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Biomedical Explanations of Psychopathology and Their Implications for Attitudes and Beliefs About Mental Disorders

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Abstract

Mental disorders are increasingly conceptualized as biomedical diseases, explained as manifestations of genetic and neurobiological abnormalities. Here, we discuss changes in the dominant explanatory accounts of psychopathology that have occurred over time and the driving forces behind these shifts, lay out some real-world evidence for the increasing ascendancy of biomedical explanations, and provide an overview of the types of attitudes and beliefs that may be affected by them. We examine theoretical and conceptual models that are relevant to understanding how biomedical conceptualizations might affect attitudes and beliefs about mental disorders, and we review some empirical evidence that bears on this question. Finally, we examine possible strategies for combatting potential negative effects of biomedical explanations and discuss important conclusions and directions for future research.

Keywords

causal reasoning; mental disorders; biological essentialism; stigma

INTRODUCTION

Across human civilizations, beliefs about the nature and origins of the phenomena that are now conceptualized as mental disorders have shifted and transformed in dramatic ways. Although it has been popular at some points in the past to view psychiatric symptoms as resulting from demonic possession, the influence of the moon, or a deficiency of maternal warmth during childhood, this review focuses on a conceptual framework that has become increasingly dominant in recent decades in which mental disorders are viewed as medical diseases rooted in biology. These biomedical explanations, which emphasize the roles of neurobiology and genetics in psychopathology, have been emphatically promoted by a range of stakeholders for a variety of reasons (Deacon 2013), leading these explanations to become widely embraced by members of the public (Pescosolido et al. 2010, Schomerus et al. 2012).

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Discussions of the increasing dominance of biomedical explanations for mental disorders sometimes raise the question, “Biomedical as opposed to what?” In other words, biomedical explanations are often seen as being in competition with other explanatory frameworks, such as those that conceptualize psychiatric symptoms as reactions to environmental factors or as traceable to early childhood experience. Although the notion that biomedical explanations cannot coexist with psychosocial ones may reflect mind–body dualism more than a true conflict in need of resolution (Kendler 2005), there is evidence that people do indeed perceive biomedical explanations as incompatible with other types of explanations. Studies that have examined the factor structure of laypeople’s perceptions of the causes of mental disorders have found that biomedical explanations tend to be independent from other etiological attributions (Goldstein & Rosselli 2003, Lebowitz et al. 2013). Moreover, in a study that asked mental health clinicians to rate the extent to which each disorder in the DSM-IV (*Diagnostic and Statistical Manual of Mental Disorders*, 4th ed.; Am. Psychiatr. Assoc. 1994) was caused by biological, psychological, or environmental factors, the biological-basis ratings were strongly negatively correlated with the psychological- and environmental-basis ratings, which in turn were positively correlated with one another (Ahn et al. 2009). This finding is especially striking in light of the fact that the clinicians were explicitly told “to think of biological, psychological, and environmental causes as non-mutually exclusive domains that could be overlapping” (Ahn et al. 2009, p. 154). Nonetheless, it mirrors earlier research conducted in Canada, which found inverse correlations between psychologists’ and psychiatrists’ ratings of biological and psychological causes for psychiatric symptoms described in clinical vignettes (Miresco & Kirmayer 2006). These results suggest that the increasing embrace of biomedical explanations may have the consequence of crowding out other levels of analysis—a concern that has been compellingly raised with alarm in the field of psychology in recent years (Kagan 2013, Miller 2010)—as not only laypeople but even mental health professionals appear to view them as in conflict with other conceptualizations.

The perceived incompatibility of biomedical explanations with other conceptual accounts of psychopathology implies that their ascendancy may represent a fundamental shift in how mental disorders are understood. This highlights the importance of understanding the implications of biomedical explanations for a wide range of attitudes and beliefs. These include not only stigmatizing social attitudes about people with mental disorders, which are widespread and impose a range of extremely destructive harms (Hinshaw & Stier 2008), but also clinical judgments and beliefs. For example, causal attributions for mental disorders may bear on expectations about prognosis, the selection of treatments, and even beliefs about how real a disorder is (Ahn et al. 2006, Iselin & Addis 2003, Kvaale et al. 2013b). The endorsement of biomedical explanations may also affect variables related to the therapeutic alliance, such as the perceived warmth of a clinician or the potential for patients to evoke empathy from their treatment providers (Lebowitz & Ahn 2014, Lebowitz et al. 2015). Thus, it is critical for clinicians and researchers in clinical psychology to understand the state of the empirical evidence regarding biomedical explanations and their consequences and implications.

This review provides a selective overview of this evidence. We begin by describing how conceptions of psychopathology have changed over time and the factors driving these

changes, as well as how the current embrace of biomedical explanations has shaped treatment trends and research priorities. We then attempt to provide some important conceptual and factual background, discussing the concept of social stigma, its application to mental disorders, and its societal effects, as well as highlighting the importance of the kinds of clinical variables mentioned above (i.e., prognostic expectations, treatment preferences, and the therapeutic relationship). Next, we delve into some broad psychological theories that are potentially relevant to the impact of biomedical explanations of mental disorders and the sometimes conflicting predictions to which they lead, and this is followed by an overview of the empirical evidence on how biomedical explanations affect attitudes and beliefs about psychopathology among members of the general public, professional clinicians, and people who are themselves affected by mental disorders. We conclude with a discussion of several proposed approaches for mitigating the negative effects of biomedical explanations, as well as some questions for future research.

HISTORY OF EXPLANATORY ACCOUNTS OF PSYCHOPATHOLOGY

In ancient times, behavior that would now be viewed as evidence of a mental disorder was commonly interpreted through a supernatural lens. In early Babylonian and Mesopotamian texts, mental disturbances are described as resulting from haunting by evil spirits, while the ancient Hebrews viewed madness as a punishment from God, and early Christianity attributed it to possession by demons (Pietikäinen 2015). In ancient Greece, the traditions of Hippocrates and Hippocratic medicine rejected supernatural explanations for human health and behavior in favor of naturalistic explanations. The theory of humoralism, in particular, traced problems in both mental and physical health to imbalances in four supposed humors, or bodily fluids: blood, phlegm, yellow bile, and black bile (Porter 2002). This early form of biomedical thinking about mental disorders fell out of favor, at least in Europe, during the Middle Ages and into the Renaissance, when a more supernatural worldview reemerged, and people exhibiting mental or behavioral disturbances were once again viewed as under the influence of demons or were even executed as practitioners of witchcraft (Pietikäinen 2015). By the nineteenth century, other areas of medicine were being revolutionized by biological discoveries, and psychiatry was suffering from diminished standing as a profession because of its failure to make similar advances. Along with frustration over the lack of efficacy of existing treatments, this may have helped set the stage for the field's twentieth-century embrace of psychobiological treatments that are now seen as barbaric, such as prefrontal lobotomies, the removal of healthy ovaries to quell hysteria, and the use of insulin-shock therapy as a treatment for schizophrenia (Duffin 2010). Although these so-called treatments are no longer employed today, other products of the field's psychobiological turn are still in use, such as electroconvulsive therapy and psychopharmacological agents.

