Functional Impairment, Mental Disorder Symptomatology, and Perceived Bias among Racial and Ethnic Minorities in the United States

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ABSTRACT

Mental health disparities in the U.S. among racial and ethnic minorities are a serious public health issue associated with substantial ethical and economic costs as well as negative health outcomes. Compared with Whites, racial/ethnic minorities have been found to have greater mental disorder symptomatology, however, very little research exists on how this impacts functional outcomes and quality of life. Additionally, research addressing the impact of bias on symptomatology and functional outcomes, especially across racial/ethnic groups, is lacking. Using the International Classification of Functioning, Disability, and Health (ICF) Biopsychosocial Model of Disability as a conceptual framework, the current study aims to address the relationship between mental disorder symptomatology and functional impairment across racial/ethnic groups, as well as evaluate the influence of perceived bias on this association. These relationships were examined using data from the Collaborative Psychiatric Epidemiological Surveys (CPES) among White, Black, Latinx, and Asian American individuals (N = 10,276). Variables include past-30-day functional impairment, past-year mental disorder symptomatology, and lifetime perceived bias. One-way analyses of variance were conducted to compare mental disorder symptomatology and perceived bias across racial/ethnic groups. Pearson correlation analyses were conducted to assess the relationship between mental disorder symptomatology and functional impairment across racial/ethnic groups. Zero-inflated negative binomial regressions were conducted to evaluate the moderating effect of perceived bias on the relationship between mental disorder symptomatology and functional impairment across racial/ethnic groups. Additional exploratory analyses were conducted to assess the relationships between mental disorder symptomatology,

perceived bias, and various domains of functional impairment across racial/ethnic groups. Findings speak to the need for additional research on predictors and correlates of mental health outcomes, such as social support, community, and other resiliency factors. Additionally, the need for broader conceptualizations of how bias, prejudice, stigma, and intersectional identity may impact health and wellbeing across diverse populations is illustrated in this work. Overall, findings indicate the continued existence of disparities in mental health across racial/ethnic groups and reify the need for additional work to address this public health problem.

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Functional Impairment, Mental Disorder Symptomatology, and Perceived Bias among Racial and Ethnic Minorities in the United States

Health disparities in the United States, particularly among racial and ethnic minorities, have been recently described as the "most serious and shameful health care issue of our time" (Feldman, 2015). Racial and ethnic disparities in health are defined by the National Institutes of Health as "differences that exist among specific population groups in the United States in the attainment of full health potential that can be measured by differences in incidence, prevalence, mortality, burden of disease, and other adverse health conditions" (National Institutes of Health, 2014). Health disparities in the U.S. are not only associated with negative health outcomes, but also exemplify and perpetuate long-standing historical inequities based on race and ethnicity (Jones, 2010). Furthermore, health inequities are associated with substantial economic costs in the U.S. (Miranda, McGuire, Williams, & Wang, 2008). Compared with other developed countries, the U.S. spends a disproportionately large percentage of its gross domestic product on healthcare (Jones, 2010). In fact, one study found that eliminating health disparities in the U.S. between 2003 and 2006 would have saved an estimated $230 billion in healthcare expenditures and more than $1 trillion in indirect healthcare costs (LaVeist, Gaskin, & Richard, 2011).

Disparities in mental health have persisted as a long-standing problem in the U.S. with little improvement. In 2001, the U.S. Surgeon General's report, *Mental Health: Culture, Race, and Ethnicity*, included eliminating racial and ethnic disparities in the utilization of mental health services as a top priority (U.S. Department of Health and Human Services, 2001). However, in the years following this report, little progress has

been made to attenuate these disparities in mental health outcomes. In fact, one study found that mental health disparities among racial and ethnic minorities worsened between the years of 2000 and 2004 (Cook, McGuire, & Miranda, 2007). Similarly, another nationally representative study of 10-year trends beginning in 1995 suggested that no significant progress has been made to ameliorate health disparities in depression and anxiety in primary care settings among racial and ethnic minorities (Stockdale, Lagomasino, Siddique, McGuire, & Miranda, 2008). These issues continue to persist today. For example, compared with Whites, racial and ethnic minorities in the U.S. continue to have less access to mental health services, are less likely to receive care (U.S. Department of Health and Human Services, 2001), and are more likely to delay or fail to seek mental health treatment when it is needed (Kessler et al., 1996). Furthermore, minorities are more likely to receive poor quality care even when mental health treatment is sought (U.S. Department of Health and Human Services, 2001).

