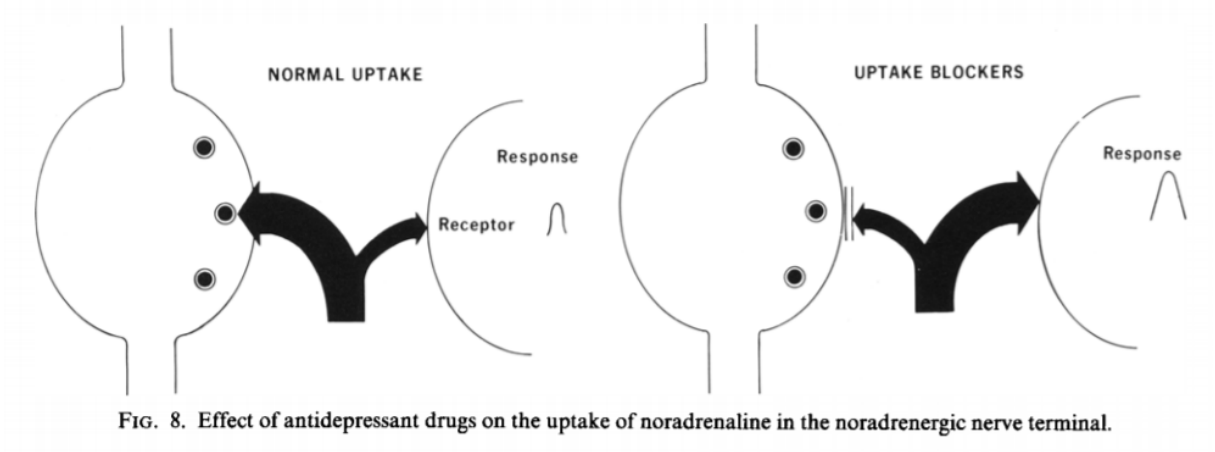

FIG. 8. Effect of antidepressant drugs on the uptake of noradrenaline in the noradrenergic nerve terminal.

Figure 2: Promoting the hypothesis that tricyclic drugs which are clinically effective block the update of noradrenaline (from Axelrod 1981, 676).

Moreover, the brain lends itself to the production of visual text. Whereas the conscious and unconscious of psychoanalysis lack a physical structure to be mapped and diagrammed, the objects in biological psychiatry can be visually represented. Pictures which purport to represent the anatomy and physical processes of the brain make biological explanations of mental illness

much more immediately accessible. For example, in the Seroxat/Paxil advertisement included in Section II, the autoradiograms of the brain sections treated by Paxil not only appear to confirm the material reality of mental illness, but also add credibility to claims that medications, themselves material objects, act on the true substrates of mental illness. Thus, during the years of the biological revolution in psychiatry, visual representations of brains, neurons, and neurotransmitters added an epistemological appeal to biological psychiatry that psychoanalysis could not match.

In the years since then, imaging technologies have made it possible to create visual texts that even more closely approximate the fantasy of the complete medical gaze. Since their popularization in the 1990s, the so-called "Decade of the Brain", technologies such as positron emission tomography (PET) scanning and magnetic resonance imaging (MRI) have enabled a seemingly objective approach to visual brain mapping (Beaulieu 2000, 41). With the fantasy being to study the brain directly as it is alive and functioning, visual imaging technologies appear to offer the best approximation yet of what it is like to peer "inside the black box" to understand—through seeing—the inner workings of the brain. Psychiatrist Michael Phelps describes PET scanning in the following manner:

> "…you have a camera and can sit there now and watch that molecule: watch it go through the blood supply, go into the brain, go into the tissue of the brain, and actually go through the biochemical process. So you have a camera that allows you to actually watch…the biology of the body. So that is really the objective…This is really what PET does. It reveals to us something that we know is going on inside your body, but that we can't get to." (from Dumit 2004, 3)

In true Foucauldian fashion, Phelps' testimony makes clear that the goal of PET is to render visible the internal bodily processes usually invisible within anatomical deep space. While elsewhere Phelps notes, "the particulars of the instruments" which indicate that such scans are not, in fact, unmediated images but statistical maps subject to highly variable parameters, analyses, and modifications, the desire for an objective medical gaze endures.