The so-called psychopharmacological revolution had a particularly notable role in moving the field of mental health from one that was more heavily influenced by Freudianism and other psychodynamic conceptualizations of psychopathology to one in which biomedical explanations played an important part (Rosenbloom 2002). In the 1950s, psychiatrists began using chlorpromazine to treat schizophrenia and soon identified it as the first broadly effective, noninvasive means of controlling positive psychotic symptoms. Soon, millions of patients were treated with the medication. In the ensuing decades, tricyclics and monoamine

oxidase inhibitors, and eventually selective serotonin reuptake inhibitors (SSRIs) and serotonin and norepinephrine reuptake inhibitors (SNRIs), began to be used to treat depression, while barbiturates, benzodiazepines, and other sedative–hypnotics became common treatments for anxiety. Further research led to a better understanding of which neurotransmitter receptors were targeted by which drugs, and psychiatrists began to think of themselves increasingly as treating biological illnesses using pharmacological interventions, much like doctors in other areas of medicine. Although the precise biological mechanisms of action of many psychiatric medications are still not well understood, the widespread use of psychopharmacological interventions to treat many mental disorders is a trend that continues today.

Advances in the development of psychopharmacological agents, along with the reconceptualization of mental disorders as diseases of neurotransmitters and receptors, led to significant changes in treatment trends by the end of the twentieth century. For example, data from nationally representative surveys in the United States suggested that in 1998 most patients undergoing mental health treatment received psychotherapy, either alone or in combination with medication; however, by 2007 the majority received only medication (Olfson & Marcus 2010). This shift also appeared to coincide with changes in attitudes toward psychopharmacology among the American public. A comparison of responses to nationally representative surveys from 1998 and 2006 suggested that while Americans' views about the risks of psychiatric medications did not change significantly, they came to believe more strongly in the potential benefits of the drugs and became more willing to take psychiatric medications in hypothetical scenarios, even when the perceived benefits were controlled for (Mojtabai 2009). This trend echoes recent shifts in attitudes that have taken place in a variety of other countries as well, where members of the public have adopted more favorable stances toward psychiatric medication over time, and biomedical conceptualizations of psychopathology have been consistently linked to positive attitudes about psychiatric medication (Angermeyer et al. 2017).

At least in the United States, one factor that has surely helped to drive the widespread adoption of biomedical conceptualizations of mental disorders and the corresponding increased uptake of psychopharmacology is the advent of direct-to-consumer advertising for psychiatric medications and other prescription drugs. After a 1997 policy change by the US Food and Drug Administration paved the way for the widespread promotion of pharmaceuticals via broadcast media (Wilkes et al. 2000), commercials for antidepressant medications in particular quickly became commonplace. By 2005, combined promotional spending on direct-to-consumer advertising for SSRIs, SNRIs, and antipsychotic agents totaled \$22 million (Donohue et al. 2007). Nationally representative data from the United States have estimated that the mean number of televised antidepressant commercials seen per year by US adults is 85.07 and that exposure to television advertising produces a 6–10% increase in antidepressant use (Avery et al. 2012). Often, advertisements advance biochemical explanations for the etiology of depression to encourage symptomatic individuals to request a medication from their doctors, which is presented as a means of correcting a supposed chemical imbalance. Indeed, research has also demonstrated that patients' requests for prescription medications—including requests that mention an advertised antidepressant by name—can significantly influence doctors' prescribing

decisions (Kravitz et al. 2005). Information contained in pharmaceutical advertisements, such as mentions of negative side effects, may also influence psychiatric patients' adherence to drug regimens (Green et al. 2017).

Recent trends in US funding priorities for mental health research also reflect an increased emphasis on biomedical explanations for mental disorders. The Human Genome Project, completed in the early years of the twenty-first century with the investment of billions of dollars of public funds, sparked hope that the genetic basis of many psychiatric disorders would be uncovered (Cowan et al. 2002). Later, the US National Institute of Mental Health's (NIMH) Research Domain Criteria (RDoC) initiative was launched as part of an effort to move the field away from a reliance on descriptive diagnostic systems—such as those used by the *Diagnostic and Statistical Manual of Mental Disorders* (Am. Psychiatr. Assoc. 2013) and the *International Classification of Diseases and Related Health Problems* (WHO 1992)—and toward approaches to conceptualizing and classifying mental disorders that are informed by genetics and neuroscience (Insel et al. 2010). The RDoC program, begun in 2009, “conceptualizes mental illnesses as brain disorders” (Insel et al. 2010, p. 749). Its unmistakable emphasis on biological variables over psychosocial ones has been criticized as creating a risk that researchers will place unwarranted emphasis on the former at the expense of the latter (Lilienfeld & Treadway 2016).

Moreover, RDoC is only one example of the shift in research investment to focus on biological studies in the area of mental health: Not just the NIMH, but also the National Institute on Drug Abuse, the Eunice Kennedy Shriver National Institute of Child Health and Human Development, and the National Institute on Alcohol Abuse and Alcoholism have shifted their funding priorities toward biological research in recent years (Schwartz et al. 2016). This shift is evident from public statements by the institutes' leaders, the relative number of divisions at each that are focused on biological science and social science (including psychological science), and the strategic plans that describe the agencies' areas of interest and priorities. In 2013, the Brain Research through Advancing Innovative Neurotechnologies (known as BRAIN) Initiative was launched by President Barack Obama, with a proposal for more than \$100 million in US government funding to map the structure and function of the human brain, including research into mental and behavioral disorders (Insel et al. 2013). These initiatives have added to concerns that funding priorities are favoring the neurobiological level of analysis over the psychological (Schwartz et al. 2016): in other words, privileging biomedical explanations of psychological phenomena, including mental disorders. Moreover, the increasing emphases on funding biological research about mental disorders have led to a drumbeat of findings underscoring the role of genetics and neurobiological mechanisms in psychopathology, which is likely to continue and to reinforce the extent to which the public and clinicians rely on biological explanations.

THEORETICAL AND CONCEPTUAL BACKGROUND: ATTITUDES AND BELIEFS ABOUT MENTAL DISORDERS

Social Attitudes and Beliefs

One important reason behind the rise in popularity of biomedical explanations for mental disorders is the perception that they are helpful for combating the stigma surrounding psychiatric symptoms and conditions because they deflect blame from patients by casting them as suffering from an ailment rather than as choosing to think or behave in abnormal ways. However, stigma is a complex and multifaceted construct, so understanding how it is affected by biomedical explanations requires a more in-depth analysis.

One influential sociological account of stigma defines it as the result of a sequence of processes (Link & Phelan 2001). First, a stigmatized characteristic is identified and used to label an individual or group. Second, the characteristic is associated with negative stereotypes or devalued attributes. Third, the characteristic is used to separate an in-group from an out-group. Fourth, the stigmatized person or group is subjected to mistreatment or discrimination and disadvantage as a result of the stigmatized identity. There also must be a power differential between the stigmatizer and the stigmatized, as power is required to devalue the identity of others.