Given this evidence, work to address and alleviate disparities in mental health among racial and ethnic minorities in the U.S. is greatly needed not only to improve health outcomes, but also to eliminate long-standing social injustices related to race and ethnicity (Jones, 2010). Reducing mental health disparities in the U.S. also has the potential to minimize substantial economic costs related to healthcare (LaVeist, Gaskin, & Richard, 2011; Jones, 2010). However, as efforts to eliminate disparities in mental health in the U.S. have made little progress over the past two decades, more nuanced and targeted research is urgently needed to identify contributing factors and mechanisms that continue to perpetuate inequities in mental health outcomes across diverse groups.

Mental Health across Racial and Ethnic Groups

Substantial research has documented differential outcomes in mental health among racial and ethnic minorities in the U.S. However, research assessing both diagnosed mental disorders as well as mental disorder symptomatology also demonstrates mixed findings in regards to racial and ethnic group-specific differences in mental health. For example, one study found that Latinx, Asian American, and Black individuals had fewer mental disorders than Whites, but also had a greater number of symptoms indicative of subclinical psychopathology (McGuire & Miranda, 2008; Miranda, McGuire, Williams, & Wang, 2008). On the other hand, another study using data from the Collaborative Psychiatric Epidemiological Surveys (CPES) examining lifetime rates of psychotic symptoms among Latinx, Blacks, Asian Americans, and Whites found that Blacks and Latinx individuals had higher rates of psychotic symptoms (15.3% and 13.6%, respectively) than Asian Americans and Whites (9.6% and 9.7%; Cohen & Marino, 2013).

Studies examining rates of depression and depressive symptoms across racial and ethnic groups indicate similarly mixed findings. Some research indicates that specific racial and ethnic groups are more likely to endorse depressive symptoms or report a mood disorder. For example, one nationally representative study of adolescents in the U.S. found that Latinx and Whites were most likely to report depressive symptoms, followed by Asian Americans and Blacks (Saluja, Iachan, Scheidt, Overpeck, Sun, & Giedd, 2004). In contrast, a separate study of adults found that Whites and Blacks were most likely to report a mood disorder, and Asian Americans and Latinx adults were least likely to report a mood disorder (Smith, Stinson, Dawson, Goldstein, Huang, & Grant,

2006). A third study found that, compared with Whites, Black and Latinx adults were more likely to demonstrate high levels of depressive symptomatology (Iwata, Turner, & Lloyd, 2002). Despite these findings suggesting discrepant, but nonetheless, disparate rates of depressive symptomatology and depression across racial and ethnic groups, other research has failed to find racial and ethnic group differences (Williams et al., 2007; Byers, Yaffe, Covinsky, Friedman, & Bruce, 2010). All in all, extant research on depression among adolescents and adults suggests that racial and ethnic disparities may exist, however, additional research is needed to clarify and elucidate these mixed findings.

In regards to anxiety disorders, findings are similarly varied. Some research suggests that Whites may be most likely to report anxiety disorders and endorse anxiety symptoms compared with minority groups. One study addressing common anxiety disorders found that Whites in the U.S. were more likely to be diagnosed with social anxiety disorder, generalized anxiety disorder, and panic disorder than were Blacks, Latinx, and Asian Americans (Asnaani, Richey, Dimaite, Hinton, & Hofmann, 2010). In a different study, Smith and colleagues also found that Whites were more likely to report an anxiety disorder than were Blacks, Asian Americans, and Latinx (2006). However, some group differences among racial and ethnic minorities may exist. Blacks may be more likely to meet criteria for post-traumatic stress disorder than other racial and ethnic groups (Asnaani et al., 2010). Alternatively, Asian Americans have been shown to endorse symptoms of anxiety disorders less frequently than other groups (Asnaani et al., 2010). Finally, some research has failed to find racial and ethnic differences in adult anxious symptomatology (Byers, Yaffe, Covinsky, Friedman, & Bruce, 2010). Again,