When applied to psychiatry, PET scan and MRI often fuel the desire to visually represent the biological reality of mental illness. As Dumit notes, a 1983 article in the fashion magazine *Vogue,* titled "High-Tech Breakthrough in Medicine: Seeing-Eye Machines…Look Inside Your Body, Can Save Your Life", included a PET scan with three brain-shaped blobs appearing alongside the labels "NORMAL", "SCHIZO", and "DEPRESSED" (see Figure 3 below). Such images demonstrate and simplify biological differences between the brains of normal and sick patients—as Dumit comments, the accompanying article does not even need to be read for the audience to understand the message. (Dumit 2004, 7). While scientists may be critically aware that brains scans do not constitute an unmediated picture of reality, in popular imagination, visual imaging technology appears to confirm the existence of significant anatomical differences embodied within mental illness that need only be rendered visible to be appreciated.

Thus, contemporary medical technologies have ushered in a new era in the production of visual evidence to support biological explanations of mental illness. Kim Sawchuk terms this newest technology-driven iteration of the Foucauldian medical gaze "biotourism", by which she means the "persistent cultural fantasy that one can travel through the inner body, a bodyscape which is 'spatialized' and given definable geographic contours." (Sawchuk 2000, 9) Sawchuk notes a few essential features of biotourism, the first of which is the "transposition of scale, turning the miniature into the gigantic". The second feature she identifies is the transformation of

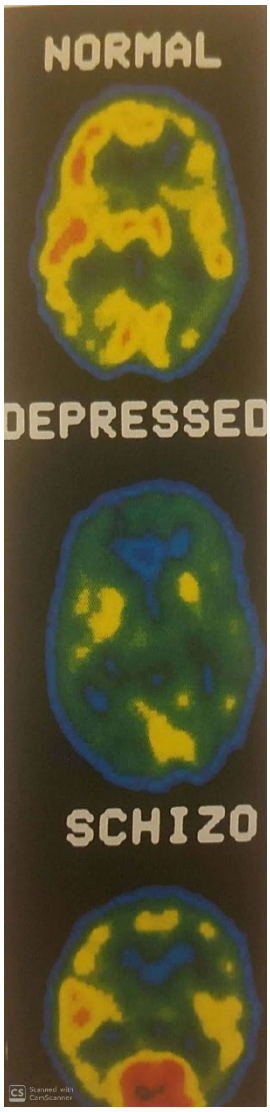

Figure 3: Positron emissions tomography (PET) scans in *Vogue*, see p. 6, reprinted from Dumit 2004 (from "New Seeing-Eye Machines…look inside your body, can save your life," by Joseph Hixson, *Vogue,* July 1983)

anatomy into a geographic space that can then be "mapped", and the last is the narration of a voyage into the body as an allegorical "journey from light into darkness" (Sawchuk 2000, 11). From these features, Sawchuk argues that contemporary uses of imaging technologies for peering into the body offer yet another way to continue the project first outlined at the birth of modern medicine. PET scans and MRI images of brains with mental illness thus enact the

Foucauldian medical gaze by rendering the deep space of the brain visible, by bringing its dark recesses to light, and by mapping its distinct geographic features.

The perceived authority of the images produced by these technologies is difficult to resist. Despite the technologically mediated nature of MRI scans, for instance, a common trope in both popular and scientific discourse is to misconstrue the anatomical picture as interchangeable with, rather than a construction of, the part of the body being scanned (Joyce 2008, 49). Especially in popular culture, attention to the many layers of human and machine mediation required to produce MRI scans is typically neglected. As a result, there is an enduring temptation to view MRI scans as providing direct access to an "a priori body that exists outside of human mediation" (Joyce 2008, 49). Donna Haraway refers to this form of technologically enabled, seemingly unmediated vision in science as "the god trick of seeing everything from nowhere" (Haraway 1988, 581). While the "god trick" is of course fantasy rather than reality, the perceived transparency and authority of MRI images and PET scans nevertheless makes them enormously powerful tools for promoting biological explanations of mental illness.

Finally, the production of visual text about the brain ultimately aims to make intervention—treatment—possible. Writing about the "codification of the flesh" that renders all bodies "completely within the domain of technical mastery", Donna Haraway argues that "the translation of the world into a problem of coding [is] a search for a common language in which all resistance to instrumental control disappears and all heterogeneity can be submitted to disassembly, reassembly, investment and exchange" (Waldby 2000, 32). Whether it is diagrams about how SSRIs work or brain scans of "depressed brains", visual texts about mental illness erase the individuality of the patient to produce a seemingly standardized, biological portrait of mental illness. For biological psychiatry, Haraway's "codification of the flesh" transforms into

the codification of emotion, whereby the subjective experiences of mood disorders like depression can be translated into a common language of neurons, synapses, and neurotransmitters—which ultimately, can be forcibly controlled through medication. Thus, the proliferation of scientific and medical knowledge about biological workings of mental illness not only enables us to understand Nature, but as Bacon would have it, the technologies which emerge from scientific observation "have the power to conquer and subdue her, to shake her to her foundations" (Keller 1996, 36).