All of these components of stigma are clearly applicable to the characteristic of having a mental disorder. First, and perhaps most obviously, the very act of assigning diagnoses to psychiatric symptoms is an act of social labeling. Although the existence of a diagnostic nosology clearly has many benefits, diagnostic labels reflect the notion that there are meaningful differences between people who do and do not carry them, which is a basic component of the stigmatization process.

Second, there is ample evidence for the notion that people with mental disorders are negatively stereotyped in society. For example, individuals with mental disorders are often assumed to be violent or dangerous in other ways by many members of the public (Pescosolido et al. 2010), a belief that has existed for many decades (Phelan et al. 2000). Moreover, some research suggests that this stereotype might be as strong among mental health professionals as among members of the public (Lauber et al. 2006). The stereotype that people with mental disorders are highly likely to be violent or otherwise dangerous persists despite evidence that the presence of a psychiatric disorder is not a strong independent predictor of violent behavior and that the vast majority of people with mental disorders are not violent (Swanson et al. 2015). Another widespread and longstanding stereotype about people with mental disorders is that they are incompetent (Hinshaw & Stier 2008). Both this belief and perceived dangerousness have been associated with a willingness to support the coercive treatment of psychiatric patients (Pescosolido et al. 1999), a finding that illustrates the potential real-world consequences of negative stereotypes.

Third, labeling a person as having a mental disorder not only suggests negative stereotypes but also categorizes the person as belonging to a social out-group. One illustration of this phenomenon is the tendency for people with mental disorders to be labeled with adjectives or nouns (e.g., “schizophrenic,” “depressive,” “bipolar”) rather than described as having a

disorder, as is common for conditions like cancer or infections (Link & Phelan 2001, Reynaert & Gelman 2007). Moreover, applying noun labels to people with mental disorders has been linked to viewing them as belonging to an essentially distinct social group, as well as to having diminished compassion for them (Howell & Woolgar 2013).

Fourth, there is overwhelming evidence that people with mental disorders face significant discrimination and social disadvantage in multiple domains as part of their stigmatization. For example, they often report employment discrimination, and employers describe a reluctance to hire or retain employees with psychiatric conditions, leading to a labor market in which it is difficult for people with mental disorders to obtain and keep jobs, especially jobs other than low-paying, menial, or temporary positions with limited benefits (Stuart 2006). This state of affairs has a clear negative impact on the financial well-being of people with mental disorders, which is compounded by the facts that they are also subject to housing discrimination, are at increased risk of homelessness, and have elevated odds of ending up in jails and prisons (Corrigan & Watson 2002b, Hinshaw & Stier 2008). In addition, people with mental disorders are often mistreated in the health-care system, not only facing discrimination in the course of treatment for their psychiatric symptoms but also receiving inferior treatment for physical health problems, which is particularly unfortunate in light of the high rates of general dental and medical problems among people with mental disorders (Thornicroft et al. 2007).

Although it is clear that the existence of stigmatizing attitudes toward people with mental disorders stretches far back into history, an unfortunate finding from studies that have examined changes in such attitudes over time among members of the general public is that as biomedical explanations have grown in popularity, attitudes toward people with mental disorders have not improved, and some studies suggest that they have become even more negative (Schomerus et al. 2012).

Clinical Attitudes and Beliefs

In addition to social attitudes (i.e., stigma), a range of clinical attitudes and beliefs that may be affected by biomedical explanations are also deeply relevant to the lives of people with mental disorders. One example is prognostic expectations. Although beliefs about the causes of a disorder may be related to beliefs about its likely prognosis across different areas of health, prognostic expectations take on particular importance in the case of mental disorders. For example, in the case of clinical depression, patients who are more pessimistic about their prognoses tend to be less engaged with treatment, and this actually impedes improvement in their symptoms (Meyer et al. 2002). By contrast, when patients expect their treatment to be effective, these expectations can be a positive driver of clinical improvement in psychiatric symptoms, especially in the case of depression (Rutherford et al. 2010). Indeed, patients' optimism about improvement is one reason why even those treated with placebos often experience clinical benefits (Rutherford & Roose 2013, Rutherford et al. 2017). Therapists' expectations of patients' improvement are also a significant predictor of patients' outcomes (Meyer et al. 2002), suggesting that clinicians' beliefs about their clients' prognoses can have real-world clinical implications. Considering that prognostic expectancies can become

a self-fulfilling prophecy, it is clearly important to understand the effects of biomedical explanations on these kinds of expectations.

Preferences for particular treatments over others are another important clinical variable that may be affected by biomedical expectations for mental disorders. As mentioned earlier, recent trends in the United States have increasingly favored treating mental disorders only with medication, and the share of patients treated with psychotherapy—either alone or in combination with pharmacotherapy—has been on the decline (Olfson & Marcus 2010). This shift has coincided roughly with a widespread embrace of biomedical explanations for mental disorders (Pescosolido et al. 2010), and it is not unreasonable to suppose that the more strongly people—both patients and clinicians—understand mental disorders as stemming from biological abnormalities, the more they might prefer treatments that purport to act directly on the biological phenomena believed to underlie symptoms. However, a trend toward embracing biomedical treatments and eschewing psychosocial treatments (such as psychotherapy) may become clinically problematic because for many disorders psychotherapies are the recommended first-line treatment, and for others, the most effective approach is often a combination of psychotherapy and medication. Therefore, while economic considerations and other factors clearly play a part in the selection of treatments, it is important to understand whether the recent ascendancy of biomedical explanations for mental disorders might be encouraging the use of pharmacotherapy and the rejection of psychotherapy.

It is also important to understand how biomedical explanations affect another set of variables that has often been overlooked or underexamined by research in this area: those related to the therapeutic alliance—that is, the relationship between treatment providers and their patients. This alliance is of substantial importance for patients' care: Research has shown that stronger therapeutic alliances significantly predict more positive clinical outcomes for treatment recipients (Horvath et al. 2011). Moreover, when the therapeutic alliance is weak, patients are significantly more likely to drop out of treatment (Sharf et al. 2010).

A therapist's empathy for clients is often thought of as the bedrock of the therapeutic alliance. Indeed, the more empathy a therapist has for a patient, the better the patient's clinical outcome is likely to be, as demonstrated by a large meta-analysis (Elliott et al. 2011). In addition to clinicians' actual feelings about their patients, patients' perceptions of their therapists are also important determinants of the strength of the therapeutic alliance (Ackerman & Hilsenroth 2003). Among other variables, these might include patients' impressions of whether a treatment provider is warm, their perceptions of the provider's competence, and whether they believe the treatment provider blames them for their symptoms or difficulties. In sum, any variable that affects how clinicians and patients perceive or relate to each other may have the potential to affect clinical outcomes. Thus, it is important to understand any effects that biomedical explanations for mental disorders might have on the therapeutic alliance between patients and treatment providers.