extant research on anxiety and anxious symptoms potentially suggests the presence of racial and ethnic group disparities, however, much more research is needed to investigate the nuanced nature of these differences.

Finally, existing research also suggests a possible pattern of racial and ethnic disparities in substance and alcohol use disorders. For example, Smith and colleagues found that Blacks and Asian Americans were less likely than Whites and Latinx to report a past-year alcohol use disorder (2006). Interestingly, in the same study, Blacks were more likely than Whites to report a past-year drug abuse disorder (Smith, Stinson, Dawson, Goldstein, Huang, & Grant, 2006). However, other research has not found racial and ethnic group differences in alcohol use disorders (Volk, Steinbauer, Cantor, & Holzer, 1997). Findings also vary in regards to substance use disorders across racial and ethnic groups, but seem to generally suggest that Black individuals may be more likely to endorse substance use and substance use disorders than other racial and ethnic groups (Smith et al., 2006; Merline, O'Malley, Schulenberg, Jerald, Bachman, & Johnson, 2004). Overall, however, more research is needed to elucidate these findings.

Additionally, it is important to note that as race, ethnicity, culture, and language can affect behavior and expression of mental disorders and symptomatology, findings of rates of mental disorders and symptomatology across racial and ethnic groups should be taken cautiously (Alarcon et al., 1997; Westermeyer & Janca, 1997). For example, in many cultures, mood and anxiety problems are perceived as social or moral issues and are reported as such, rather than mental health concerns (Kirmayer, 2001). This may lead to underreporting of symptoms or mental disorders as they are conceptualized in the DSM-5. Cultural differences in mental disorder presentation may also affect how

symptomatology is understood. For example, in Japan, a culturally distinctive form of social anxiety called “taijin kyofusho” shares many symptoms with social anxiety as it is conceptualized in the DSM-5. However, taijin kyofusho is associated with concerns around upsetting others rather than one’s own embarrassment, as regulation of interpersonal interactions and attention to social status is emphasized in Japanese culture (Kirmayer, 2001). These differences in behavioral expression and symptomatology may lead to misdiagnosis and underreporting of social anxiety among Japanese individuals. Thus, prevalence findings of mental disorders across racial and ethnic groups should be taken with consideration of other factors that may influence accurate reporting and diagnosis. As diagnostic algorithms have been developed with White populations, assessing symptomatology may be a potentially more equitable approach to assessing mental health across diverse racial and ethnic groups.

Mental Health and Functional Impairment

Currently, a majority of intervention literature focusing on mental health outcomes and disparities defines efficacy of treatment in terms of mental health symptoms without including quality of life (McKnight & Kashdan, 2009). Efficacy is conceptualized as the capacity of a given intervention to reduce the severity of a mental health issue (Bower, 2003). However, chronic mental health conditions can vary widely in their effects on an individual and may not be fully explained by measures of symptomatology (McKnight & Kashdan, 2009; Reed, Spaulding, & Bufka, 2009). Indeed, one study found that mental disorder symptomatology only explained a small to modest proportion of variance in quality of life among patients with significant mental

disorder-related disability (Rapaport, Clary, Fayyad, & Endicott, 2005), suggesting that efforts to solely reduce mental disorder symptomatology are inadequate given the multifaceted nature and consequences of mental health problems (Reed, Spaulding, & Bufka, 2009). As mental health outcomes are of concern due to their associated functional impact affecting individuals, families, and societies (McKnight & Kashdan, 2009), improvement in functional impairment is of clinical importance and must be considered in conjunction with symptomatology (Moller et al., 2003).