Thus, the epistemological foundations of biological psychiatry allowed it to slip seamlessly into the realms of modern science and medicine. By enabling a number of conceptual maneuvers, the biological paradigm of mental illness neatly aligned psychiatry with the normative dimensions of science and medicine defined hundreds of years ago: biological explanations of mental illness located the site of mental illness within the body, converted feelings into a natural object, and opened up the terrain of the human brain to the medical gaze, making it possible to produce visual text about mental illness and ultimately intervene in it. It was these conceptual shifts that gave biological psychiatry its enduring epistemological appeal, its status as a more legible and legitimate way of looking at mental illness. As we have observed, this paradigm shift starkly redefined the methods and goals of psychiatry: Now, in a logical universe that makes psychoanalysis appear just shy of a fairytale, psychiatrists and patients alike endeavor to produce visual text not just about, but *of*, the brain—so that in our wildest dreams, one day we may point to picture of a brain and be able to definitively say, "that is a brain on depression".

IV. It's not Me, It's my Brain: Conceptions of Selfhood in the Age of Biological Psychiatry

> "I was so relieved when the doctor said 'You're depressed' because I thought oh that's what it is and it's not my fault. You know, I thought, this depression is not my fault. Because I thought everything was my fault before and there's days that I still feel that way...what I wish we could do is like stick a thermometer in your ear and check your serotonin level…So they could look at a number of people and say "OK this person has this symptoms and their serotonin, you know you're down a quart."
>
> - Cynthia, a patient (Lafrance 2007, 16)

Shifts in scientific thinking do not simply exist "out there", confined to the spheres of science and expertise. Scientific discourse is also actively negotiated and made meaningful within popular discourse, where people may accept, reject, qualify, or adjust scientific narratives they encounter to suit their individual needs. In the quote above, for example, Cynthia adopts a biomedical narrative of depression to relieve herself of blame for her illness. Moreover, in her wish for a "serotonin thermometer", she articulates a desire for a more robust tool with which to ascertain for the biological reality of mental illness. Patients like Cynthia demonstrate the extent to which large-scale paradigm shifts can shape intimate ways of being in the world. For Cynthia, the ideological debates between psychoanalysts and biological psychiatrists which animated the late twentieth century hold very personal implications for how she interprets her day-to-day experiences and understands who she is.

In this final section, I explore how the shift to a paradigm of biological psychiatry had implications not just for the practice of psychiatry, but also for our broader conceptions of selfhood, disease, and the body. Many scholars have approached this topic by conducting

interviews with people who identify as having a mental illness. Reviewing some of those studies, I raise the following questions: How does the paradigm of biological psychiatry shape how we understand ourselves in relation to our brains, and how do these understandings impact stigma against mental illness? Are we sick, or are our brains sick? Is there a difference? And lastly, how do medications affect who we are?

First, many anthropological investigations into how patients understand their mental illnesses highlight their sense of relief in knowing that depression has neurochemical roots. For many, characterizing depression as a chemical imbalance, as an issue with the physiological constitution of one's brain, removes the stigma and moral blame attached their illness. In an interview with Michelle Lafrance, Kate explains:

> "I would like to see more women be honest about [depression] and lose their shame because it doesn't mean- And this is something that I've learned. I'm not a weak person because I have this, I'm not a bad person because I have this, I could just as easily had, you know diabetes or blond hair or red hair or long legs, I should be so lucky. You know it's just, it's one of those things and there's no blame associated with it" (Lafrance 2007, 10)

Kate's account is infused with moral language: "shame", "weak", "bad", "blame". Yet by construing depression as a trait subject to whims of the genetic lottery, like having "red hair or long legs", she allows a biomedical understanding of mental illness to do the work of removing associations of depression as a character flaw. In other words, because depression is located within the body just like "diabetes", it is not a behavior or decision for which Kate can be blamed.

Indeed, the potential for biological understandings of mental illness to reduce moral blame has also captured the interest of advocates, researchers, and families of patients. For example, the National Institute of Mental Health states on their website that "Identifying brain activity associated with depression and the changes that result from treatment and the patient's improved mood will help to destigmatize the illness, a disease of the brain" (Dumit 2007, 155). Similarly, Dumit notes that at the Brain Imaging Center at the University of California, Irvine, a major source of funding for the Center's PET scanner came from donations from families which had members with schizophrenia, who were compelled by the potential for a biological redefinition of mental illness to reduce moral blame. Compared to psychoanalytic theory and its tendency to fault poor mothering as the cause for mental illness, biological explanations appeared to offer a reprieve from biased, unfair accusations. Buchman et al. notes, too, that beyond concerns about diagnostic accuracy or treatment specificity, clinicians and scientists' adherence to neurobiological explanations of mental illness is also motivated by a desire to reduce stigma by construing mental illness as *bona fide* medical condition (2013, 67).