THEORETICAL AND CONCEPTUAL BASES FOR CONFLICTING PREDICTIONS ABOUT THE EFFECTS OF BIOMEDICAL EXPLANATIONS

Before reviewing the state of the empirical evidence about how biomedical explanations affect the social and clinical variables mentioned in the foregoing paragraphs, we first describe several theoretical frameworks that have led to various, sometimes conflicting, predictions about the impact of biomedical explanations.

The first of these is the broad umbrella of attribution theory, which undoubtedly had very strong impacts on early assumptions about how conceptualizing mental disorders as medical diseases would affect attitudes and beliefs. Attribution theory considers the interrelationships between causal attributions for stigmatized characteristics, judgments of individual responsibility for them, and socioemotional reactions to them. Long-standing attributional frameworks would generally predict that when stigmatized characteristics are seen as having a controllable cause, individuals will be seen as more responsible for having them and will, therefore, receive more negative reactions, such as blame, anger, and punishing or harsh treatment (Weiner 1993). By contrast, attribution theory holds that when stigmatized characteristics are seen as having uncontrollable causes, those who have them will be seen as less responsible and will elicit less-harsh reactions, such as pity and helping behavior instead of anger, blame, and punishment. Notably, much of the reasoning that had been used, especially before much evidence had accumulated, to argue that biomedical explanations should positively impact attitudes and beliefs about mental disorders has mirrored the logic of attribution theory. That is, a pervasive argument has been that because biomedical explanations depict psychiatric symptoms as reflecting a medical disease with biological roots—an uncontrollable cause—they can be used to reduce the blaming of and to temper negative emotional reactions toward people with mental disorders. In sum, traditional attribution theory predicts that biomedical explanations would have generally positive effects on attitudes and beliefs about mental disorders.

Relatedly, some optimism about how biomedical explanations should affect attitudes and beliefs about mental disorders appears to stem from the notion that such explanations would cast psychiatric conditions as diseases like any other. This line of reasoning contends that conceptualizing mental disorders as medical illnesses places them in a category of nonstigmatized conditions that evoke sympathy and compassion rather than stigma and other negative reactions. For example, an anti-stigma effort launched by the Brain and Behavior Research Foundation in 2013 featured a quote from the Nobel prize-winning psychiatrist and neuroscientist Eric Kandel asserting, “Schizophrenia is a disease like pneumonia. Seeing it as a brain disorder de-stigmatizes it immediately” (Brain Behav. Res. Found. 2013). Indeed, it has been argued that disseminating information about the biomedical etiology of mental disorders will reduce negative attitudes toward them, playing much the same role that increasingly widespread medical understanding played in the destigmatization of cancer (Phelan 2002). However, psychiatric symptoms affect a person’s mental functioning, which may be seen as having a special importance to individual identity absent from bodily systems typically affected by general medical diseases, so biomedical explanations for

mental disorders may not have the same effects as they do for diseases such as cancer (Lebowitz 2014).

Another category of theories relevant to the effects of biomedical explanations is related to psychological essentialism. Psychological essentialism refers to the notion that people often think about categories as being defined by an underlying essence that is shared by all members of the category and accounts for surface-level similarities among members of the category (Medin & Ortony 1989). Categories of people (e.g., women, minority groups, social classes, age cohorts) are essentialized to varying degrees, and the more such a category is essentialized, the more the category will be seen as having clear boundaries and as being natural and immutable (Prentice & Miller 2007).

Because essentialism can affect people's perceptions of social groups and their motivation to overcome intergroup differences, it may have important consequences for social attitudes. Importantly, essences are typically considered to be deep-seated and not directly observable, meaning, in part, that changes to the surface features of a category member do not remove the category essence: For example, a raccoon made over to look like a skunk is still considered to be a raccoon (Keil 1989). Because essences are rather abstract, people often assume that an essence exists—one that links all members of a particular category—without having a clear understanding of what that essence actually is or how it gives rise to similarities among category members. The assumption that an essence must exist has been referred to as an essence placeholder because it can stand in for an understanding of what the essence might actually be (Medin & Ortony 1989). Recently, scholars increasingly have discussed the idea that even vague notions of biomedical etiology can sometimes act as essence placeholders. In one prominent example, Dar-Nimrod & Heine (2011) reviewed evidence for the widespread existence of genetic essentialism, which describes the tendency to view an individual's genes as representing that person's essence: fundamentally, immutably, and naturally determining the person's characteristics and defining the human categories to which the person belongs. They argued for the existence of genetic essentialist biases, which are evoked by genetic explanations for human characteristics or group membership. In particular, genetic explanations for a particular characteristic tend to lead to the belief that the characteristic is immutable, is caused fundamentally and specifically by genes, can discretely define a homogeneous category of people, and occurs naturally. Thus, genetic explanations might contribute to the essentializing of psychiatric disorders by implying that they are incurable or untreatable; that people with mental disorders are fundamentally different from those without mental disorders and represent a separate, naturally occurring category of human beings; and that psychopathology reflects a specific biological abnormality with regard to which psychosocial factors are relatively less important. In addition to genetic explanations, neurobiological explanations have also been described as having the potential to increase psychological essentialism, and the notion that neurobiology can be seen as the deep-seated, fundamental, and immutable essence of a person's psychiatric state has been referred to as neuroessentialism. Haslam (2011), among others, has argued that neuro- and genetic essentialism are particularly prominent in the domain of reasoning about psychiatric disorders and that they can contribute to a variety of negative attitudes and beliefs about people with mental disorders, including the desire to maintain social distance (a reluctance to engage in social interaction) from people with

mental disorders, belief in the stereotype of dangerousness, prognostic pessimism, and blame.

In addition to essentialism, another mechanism through which biomedical explanations have been predicted to have negative effects on attitudes and beliefs about mental disorders is dehumanization, which has been described as taking two possible forms (Haslam 2006). The first, animalistic dehumanization, occurs when the target is perceived as lacking characteristics that are uniquely human—those that differentiate humans from animals—such as sophistication, culture, rationality, higher-order cognition, and morality. The second, mechanistic dehumanization, occurs when the target is perceived as lacking characteristics that are constitutive of human nature—those that differentiate agents from objects or robots—such as individual agency, emotional responsiveness, interpersonal warmth, and cognitive openness. In other words, “Whereas humans are distinguished from animals on attributes involving cognitive capacity, civility, and refinement, we differ from inanimate objects on the basis of emotionality, vitality, and warmth” (Haslam & Loughnan 2014, p. 403).