The World Health Organization conceptualizes functional impairment as limitation in activities and behaviors as well as restriction on participation in life and society attributed to mental health problems (Keyes, 2002; Gold, 2014). Functional impairment can affect numerous life domains including social impairment, occupational impairment, and physical impairment, which are commonly addressed in the mental health literature. For example, in their discussion of functional impairment, McKnight and Kashdan highlight social, occupational, and physical impairment to exemplify different life domains affected by depression (2009). Social impairment may encapsulate relationship quality (Spanier, 1976), family life (Sheehan, Harnett-Sheehan, & Raj, 1996), and sensitivity to social situations (Paykel, 1999). Occupational impairment might include absenteeism (Zohar, 1999), presenteeism (Koopman et al., 2002), and employment status (Coryell et al., 1993). Finally, physical impairment can include physical limitation (Ware & Sherbourne, 1992), physical ability (Penninx et al., 1998), or physical activity (Staten et al., 2001).

Despite the well-established importance of utilizing multidimensional approaches to assess mental health problems, research on functional impairment outcomes in the

literature is greatly lacking. To demonstrate, a review of over 90 depression treatment outcome meta-analyses indicated that less than 5% of clinical trials measured and reported functional outcomes (McKnight & Kashdan, 2009). A different systematic review of over 150 published clinical trials on major depression found that an even lower proportion of trials addressed functional outcomes (McKnight & Kashdan, 2009). As such, it is evident that more research on multidimensional conceptualizations of mental health outcomes is greatly needed.

The little existing research on functional outcomes and mental health demonstrates that mental disorders cause functional impairment and are associated with high rates of disability (Buist-Bouwman et al., 2006). A report by the World Health Organization indicated that mental disorders are a salient predictor of long-term functional impairment (Mathers & Loncar, 2006) and another study found that 69% of disability cases in the U.S. can be attributed to mental disorders (Prince, Harwood, Thomas, & Mann, 1998). Additionally, 32% of all years-lived-with-disability in the U.S. can be linked to neuropsychiatric conditions including depression, alcohol-use disorder, schizophrenia, bipolar disorder, and dementia (Mathers & Loncar, 2006). However, the majority of the literature on specific mental disorders only assesses one or two components of functional impairment. For example, depression has been found to predict the onset and progression of both physical and social functional impairment (Bruce, Seeman, Merrill, & Blazer, 1994; Penninx, Guralnik, Ferrucci, Simonsick, Deeg, & Wallace, 1998; Carroll, Cassidy, & Cote, 2003; Bruce & Hoff, 1994; Phifer & Murrell, 1986; Kennedy, Kelman, & Thomas, 1990; Beekman, Deeg, Smit, & van Tilburg, 1995; Prince, Harwood, Thomas, & Mann, 1998; Schoevers et al., 2000; Cole & Dendukuri,

2003). On the other hand, schizotypal, borderline, avoidant, and obsessive-compulsive personality disorder symptomatology has been linked to occupational and social functional impairment (Skodol et al., 2002).

While the presence of mental disorders has been shown to increase odds of functional impairment, it is also likely that functional impairment can bidirectionally influence the development and severity of mental disorders (Prince et al., 2007; Barnett & Gotlib, 1988; McKnight & Kadash, 2009). For example, in a longitudinal study of adults, Kivela found that poor marital relations adversely impacted affect and mood in men, suggesting that social impairment can cause depressive symptomatology (1994). Alternatively, Segrin and Abramson suggest that depression can cause social skill deficits, leading to social impairment (1994). In turn, social impairment can create and exacerbate socially uncomfortable situations that perpetuate negative cognitions and affect, leading to depressive symptomatology. The link between functional impairment and mental disorder symptomatology warrants greater research and attention. In particular, functional impairment is a valuable outcome variable of interest, given its wide-reaching and powerful effects on individuals, families, and societies (McKnight & Kashdan, 2009).