How do biological explanations of mental illness reduce blame? We might understand this effect as linked to the normative value of detachment embodied in modern science. As argued in Section III, the shift to biological psychiatry involved the designation of the brain as an object of scientific inquiry. Recalling Bordo's observation that modern science is premised on a "detachment" from "the emotional life, from the particularities of time and place, from personal quirks, prejudices, and interests, and most centrally, *from the object itself*" (Bordo 1986, 451, emphasis added), we might consider that the biological paradigm of psychiatry enabled patients to practice some level of detachment from their own brains. Thus, patients like Kate could absolve themselves of personal blame by putting some distance between their personhood and

their (dysfunctional) bodies, almost as if one's depressed brain were an entity independent from the self. With biological psychiatry's rendering of mental illness as embodied in the brain, a natural object, one's mental illness occupied a different conceptual space from their subjective personhood.

However, public attitudes regarding stigma tell a different story, as other studies have concluded that biological explanations may also sometimes increase stigma against mental illness. For example, in reviewing the literature on trends in public attitudes toward people with depression and schizophrenia, Schomerus et al. found that attitudes toward people with mental disorders have not improved, and desire for social distance from people with schizophrenia has actually increased (2012, 450). Similarly, Pescosolido et al. concluded that promoting the biomedical model is at best ineffective at destigmatizing mental illness and may even exacerbate stigma (2010, 1325). These findings suggest that biological understandings of mental illness may contribute to the otherization of people with mental illness by overemphasizing what are perceived to be innate, inconvertible differences (Deacon 2013, 852). Thus, different audiences may focus on different normative dimensions of biological psychiatry when it comes to stigma against mental illness: while patients focus on the detachment of personhood from the object of illness (the brain), the public focuses instead on the permanence of physical difference in patients with mental illness.

Moreover, the notion that biological psychiatry enables distance between personhood and the brain is not wholly complete, either. Unlike other parts of the body which might be taken as objects of scientific inquiry, the brain is unique in that it is widely assumed to be the biological seat of the self. Thus, the brain occupies an uncertain position as both an object separate from the subjective self, as well as the physical embodiment of the self. As Dumit argues, this paradoxical

notion of the brain then influences how patients with mental illness *feel* about their own brains. While Emily Martin and Deborah Heath have noted that people with genetic afflictions tend to boo and hiss at pictures of genes or enzymes believed to cause their conditions, Dumit notes that sufferers of mental illness react to brain images of depression or schizophrenia with care and concern. He compares their reactions with the way parents experience reassurance and bonding with ultrasound images of their unborn children (Dumit 2007, 163). These observations suggest that while biological psychiatry may distance the patient from the brain enough to absolve them of moral blame, it is not to the extent that they no longer recognize the brain, the perceived cause of their suffering, as part of themselves.

The brain's simultaneous identity as the root, as well as the bearer of illness, also introduces complications for how patients understand themselves in relation to their brains, especially when it comes to identifying which of the two is "sick". Here, Dumit provides a nuanced reading of journalist Tracy Thompson's memoir, *The Beast: A Reckoning with Depression.* Writing about her experiences in a psychiatric ward after a failed suicide attempt, Thompson deploys the biomedical model of depression to absolve herself of moral blame for her depression. But she expresses confusion and uncertainty about how to then understand the relationship between herself and her brain:

> "So I was sick. But this was my *brain* I was talking about, not my gallbladder or kidneys…It produced behavior, the sum total of which was somehow *me.* If I wanted to simply say that my brain was sick, I could stop there and disavow my responsibility for that sickness—but if I did that, I would be giving up my idea of autonomy in the world…It seemed to me that if the first approach was too simplistic, its opposite might be as well" (Thompson 1996, 190).

At the same time Thompson resents thinking about herself as the "mere product of a chemical abnormality in the lumpy gray organ between [her] ears" (Thompson 1996, 217), she also desires to simplify her illness by simply declaring that she is "sick" and not a "moral leper" (Thompson 1996, 190). According to Dumit, Thompson eventually settles this quandary by creating a "new type of human, a depressed human, who is also a type of brain, a depressed brain" (Dumit 2007, 161). This to say that Thompson "*is* a depressed person because she *has* a depressed brain…She is her brain against her brain: She is now a person with depression fighting that depression" (Dumit 2007, 161). The challenges that Thompson faces in trying to settle her identity point to some of the fraught, likely unforeseen, difficulties of reconciling a coherent notion of selfhood with the biological paradigm of psychiatry. Moreover, her eventual conclusions seem to include more contradictions than answers. Thus, while the conceptualization of mental illness as being rooted in the brain perhaps made practice and research more straightforward for doctors and scientists, it left the patients themselves with an extraordinarily messy question: where does one situate the self among subjective experiences of illness and objective explanations of their origins?