Although animalistic dehumanization is the form that is often prominent in ethnic and other intergroup conflicts, mechanistic dehumanization is said to occur frequently in technological and medical contexts (Haslam & Loughnan 2014). In particular, biomedically oriented psychiatric practice has been described as dehumanizing patients in a mechanistic way by treating their symptoms as mechanical malfunctions and conceptualizing patients’ minds as malfunctioning machines (Haslam 2006). Because mechanistic dehumanization involves equating people with inanimate objects and denying them their subjective emotionality and cognitive depth, it may be particularly detrimental to empathy, which requires perceiving others as having thoughts and feelings (Haslam 2006). Given the clinical importance of empathy in mental health treatment, this suggests that if biomedical explanations lead to the mechanistic dehumanization of people with mental disorders, they could have both negative social consequences (i.e., for stigma and prejudice) and negative clinical consequences (by adversely affecting clinician-patient relationships).

Recently, some scholars have attempted to develop models for understanding the effects of biomedical explanations of mental disorders that take into account both their potential benefits and their potential harms. One example is the Mixed-Blessings Model (Haslam & Kvaale 2015). This conceptualization argues that biomedical explanations may reduce the blame ascribed to people with mental disorders through the mechanisms predicted by attribution theory while simultaneously increasing prognostic pessimism, social distance, and perceived dangerousness through the mechanisms of psychological essentialism. In other words, considering the effects of biomedical explanations in this way suggests that they might temper some forms of negative attitudes and beliefs while exacerbating others. This, in turn, leaves open the possibility that the positive effects of biomedical explanations in some cases might be canceled out by their negative effects and vice versa. For example, biomedical explanations of obesity have been shown to increase prognostic pessimism but simultaneously to decrease blame, and these effects can counterbalance each other such that measures of more downstream attitude variables, such as explicit prejudice, show no overall effect (Hoyt et al. 2017). Similarly, Cheung & Heine (2015) found that genetic explanations of lawbreaking not only led people to perceive criminals as being more likely to reoffend but

also as having less control over their actions; these effects appeared to cancel each other out in sentencing considerations, leading to a lack of significant overall effects on ultimate sentencing decisions. Thus, if biomedical explanations operate in the same way for mental disorders as they do for obesity and criminal offending, they may have mixed blessings or be a double-edged sword: Even if downstream variables suggest a lack of overall effects, this may reflect both positive and negative effects on attitudes and beliefs that are strong enough to obscure each other.

There are a number of plausible theoretical accounts of how biomedical explanations should affect attitudes and beliefs about mental disorders. Some predict generally positive effects while others predict generally negative effects and yet others predict a combination of advantages and disadvantages. Given these sometimes conflicting predictions, we turn our attention to a selective review of the empirical evidence regarding the observed effects of biomedical explanations of mental disorders.

WHAT DOES THE EMPIRICAL EVIDENCE SAY ABOUT THE EFFECTS OF BIOMEDICAL EXPLANATIONS?

Empirical studies examining the implications of biomedical explanations for mental disorders have yielded a growing literature in recent years. Here, we attempt to shed light on what can be gleaned from this evidence. We separately consider what studies have found concerning the effects of biomedical explanations on members of the general public, on professional clinicians who treat people with mental disorders, and on people affected by mental disorders.

Effects of Biomedical Explanations Among the General Public

Given how widespread harsh attitudes and negative stereotypes are about people with mental disorders among the general public and the negative effects that this social stigma has on the lives of such people, a number of studies have assessed how biomedical explanations affect the attitudes and beliefs of laypersons. The main facets of stigmatization that have been measured among samples of the general population in relation to biomedical explanations are perceptions of dangerousness, blame, perceptions of immutability, and social distance.

Perceptions of dangerousness.—In recent years, some authors have raised concerns that by promoting the notion that people with mental disorders lack individual control over their behaviors and mental states, biomedical explanations might lead to the perception that patients are unpredictable and potentially dangerous (Read et al. 2006). For example, Walker & Read (2002), in a study of New Zealand undergraduates, found that compared with baseline measures, ratings on a scale measuring perceived dangerousness and unpredictability increased significantly after participants watched a video of an individual describing his experience of psychosis and were given a biomedical explanation of his symptoms. Among participants who watched the same video but were given a psychosocial explanation or a combined biomedical-psychosocial explanation, no such worsening of attitudes occurred. Other studies have also yielded findings consistent with this account, particularly for disorders for which the stereotype of dangerousness is already prevalent,

such as schizophrenia (Bennett et al. 2008, Read & Law 1999). This is also true for large-scale population-based surveys (Jorm & Griffiths 2008, Schnittker 2008). Indeed, recent meta-analyses that considered studies that used samples of members of the public as well as more specialized samples found that, overall, biomedical explanations of mental disorders show a small but significant association with increased perceptions of dangerousness across both experimental and correlational studies (Kvaale et al. 2013a,b).

Ascriptions of blame.—A long-standing and prominent argument in favor of the widespread adoption of biomedical explanations of mental disorders has been that they lead people with mental disorders to be blamed less for their own symptoms. Indeed, there is empirical support for the claim that biomedical explanations reduce perceptions of blame and personal responsibility (Crisafulli et al. 2008, Deacon & Baird 2009, Lebowitz et al. 2016). For example, Crisafulli et al. (2008) conducted a study of undergraduate nursing students in which participants read one of two singlepage information sheets about anorexia nervosa, one of which emphasized the role of genes in the disorder's etiology and one of which focused instead on the causal role of sociocultural factors. They found that those who read the biomedical account rated patients with anorexia nervosa as significantly less blameworthy than those who read the sociocultural account. Notably, meta-analytic findings have linked biomedical explanations to decreased blame in both experimental and correlational studies and identified decreased blame as perhaps the most robust effect of these explanations (Kvaale et al. 2013a,b). However, some evidence casts doubt on whether reducing blame should be a primary goal of efforts to decrease the stigma attached to mental disorders. For example, Angermeyer and colleagues (2011) argue that the stigmatizing view of people with mental disorders as personally responsible for their own problems is actually relatively uncommon among members of the public, especially as compared with the stereotypes of dangerousness and unpredictability. However, in some cultures in which blaming people for having mental disorders is more common or for disorders that are particularly liable to be seen as stemming from individual failings (e.g., attention deficit/hyperactivity disorder, addictions, eating disorders), reducing blame might still be a necessary objective, implying that biomedical explanations may be useful in such cases (Angermeyer et al. 2011, Easter 2012, Lebowitz & Appelbaum 2017, Lebowitz et al. 2016, Schomerus et al. 2014).

Perceptions of immutability and distinctness.—Although prognostic pessimism among people with mental disorders and the clinicians who treat them is clearly clinically important, perceptions among members of the public that mental disorders are immutable could also have notable social consequences. This is especially true because when people perceive other categories of people to be demarcated by permanent boundaries, the perception that stigmatized groups are categorically distinct from the rest of humankind may be strengthened, setting the stage for essentialism and potential dehumanization. Thus, a number of studies have examined how biomedical explanations relate to beliefs among the public about the prognoses of mental disorders. Regrettably, their findings have tended to be consistent with the notion that biomedical explanations evoke essentialist biases and lead to the assumption that mental disorders are relatively immutable and unlikely to remit (Bennett et al. 2008, Phelan 2005). In one such study, Phelan (2005) examined data from a nationally

representative sample of US adults in which respondents were presented with a vignette describing a woman who had experienced schizophrenia or major depression; participants were randomly assigned to be told that the origins of her symptoms were genetic, partially genetic, or not genetic. Those who were told that the cause of the patient's symptoms was genetic or partially genetic rated the symptoms as more serious, more likely to be lifelong, and more likely to be passed on if the patient were to have a child. Meta-analytic findings also support the conclusion that biomedical explanations can cause people to view mental disorders as less likely to abate (Kvaale et al. 2013b).