It is of noteworthy consideration that, in addition to the scarcity of research examining the link between mental disorder symptomatology and functional impairment, little research exists addressing specific domains of impairment. In particular, while social, occupational, and physical impairment have been addressed in the existing literature (e.g., McKnight & Kashdan, 2009; Segrin & Abramson, 1994; Skodol et al., 2002), other domains of functional impairment, including cognitive, self-care, role, and

participatory function, have been largely neglected. Thus, work addressing correlates of functional impairment across different domains of disability are also greatly needed to explore and establish multidimensional conceptualizations of mental health.

In addition to the paucity of literature on different domains of functional impairment associated with mental health outcomes, very little research exists on the link between mental disorder symptomatology and functional impairment among racial and ethnic minorities. However, the little extant research suggests that mental disorder symptomatology may differentially affect individuals across racial and ethnic groups, leading to varying degrees and perhaps different types of functional impairment. Some studies have found that Black individuals may report higher levels of mental health-related functional impairment than other racial and ethnic groups (Williams et al., 2007). For example, one study examining the functional impact of major depressive disorder among Blacks, Latinx, and Whites found that, while lifetime estimates of major depressive disorder were highest for Whites, chronic, severe, and disabling major depression was more common among Blacks leading to higher levels of impairment (Williams et al., 2007). Similarly, another study addressing the functional effects of disordered eating on Blacks, Latinx, Asian Americans, and Whites found that Blacks with an eating disorder reported significantly greater levels of functional impairment compared with the White referent group (Marques et al., 2011). However, less research exists on the effects of mental disorder symptomatology on functional impairment.

All in all, within the field of clinical psychology, the substantial impact of mental health-related functional impairment on individual and societal quality of life necessitates more work in this area. Given the extant literature, it is evident that additional research

assessing the relationship between functional impairment and mental disorder symptomatology across racial and ethnic groups is greatly needed to gain a more informed perspective on health disparities in the U.S. (Lam, Filteau, & Milev, 2011). Additionally, work addressing how symptomatology is associated with different domains of impairment across racial and ethnic groups is warranted to further examine function as a multifaceted and informative clinical outcome. While clinical intervention efficacy is generally assessed in terms of mental disorder severity reduction, efficacy outcomes are largely incomplete without acknowledgement and incorporation of measures addressing functionality and life impairment (Bower, 2003; McKnight, Monfort, Kashdan, Blalock, & Calton, 2016). Furthermore, given the egregious current state of racial and ethnic health disparities in the U.S., closely examining proximal (e.g., over the course of the last 30 days) and multifaceted functional outcomes across diverse groups will provide information about how mental health differentially affect individuals as well as will inform targeted approaches to address these issues in clinical practice (Keyes, 2002; World Health Organization, 2001).

Discrimination

When considering disparate health outcomes among racial and ethnic minorities in the U.S., one relevant factor is discrimination, and in particular, perceived discrimination. Perceived discrimination is conceptualized as a perceived "behavioral manifestation of a negative attitude, judgment, or unfair treatment towards members of a [minority] group" (Banks, Kohn-Wood, & Spencer, 2006; Williams, Spencer, & Jackson, 1999). Race and ethnicity-related perceived discrimination is pervasive in the U.S.

(Pascoe & Richman, 2009) and targets of discrimination are well-aware of these negative perceptions and attitudes (Clark et al., 1999). Thus, perceived discrimination is a distinct and valuable variable of influence in the consideration of health outcomes among racial and ethnic minority groups (Banks, Kohn-Wood, & Spencer, 2006).

Research suggests that perceived discrimination and mental health outcomes may be linked through a number of different mechanisms. First, discrimination may elicit stress, which may in turn lead to negative emotional states, generating psychological distress and negatively affecting mental health. Second, coping responses to perceived discrimination can lead to maladaptive behaviors to manage stress and distress such as alcohol and tobacco use and disengagement from adaptive health activities (e.g., sleep, exercise, and adherence to medical regimens). Finally, psychological and behavioral responses to acute and chronic stressors like perceived discrimination can lead to structural and functional changes in physiological systems, including neuroendocrine, autonomic, and immune systems (Cohen et al., 1995). Heightened physiological responses related to perceived discrimination have been shown to elicit elevated blood pressure, heart rate, and cortisol secretion (Clark, Anderson, Clark, & Williams, 1999), which can contribute to poor mental health.