Given these complex and often conflicting notions about relationships between the self, the brain, and mental illness, it is perhaps not surprising that the there is also little consistency in how patients interpret the role played by antidepressants in shaping selfhood during treatment. Some narratives of recovery seem to follow quite straightforwardly from a biomedical understanding of mental illness. In other studies, however, the inconsistencies surrounding selfhood and biological psychiatry produce a proliferation of different narratives about the relationship between the role played by antidepressants in recovery.

To start, concerns about the appropriate relationship between antidepressants and selfhood were raised as early as 1993 by psychiatrist Peter Kramer in *Listening to Prozac.* Kramer writes about several case studies within his own psychiatric practice in which patients experienced extraordinary improvement while taking Prozac. For example, he tells the story of Tess, a perpetually anxious woman who suddenly becomes confident and assertive at work and in her dating life after going on Prozac. When coming off medication leads Tess to suffer a relapse of symptoms and conclude she is "not herself" without Prozac, Kramer expresses wonder at how Prozac led Tess to reconstrue her usual, unmedicated self, whom she had lived as her whole life, as "not herself" (Kramer 1993, 18). Kramer asks: "But who had she been all those years if not herself? Had medication somehow removed a false self and replaced it with a true one? Might Tess, absent the invention of the modern antidepressant, have lived her whole life…and never been herself?" (Kramer 1993, 19).

This contradiction in Tess's understanding of herself in relation to Prozac highlights one of the surprising ways in which psychotropic medication influenced understandings of selfhood. For Kramer, Tess's story raised concerns that Prozac produces a "redefinition of self" which reorganized understandings of "what is constant to the self" and what is mutable", or "what is necessary and what contingent" (Kramer 1993, 21). After such "redefinitions", the true self in these illness and recovery narratives becomes increasingly elusive. Moreover, Kramer also argues that an overreliance on drug treatment may result in the misconstruction of social and cultural causal factors of disease as biological. Regarding Tess's shyness, Kramer writes: "If her self-destructiveness with men and her fragility at work disappeared in response to a biological treatment, they must have been biologically encoded…But are we willing to allow medications to tell us how we are constituted?" (Kramer 1993, 18). Thus, early on Kramer identified many of

key concerns raised by our modern era of psychopharmacology. How is the true self affected by medication? How does medication reorganize which aspects of the self we find most salient?

In more recent decades, additional scholarship has built upon some of the questions raised by Kramer in 1993. For example, with regard to whether antidepressants restore a true self or create a new self, many of the women interviewed by Fullager in 2009 leaned towards the former, offering a relatively uncomplicated narrative of recovery. These women, who often reported having positive experiences with antidepressants, adopted the expert language of biomedicine to construe their depression as a biological issue, which rationalized their "crazy" into a legible disease, depression, and rendered it manageable with medication (Fullagar 2009, 393). In women's own accounts, depression was often explained as a chemical imbalance within the brain or the result of a genetic inheritance within the family; life events or other environmental circumstances were positioned as secondary in depression's etiology. Taking medication was thus construed as a "process of chemical adjustment to restore normalized selfhood" (Fullagar 2009, 396). Overall, such accounts mesh nicely with the assumptions and goals of modern science and biological psychiatry.

However, much greater variety exists in patient's experiences with antidepressants and their perceived relation to the self. Indeed, in her discursive analysis of women's experiences with antidepressants, Celine Wills identifies among her participants six different ways in which women understood their antidepressants to impact their sense of self. There were those who identified with the "New Self" Narrative, for whom antidepressants changed their lives for the better and transformed them into different people; those who identified with the Bringing Back my "Old Self" Narrative, in which antidepressants brought back the "real me" that was lost to depression, the "Partly Repaired Self" Narrative, in which antidepressants can help give a boost

to get through the "real causes" of issues going on in life; the "Loss of Self" Narrative, in which antidepressants' emotional numbing effects made participants in feel that they had lost their true selves; the "Damaged Self" Narrative, in which negative experiences with ineffective antidepressants, debilitating side effects, and unreceptive doctors were internalized as being an "incurable" and "deficient" person; and the "Powerless Self" Narrative, in which antidepressants were felt to be a solution pushed upon the participant by doctors and parents, necessary to manage what felt to be the "life-long sentence" of depression. The participants in Will's study displayed a wide range of positive and negative experiences with antidepressants, as well as large variation in the centrality of biological explanations of mental illness in their understandings of depression. Overall, the variety in these women's experiences, as well as in their interpretations of their experiences, highlights that the meanings of depression and antidepressants are anything but uniform.