Social distance.—Measures of desire for social distance constitute one of the most commonly used methods of gauging stigmatizing attitudes toward people with mental disorders (Link et al. 2004). However, biomedical explanations have had inconsistent effects on such measures. Although some studies have found a link between biomedical explanations and increased social distance (Bag et al. 2006; Dietrich et al. 2004, 2006), these studies tend to use correlational designs, and in other cases biomedical explanations seem to have no effect on social distance or even to decrease it (Bennett et al. 2008, Lebowitz & Ahn 2012, Lebowitz et al. 2016). Indeed, meta-analytic findings suggest that across experimental studies, biomedical explanations tend to have no significant effect on the desire for social distance, and while a relationship between biomedical causal attributions and social distance may be observed in correlational studies, the association is small and inconsistent (Kvaale et al. 2013a,b). The lack of a clear, consistent relationship between biomedical explanations and social distance may reflect the sort of double-edged sword phenomenon described above. That is, the desire for social distance may be the sort of downstream attitude variable that is influenced in countervailing directions by the positive effects of biomedical explanations (e.g., blame reduction) and their negative impacts (e.g., increased perceptions of dangerousness and immutability), leading to no ultimate effect one way or the other being observed on measures of social distance itself.

Effects of Biomedical Explanations on Mental Health Clinicians and Clinician–Patient Relationships

Although the public's attitudes toward psychiatric patients have the potential to influence the well-being of people with mental disorders, the attitudes and beliefs of the clinicians who treat these individuals are likely even more important. As Hinshaw & Stier (2008, p. 384) have noted, "Even a small amount of stigma among professionals will translate into many thousands of negative social interactions in any given year, with the potential for long-term damage to morale and the promotion of stigma by the very personnel entrusted with helping those with mental illness." Thus, given the increasing emphasis on biomedical explanations in clinical care, it is important to understand how they impact clinicians' attitudes and beliefs and the crucial therapeutic alliance.

Social distance and clinicians.—The desire for social distance from people with mental disorders is one of the most common types of stigmatizing attitudes held by health professionals, even when they may be less likely to endorse other types of negative reactions that are common among the general public (Wahl & Aroesty-Cohen 2010). Nonetheless, despite the current ascendancy of biomedical explanations for mental disorders, few studies

have assessed how they might impact clinicians' desire for social distance from people with mental disorders (Larkings & Brown 2018). One study of mental health professionals in Austria found no significant relationship between genetic attributions for schizophrenia and the desire for social distance from patients with schizophrenia (Grausgruber et al. 2007). Further research is clearly needed to understand how biomedical explanations might affect clinicians' desires for social distance.

Clinician empathy and the therapeutic alliance.—As discussed earlier, any impact that biomedical explanations might have on clinicians' empathy or therapeutic relationships would have important clinical implications. Recently, several studies have examined this issue. In one set of experiments, mental health clinicians in the United States were presented with vignettes describing patients with a variety of mental disorders, and each vignette was paired with either a biomedical or psychosocial explanation of the patient's symptoms (Lebowitz & Ahn 2014). Clinicians completed several measures in response to each vignette, including one gauging the empathy they felt for the patient. Analyses indicated that across different disorders, the biomedical explanations consistently yielded less empathy than the psychosocial explanations. Even when the stimuli included explanations that contained both biomedical and psychosocial information, clinicians' empathy ratings were lower when the information was predominantly biomedical compared with when it was predominantly psychosocial. This may have occurred because the biomedical explanations triggered mechanistic dehumanization by encouraging clinicians to conceptualize the patient's symptoms as mechanical malfunctions, which may evoke less empathy than psychosocial explanations that relate to human emotions, thoughts, and experiences. The biomedical explanations may also have evoked less empathy because they essentialized the patients described in the vignettes, leading them to be seen as categorically different from healthy individuals and, therefore, they perhaps less readily evoked empathy. Regardless of the reasons for the negative effects of biomedical explanations, they have significant implications for patient care, given the clinical importance of clinician empathy. Furthermore, a subsequent set of studies found that potential patients may also perceive a clinician's endorsement of biomedical explanations as suggesting a decreased level of compassion and care (Lebowitz et al. 2015). In a study in which laypeople were asked to imagine that they were or a loved one was suffering from a mental disorder and then to read first-person self-descriptions of one clinician espousing biomedical explanations and one advocating for a psychosocial perspective, participants consistently rated the biomedically oriented clinician as less warm (e.g., less compassionate and less respectful). Patients who perceive their treatment providers as lacking warmth and compassion would have clear impediments to forming a strong therapeutic relationship. Thus, biomedical explanations might impact the therapeutic alliance not only by affecting clinicians' reactions to patients but also patients' perceptions of clinicians.

Treatment selection.—Given the common tendency toward mind–body dualism, in which the mind is conceptualized as being separate from the body (including the brain), it is plausible that biomedical explanations could impact clinicians' selection or recommendation of treatments, as mental health professionals are not immune from mind–body dualism (Miresco & Kirmayer 2006). That is, biomedically explained symptoms might be seen as

necessitating treatments that act directly on biological targets, whereas psychosocial treatments such as psychotherapy might be seen as having a psychological target (the mind) and, therefore, as ineffective against biomedically conceptualized disorders (Iselin & Addis 2003, Lebowitz & Appelbaum 2017). Indeed, in a study of psychiatrists, clinical psychologists, and social workers, Ahn and colleagues (2009) found that the more strongly clinicians rated a particular disorder as having a biological basis, the more effective they expected medication would be for treating it and the less effective they expected psychotherapy would be. Although this finding was correlational, a similar result was found using an experimental approach in subsequent research, when Lebowitz & Ahn (2014) presented clinicians with vignettes describing patients with a variety of disorders and systematically varied whether each was paired with a biomedical or psychosocial explanation. Specifically, when clinicians were given a biomedical explanation of a patient's symptoms, the clinicians consistently rated psychotherapy to be less effective, and with one exception (schizophrenia, for which ratings of the effectiveness of medication were about equally high regardless of the explanation provided), they rated medication to be more effective. These results suggest that the growing prominence of biomedical explanations for mental disorders might have significant and immediate effects on patients' care by directly affecting which treatments their providers recommend.

Effects of Biomedical Explanations on People Affected by Mental Disorders

The beliefs and attitudes of mental health clinicians clearly have important implications for patients, but people's attitudes and beliefs about their own disorders are likely the most clinically meaningful of all. When symptomatic individuals understand their own mental disorders as biomedical conditions, this may have implications for their self-stigmatizing attitudes; their sense of control, agency, and self-efficacy in confronting their symptoms; and their expectations about their own prognoses.

Self-stigma and self-blame.—Unfortunately, in addition to engendering negative attitudes among members of the public, the stigma attached to mental disorders can also manifest as self-directed negative attitudes among people with psychiatric symptoms (Corrigan & Watson 2002a, Watson et al. 2007). In recent years, a relatively small number of studies has begun to examine how symptomatic individuals' endorsement of biomedical explanations for their own mental disorders is related to self-stigmatizing attitudes (Carter et al. 2017, Larkings & Brown 2018, Lebowitz 2014). Results in this area have been somewhat mixed, particularly as related to the construct of guilt or self-blame. For example, one study of people diagnosed with serious mental illness found that believing in biomedical explanations was significantly associated with implicit guilt (measured using a version of the Implicit Association Test that was adapted to gauge associations between “me” and “guilty”) as well as higher fear of people with mental disorders (Rüsch et al. 2010). In another study, however, an examination of people with social anxiety disorder and major depression found that compared with a cognitive behavioral (CB) etiological explanation, a biomedical explanation yielded less self-blame (Lee et al. 2016). Yet another study, this time among participants with elevated levels of eating disorder symptomatology, found no relationship between causal explanations (e.g., biomedical or CB) and self-blame (Farrell et al. 2015). In general, the research base examining the relationships between self-directed negative social

attitudes and beliefs and biomedical explanations among people affected by mental disorders appears to be relatively scant and inconsistent. What little evidence does exist suggests that this relationship may differ depending upon the disorders in question, the measures used, and possibly other factors. Further research is needed to better understand how biomedical explanations affect self-blame and other forms of self-stigma.

Agency and self-efficacy.—The argument that biomedical explanations reduce perceptions of blameworthiness (which they appear to do, at least among members of the public) is often based on the idea that they cast psychiatric symptoms as falling outside the personal control of the affected individual. Given this line of reasoning, one concern surrounding the effects of biomedical explanations on people with mental disorders is that they could lead to a reduction in people's perceptions of themselves as possessing autonomy, agency, and self-efficacy (Kong et al. 2017). That is, if biomedical explanations lead people with mental disorders to believe that they lack control over the onset of their symptoms, might these explanations also lead them to doubt their ability to exert control to overcome or cope with the symptoms, thus producing a sense of resignation, helplessness, and fatalism?

Recent research examining this question has produced mixed results. For example, in a study among people with elevated symptoms of depression, Lebowitz et al. (2013) found that presenting depression as a biological illness actually increased their sense of agency to combat their symptoms compared with an experimental condition in which participants received no explanation. Moreover, Lee and colleagues (2016) found that among individuals with symptoms of social anxiety disorder and major depressive disorder, a biomedical explanation produced lower feelings of helplessness compared with a CB explanation or a combined CB–biomedical explanation. However, Farrell and colleagues (2015) found that among people with eating disorder symptoms, a purely biological explanation yielded significantly lower self-efficacy than did a CB explanation or a combination CB–biomedical explanation. In another study, participants who were told that they carried a genetic predisposition to alcoholism rated themselves as having less personal control over their drinking (Dar-Nimrod et al. 2013). These conflicting results suggest that as with self-blame and other self-stigmatizing attitudes, the effect of biomedical explanations on self-efficacy and feelings of agency may differ by disorder or may be sufficiently nuanced to depend on the nature of the stimuli and measures used in particular studies, as well as what biomedical explanations are compared against. Given the lingering uncertainty, further research is needed to gain a comprehensive understanding of how biomedical explanations affect these clinically crucial variables.

Clinical beliefs and expectations.—In addition to general feelings of self-efficacy and agency, it is also important to understand how biomedical explanations affect the specific clinical beliefs—such as prognostic expectations and beliefs about the effectiveness of particular treatments—of people affected by psychiatric symptoms, especially in light of the clear implications of these beliefs for treatment and outcomes. Research investigating the relationship between biomedical explanations and prognostic and diagnostic beliefs has unfortunately revealed some findings that are troubling in light of the current ascendancy of biomedical explanations. For example, in a series of studies among people with elevated

symptoms of depression, Lebowitz and colleagues (2013) found that the more they attributed their symptoms to biochemical and genetic causes, the longer they expected to remain depressed. In a subsequent study, people with symptoms of generalized anxiety disorder who were exposed to a biomedical explanation rated the prognosis of their disorder as more negative than those in a control condition (Lebowitz et al. 2014). Farrell et al. (2015) found that a biomedical explanation led people with eating disorders to be less optimistic about their own prognosis. Kemp and colleagues (2014) explored the effects of giving people with a past or current depressive episode a biomedical explanation for their depression. After having their cheeks swabbed, participants were told either that this had revealed low levels of serotonin, consistent with a chemical imbalance, or that they had normal neurotransmitter levels, indicating that their depression was not caused by a chemical imbalance. Similar to the previous studies, the biomedical explanation yielded greater prognostic pessimism. More recent research showed that when people were led to believe that they had a genetic predisposition to depression, they rated themselves as less likely to cope effectively with depressive symptoms in the future (Lebowitz & Ahn 2018) and were more likely to believe they had experienced depressive symptoms in the past (Lebowitz & Ahn 2017). Several studies have also suggested that people who adopt or are provided with biomedical explanations are more likely to believe that medication will be effective in treating their symptoms (Carter et al. 2017, Gershkovich et al. 2018, Lüllmann et al. 2011), although this may come at the cost of reduced confidence in psychotherapy (Kemp et al. 2014, Lebowitz & Appelbaum 2017).

APPROACHES FOR COUNTERACTING THE NEGATIVE EFFECTS OF BIOMEDICAL EXPLANATIONS

For some years, efforts have been underway around the world to identify effective strategies for reducing negative attitudes and beliefs about mental disorders (Corrigan et al. 2012, Gronholm et al. 2017, Mittal et al. 2012). This section focuses on approaches specifically aimed at reducing the negative effects of biomedical explanations.

Emphasizing Treatability and Malleability

Many of the negative effects of biomedical explanations appear to stem from their propensity to promote essentialism—that is, to engender the perception that mental disorders are deterministically and immutably caused by biological abnormalities. As such, some researchers have studied whether these detrimental effects can be ameliorated by teaching people about the existence of effective treatments for mental disorders and about the malleability of biological factors involved in psychopathology. For example, combining biomedical explanations with information about effective treatments for disorders appears to reduce the desire for social distance (Lebowitz & Ahn 2012). Moreover, educational interventions to promote the notion that biological factors involved in the etiology of a disorder are malleable and can be affected by actions within an individual's control have been shown to decrease prognostic pessimism among people with symptoms of depression (Lebowitz et al. 2013) and people with symptoms of eating disorders (Farrell et al. 2015). Subsequent research in the area of depression has shown that even a brief intervention using an educational video focused on malleability can have durable effects that remain observable

weeks after its administration (Lebowitz & Ahn 2015). More recently, this kind of malleability-focused educational intervention has been shown to effectively mitigate some of the negative psychological effects of personalized genetic feedback that indicates a susceptibility to depression (Lebowitz & Ahn 2018). These findings point to some clinically relevant insights (Howell 2017). For example, clinicians and genetic counselors may be able to achieve meaningful clinical benefits for their clients by helping to dispel essentialist assumptions about the role of biology in causing psychiatric symptoms. This highlights the importance of understanding clients' beliefs about the role of biological factors in causing their symptoms and of clinicians responding thoughtfully.