In addition, recent investigations into how medication impacts conceptions of the self reveal even more tenuous conclusions for the first generation of young adults to have grown up on antidepressants. For example, in *Dosed: The Medication Generation Grows Up,* Kaitlin Bell Barnett focuses her attention on the lived experiences of young adults who began taking antidepressants during their adolescent years. Barnett argues that people who came of age while taking antidepressants face additional layers of complexity in attempting to discern medication's legacy in their personal lives. It is difficult to distinguish, for example, how much of past their emotional and behavioral experiences can be attributable to the action of medication, and how much is their own. Whether prolonged medication use alters the course of personal development during adolescence also remains an option question. With "very little information out the lasting physical, emotional, and cognitive effects of using psychiatric medication during childhood and

beyond", writes Barnett, "the original group of medicated children…[is] left with the legacies of using medication, though in many cases they're not quite sure what those legacies are, or will be" (Barnett 2012, xxii). Over the course of interviews with many young people, she finds considerable variation in how they understand themselves, their illnesses, and the roles played by medication.

Personal narratives of illness and recovery offer a rich space within which to negotiate scientific paradigms of mental illness. For those with lived experience of mental illness, scientific discourse can exist in a sometimes compatible, sometimes uneasy relationship with their own experiential authority. Indeed, while explanations of the objective causes of mental illness hold some degree of coherency in scientific discourse and certainly in pharmaceutical advertising, the brain-based narrative tends to splinter when faced with the real-life experiences of people with depression. One way to interpret these inconsistencies is that they point to the imperfect fit of the biomedical model of disease with an illness whose experience is so strongly subjective. In any case, it is immensely important for researchers and psychiatrists alike to pay attention to the voices of the patients themselves so that they may better understand how the knowledge that they produce and promote affects the lives of real individuals. From this understanding, scientists and doctors may gain a more reflexive understanding of the immense power they wield in shaping the day-to-day realities of those living with mental illness.

Conclusion

The present paradigm of biological psychiatry is neither natural nor historically invariable. This honors thesis has attempted to undertake the multidimensional project of

understanding the contexts from which the biological paradigm emerged. Thus, I have attempted to illuminate the historical and philosophical elements which made the present moment of biological psychiatry possible, as well as explore some of the implications it has for understandings of the self. In conclusion, I hope that this project has been successful in denaturalizing biological explanations of mental illness—interrogating their historical specificity, parsing out their claims to scientific and medical legitimacy, and historicizing the philosophical roots which gave them their appeal.

My primary concern throughout this process has not been to decide whether biological explanations of mental illness are true. There is, and always has been, scientific literature on both sides, demonstrating and refuting the biomedical model of mental illness. Rather, my aim has been to critically rethink the biological paradigm of psychiatry as cultural narrative which does particular kinds of work in scientific and popular imagination. I have attempted to partially step outside of the debates regarding biological psychiatry's truth claims to better see the bigger picture. In doing so, I have attempted to explore and provide at least partial answers to the following questions: among different possible knowledges which can explain mental illness, why do some appear more appealing and powerful than others? How and why are different knowledges imbalanced, and what are the implications for real people of selecting between these different knowledges?

Of course, my interrogation remains incomplete. There are a variety of additional dimensions which could be added to this work. For example, while I focused on the implications of the biological paradigm of psychiatry on understandings of selfhood, an additional chapter to this project might be to explore more large-scale implications. How did the paradigm shift affect funding for different forms of support related to mental illness? For example, how did it affect

the amount of funding designated for research into biological causes versus social support services for those currently living with mental illness? How did it affect the way that universities understood their role in handling mentally ill students, or businesses in handling mentally ill employees? More broadly, how did the paradigm shift in psychiatry affect how we understood the role of the community in addressing mental illness? In addition, another addendum to this work might be to include more historical scholarship focusing on the decades after the 1980s. My primary goal in Section II was to cover the period traditionally recognized the beginning of modern biological psychiatry, so providing a more extensive history of psychiatry that led all the way up to the present seemed slightly outside the scope of my project. However, investigation into twenty-first century developments in psychiatry may provide useful updates to my account. In addition, more detailed analysis into the cultural representations of mental illness in psychiatric advertising might provide fruitful insights into how science and culture mutually influence each other in promoting the rise of biological psychiatry.