Contact-Based and Humanization-Based Approaches

Intergroup contact—which can take the form of direct face-to-face, vicarious, or even imagined contact between in-group and out-group members—is one of the most widely studied and effective ways of reducing negative attitudes toward disfavored groups, and it operates in part by facilitating empathy and by personalizing relationships between members of different groups (Schellhaas & Dovidio 2016). Similarly, personification, which refers to focusing on the personal characteristics that distinguish individuals from objects, has been proposed as a strategy for reducing dehumanization in health care (Haque & Waytz 2012). Researchers have begun to examine how contact-based and personification-based (or humanization-based) approaches might be employed to help reduce negative attitudes toward people with mental disorders. While a number of studies have found that contact-based approaches show promise for reducing stigma in general (Corrigan et al. 2012, Gronholm et al. 2017), little research has examined using contact specifically as a strategy for counteracting the negative effects of biomedical explanations. There is some evidence that having more contact with people who have mental disorders is associated both with less endorsement of biomedical explanations and with less stigmatizing attitudes (Read & Law 1999), although it is unclear whether the former relationship mediates the latter. Mental health clinicians have been shown to endorse biomedical explanations less strongly when considering a specific patient rather than a disorder in the abstract (Kim et al. 2016), so perhaps contact promotes humanization partly by discouraging a purely biomedical conceptualization of psychopathology. In other research with mental health clinicians, promoting personification (along with agency reorientation, which involves drawing attention to patients' capacities to make choices and decisions for themselves) was found to reduce clinicians' stigmatizing attitudes toward patients (Lebowitz & Ahn 2016). Future research could examine whether incorporating contact- and humanization-based approaches to reducing stigma into the training of mental health clinicians might be effective in reducing their negative attitudes toward people with mental disorders, especially as their training is likely to include ever more emphasis on biomedical conceptualizations of psychopathology.

CONCLUSIONS AND DIRECTIONS FOR FUTURE RESEARCH

In this article, we have attempted to provide an overview of biomedical explanations for psychopathology and how they relate to attitudes and beliefs about people with mental disorders. The volume of potentially relevant literature is vast, which has required us to be selective in our review, but a few conclusions appear clear. Mental disorders are increasingly

understood through a biomedical lens that views them fundamentally as genetic and neurobiological abnormalities, a trend that has been driven by a variety of forces in society and the history of health care and has had wide-ranging and meaningful social and clinical consequences. Although the evidence regarding the impact of biomedical explanations on attitudes and beliefs about mental disorders is somewhat conflicting, some effects have emerged relatively consistently. These include the finding that biomedical explanations appear to reduce blame, as predicted by attribution theory, but also appear to engender essentialism, which can create or exacerbate the impression that mental disorders are relatively immutable or unlikely to remit. They may also reduce clinicians' empathy for patients and lead clinicians to appear less warm, potentially interfering with therapist-patient relationships; and they appear to affect treatment preferences, leading to increased confidence in pharmacotherapy and decreased confidence in psychotherapy. In some studies, they also appear to reduce people's confidence in their own ability to overcome their symptoms. All of these effects have stark and potentially worrying clinical implications.

A number of future research avenues could shed important light on the effects of biomedical explanations for mental disorders. As noted above, these include further study of how biomedical explanations affect self-stigma (e.g., self-blame and self-directed perceptions of dangerousness or incompetence), as well as self-efficacy and agency, as a construct separate from prognostic pessimism. In such research, it will be important to examine carefully differences among disorders and various types of biomedical explanations. Indeed, all of the effects of biomedical explanations could be different depending on the types of explanations that are invoked (e.g., genetic versus neurobiological), and further research comparing different types of biomedical explanations using carefully controlled methods would provide welcome clarity. Further research is also needed to examine how biomedical explanations affect clinicians' attitudes toward patients, as well as to develop methods for reinforcing clinicians' empathy and reducing stigmatizing attitudes in the context of biomedical explanations. Perhaps most importantly, research conducted in naturalistic clinical settings will be crucial for elucidating what effects biomedical explanations have on real-world treatment processes.

At this point, the trend toward embracing biomedical understandings of mental disorders is firmly entrenched, and abandoning it—even if to do so were possible—would likely be unwise, given the promise of biomedical advances for aiding the field's understanding of psychopathology. However, this review highlights the importance of rigorous research that carefully considers the possible unintended negative consequences of biomedical explanations, as well as effective ways of mitigating them.

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SUMMARY POINTS

1. Beliefs about the nature and causes of psychopathology have undergone dramatic shifts over the course of history, and in recent decades biomedical explanations—which conceptualize mental disorders as medical diseases with neurobiological and genetic roots—have become increasingly dominant.
2. Biomedical explanations of psychopathology are often assumed to be beneficial for reducing negative attitudes toward people with mental disorders by casting them as blameless victims of a medical disease.
3. Although there is evidence that biomedical explanations do reduce the extent to which people are blamed for their own psychiatric symptoms, these explanations can also have negative effects, such as causing pessimism about patients' prognoses and potentially interfering with clinician–patient relationships.
4. Education about the nondeterministic role of biological factors in the etiology of mental disorders appears to mitigate some of the negative effects of biomedical explanations, but more research is needed to develop effective strategies for minimizing the harms that may stem from the ongoing embrace of these explanations in mental health.

Biomedical explanation: an account of the nature of mental disorders that casts them as medical diseases with biological roots, such as in genes or neurobiology

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Therapeutic alliance: the relationship between treatment providers and their patients; the strength of the alliance is associated with the likelihood of success in treating mental disorders

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Empathy: a compassionate understanding of or sharing in the feelings of another person; an important quality for mental health providers associated with treatment success

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Stigmatization: applying to a person or personal characteristic a categorical label associated with negative social stereotypes, prejudice, and discrimination

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Essentialism: belief that underlying essences (e.g., genes, neurobiology) define categories (e.g., social groups) and deterministically cause surface-level similarities among category members

Prognostic pessimism: the belief that a disease or disorder is unlikely to abate or will be resistant to treatment

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Dehumanization: the perception of a person or group as lacking humanness or as being subhuman

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Self-efficacy: a person's belief in his or her ability to influence events or achieve a goal, such as overcoming a disease or disorder

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