While the number of additional pieces which could be added to this discussion borders on limitless, I hope that the work I have begun in this project may be useful to those negotiating their own experiences with mental illness, to their friends and family who support them, and to the current and future scientists who are interested in biological explanations of mental illness. All of us have something at stake in topic. I hope that by better understanding the stories we tell about our bodies—where they come from and what they do—we might find a way to move forward as conscientiously and intentionally as possible.

References

Aan het Rot, Marjie, Sanjay J. Mathew, and Dennis S. Charney. “Neurobiological mechanisms in major depressive disorder.” *CMAJ* 180, no. 3 (February 3 2009): 305–313.

Axelrod, Julius. “Catecholamine neurotransmitters, psychoactive drugs, and biological clocks.” *Journal of Neurosurgery* 55 (November 1981): 669-677.

Barnett, Kaitlin B. *Dosed: The Medication Generation Grows Up.* Beacon Press, 2012.

Beaulieu, Anne. "The Brain at the End of the Rainbow: The Promises of Brain Scans in the Research Field and in the Media." In *Wild Science: Reading Feminism, Medicine and the Media*, edited by Janine Marchessault and Kim Sawchuk, 24-38. Routledge, 2000.

Benning, Tony B. “No such thing as mental illness? Critical reflections on the major ideas and legacy of Thomas Szasz.” Review of *The Myth of Mental Illness,* by Thomas Szasz. *BJPsych Bulletin* 40 (2016): 292-295.

Bordo, Susan. "The Cartesian Masculinization of Thought." *Signs* 11, no. 3 (1986): 439-56.

Buchman, Daniel Z., Emily Borgelt, Louise Whiteley, and Judy Illes. "Neurobiological narratives: experiences of mood disorder through the lens of neuroimaging." *Sociology of Health and Illness* 35, no. 1 (January 2013): 66-81.

Cohen, David and Shannon Hughes. “How Do People Taking Psychiatric Drugs Explain Their ‘Chemical Imbalance?’” *Ethical human psychology and psychiatry* 13, no. 3 (December 2011): 176-189.

Cowan, Ruth S. “Francis Galton's Contribution to Genetics.” *Journal of the History of Biology* 5, no. 2 (Autumn 1972): 389-412.

Deacon, Brett J. “The biomedical model of mental disorder: A critical analysis of its validity, utility, and effects on psychotherapy research.” *Clinical Psychology Review* 33 (2013): 846–861.

Duman, Ronald S. and George K Aghajanian. “Neurobiology of Rapid Acting Antidepressants: Role of BDNF and GSK-3β.” *Neuropsychopharmacology* 39 (2014): 233.

Dumit, Joseph. *Picturing Personhood: Brain Scans and Biomedical Identity.* Princeton University Press, 2004.

Ehrenreich, Barbara and Deirdre English. *For Her Own Good: Two Centuries of the Experts’ Advice to Women.* Anchor Books, 2005.

Esposito, Luigi and Fernando M. Perez. “Neoliberalism and the Commodification of Mental Health” *Humanity and Society* 38, no. 4 (2014): 414-442.

Faulker, Wendy and Emily Anne Kerr. “On Seeing Brockenspectres: Sex and Gender in Twentieth-Century Science”. In *Science in the Twentieth Century,* edited by John Krige and Dominique Pestre, 43-60. Harwood Academic Publishers, 1997.

Foucault, Michel. *The Birth of The Clinic*. Tavistock Publications, 1973.

France, Christopher M., Paul H. Lysaker, and Ryan P. Robinson. “The ‘Chemical Imbalance’ Explanation for Depression: Origins, Lay Endorsement, and Clinical Implications. *Professional Psychology: Research and Practice* 38, no. 4 (2007): 411-420.

Frances, Allen. *Treating the Ailing Doctor-Patient Relationship,* Psychiatric Times. Sept 15, 2014.

Fullager, Simone N. "Negotiating the neurochemical self: anti-depressant consumption in women's recovery from depression." *Health: An Interdisciplinary Journal for the Social Study of Health, Illness and Medicine* 13, no. 4 (June 2 2009).

Haraway, Donna. “Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective.” *Feminist Studies* 14, no. 3 (Autumn 1988): 575-599.

Harding, Sandra. “‘Strong Objectivity’ and Socially Situated Knowledge”, in *Whose Science? Whose Knowledge?: Thinking from Women's Lives,* 138-163. Cornell University Press, 1991.

Healy, David. *The Creation of Psychopharmacology.* Harvard University Press, 2002.

Hoppen, K. Theodore. "The Nature of the Early Royal Society: Part I." *The British Journal for the History of Science* 9, no. 1 (1976): 1-24. http://www.jstor.org/stable/4025703.

Joyce, Kelly A. *Magnetic Appeal: MRI and the Myth of Transparency.* Cornell University Press, 2008.

Keller, Evelyn. *Reflections on Gender and Science*. Yale University Press, 1996.

Keller, Evelyn. *The Mirage of a Space Between Nature and Nurture*. Duke University Press, 2010.

Kramer, Peter. *Listening to Prozac: A Psychiatrist Explores Antidepressant Drugs and the Remaking of the Self.* Penguin Books, 1993.

Lafrance, Michelle N. “A Bitter Pill: A Discursive Analysis of Women's Medicalized Accounts of Depression.” *Journal of Health Psychology* 12, no. 1 (January 2007).

Lane, Christopher. *Shyness: How Normal Behavior Became a Sickness*. Yale University Press, 2007.

Metzl, Jonathan. *Prozac on the Couch: Prescribing Gender in the Era of Wonder Drugs*. Duke University Press, 2005.

Moore, Thomas J. and Donald R. Mattison. “Adult Utilization of Psychiatric Drugs and Differences by Sex, Age, and Race.” *JAMA Intern Med* 177, no. 2 (2017): 274–275. doi:10.1001/jamainternmed.2016.7507

Oxford University Press. “Definition of *innate* in English”. Oxforddictionaries.com. https://en.oxforddictionaries.com/definition/innate. (accessed April 5, 2019).

Pescosolido, Bernice A., Jack K. Martin, J. Scott Long, Tait R. Medina, Jo C. Phelan, and Bruce G. Link, “A disease like any other? A decade of change in public reactions to schizophrenia, depression, and alcohol dependence.” *The American Journal of Psychiatry* 167 (2010): 1321–1330.

Philo, Chris. “‘The Birth of the Clinic’: An Unknown Work of Medical Geography.” *Area* 32, no. 1 (2000): 11–19.

Rattansi, P.M. “The intellectual origins of the Royal Society.” *Notes and Records of the Royal Society of London* 23, no. 2 (December 31 1968): 129-143.

Rogers, Kara, Susan Heyner Joshi, and Edna R. Green. 2018. “Biology.” Brittanica.com. https://www.britannica.com/science/biology. (accessed April 5, 2019).

Rose, Nikolas. "Neurochemical Selves." *Society* 41, no. 1 (November 2003): 46–59.

Ross, Colin A. “Errors of Logic in Biological Psychiatry.” In *Pseudoscience in Biological Psychiatry: Blaming the Body,* edited by Colin A. Ross and Alvin Pam, 85-128. Wiley & Sons, 1995.

Rubin, Lawrence C. “Merchandising Madness: Pills, Promises, and Better Living Through Chemistry.” *Journal of Popular Culture* 38, no. 2 (2004): 369 - 383

Sawchuk, Kim. “Biotourism, *Fantastic Voyage*, and Sublime Inner Space.” In *Wild Science: Reading Feminism, Medicine and the Media*, edited by Janine Marchessault and Kim Sawchuk, 9-23. Routledge, 2000.

Schomerus, Georg, Christian Schwahn, Anita Holzinger, Patrick W. Corrigan, Hans Jörgen Grabe, Mauro Giovanni Carta, and Mathias C. Angermeyer. “Evolution of public attitudes about mental illness: A systematic review and meta-analysis.” *Acta Psychiatrica Scandinavica* 125 (2012): 440–452.

Shorter, Edward. *A History of Psychiatry: From the Era of the Asylum to the Age of Prozac.* John Wiley & Sons, 1997.

Starobinski, Jean. “Gazing at Death.” Translated by Peter France. Review of *The Birth of the Clinic: An Archaeology of Medical Perception,* by Michel Foucault, translated by A.M. Sheridan Smith. *The New York Review of Books,* January 22, 1976.

Szasz, Thomas. *The Myth of Mental Illness: Foundations of a Theory of Personal Conduct.* HarperCollins Publishers, 1974.

Thompson, Tracy. *The Beast: A Journey Through Depression.* Penguin Books, 1996.

Valenstein, Elliot. *Blaming the Brain: The Truth About Drugs and Mental Health*. The Free Press, 1988.

Waldby, Catherine. "The Visible Human Project: Data Into Flesh, Flesh Into Data." In *Wild Science: Reading Feminism, Medicine and the Media*, edited by Janine Marchessault and Kim Sawchuk, 24-38. Routledge, 2000.

Whitaker, Robert. *Anatomy of An Epidemic: Magic Bullets, Psychiatric Drugs, And The Astonishing Rise Of Mental Illness In America.* Broadway Paperbacks, 2010.

Wills, Celine. “A hard pill to swallow: Young women's experiences of taking antidepressants.” PhD diss., University of Auckland, 2015.