Indeed, existing research on discrimination and health outcomes suggests a positive association between discrimination and morbidity, with increased discrimination predicting increased morbidity (Williams et al., 2003; Krieger, 1999). Perceived discrimination has also been shown to be inversely related to mental health such that increased perceived discrimination is associated with poorer mental health outcomes (Pascoe & Richman, 2009). In particular, the link between perceived discrimination and

psychological distress has been well-established across various ethnic and racial minority groups. Perceived discrimination has been shown to be associated with higher levels of psychological distress among Blacks both cross-sectionally (Pieterse, Todd, Neville, & Carter, 2012) and longitudinally (Brown, Williams, Jackson, Neighbors, Torres, Sellers, & Brown, 2000). Similarly, perceived discrimination has also been linked with psychological distress among Latinx and Asian Americans (Moradi & Risco, 2006; Huang & Goto, 2008).

Perceived discrimination has also been linked with specific mental disorders among racial and ethnic minorities. Among Blacks, perceived discrimination has been linked with alcohol and substance use and depressive and anxious symptoms (Huang & Goto, 2008; Williams, 2006; Pascoe & Richman, 2009). Among Latinx, perceived discrimination is associated with post-traumatic stress symptoms, suicidal ideation, anxiety, depression, and substance use (Huang & Goto, 2008; Flores, Tschann, Dimas, Pasch, & de Groat, 2010). Among Asian Americans, perceived discrimination has been shown to be associated with greater odds of having any mental disorder within the past year, suicidal ideation, substance use, depressive disorder, and anxiety disorder (Gee, Spencer, Chen, Yip, & Takeuchi, 2007; Huang & Goto, 2008; Tran, Lee, & Burgess, 2010). Furthermore, the same study found that Asian Americans who reported any perceived discrimination were at a twofold greater risk of having one mental disorder within the past year, and a threefold greater risk of having two or more mental disorders (Gee et al., 2007).

However, some discrepant findings also exist. Some research suggests that ethnic minority identity may protect against the negative effects of perceived discrimination on

mental health outcomes (Mossakowski, 2003). To that end, a meta-analysis of 134 studies found no differences in the moderating effects of race and ethnicity on the relationship between perceived discrimination and mental health (Pascoe & Richman, 2009). These findings could indicate that, consistently across groups, race and ethnicity has no significant effect on the relationship between perceived discrimination and mental health. Alternatively, invariance in the effects of discrimination on mental health between racial and ethnic groups could account for these null findings. Finally, it is possible that other factors, such as treatment seeking, might interact with the effects of perceived discrimination and influence mental health outcomes across racial and ethnic groups (McGuire et al., 2008; Anderson & Davidson, 2007). Overall, it is evident that, given these disparate findings, additional research is needed to examine the influence of perceived discrimination on mental health outcomes across racial and ethnic groups.

Furthermore, to our knowledge, no research exists on the impact of perceived discrimination on functional impairment and additional work is needed to ascertain and examine these relationships across racial and ethnic groups. However, given that psychological distress and poor mental health have both been shown to be associated with functional impairment (Keyes, 2002), it is likely that perceived discrimination, a predictor of psychological distress and poor mental health (Pascoe & Richman, 2009), is also related to negative outcomes in functional impairment. Additionally, it is possible that racial and ethnic minorities, who experience greater levels of perceived discrimination, may exhibit greater levels of resultant functional impairment (Banks, Kohn-Wood, & Spencer, 2006; Williams, Spencer, & Jackson, 1999; Pascoe & Richman,

2009; Clark et al., 1999). Finally, perceived discrimination could potentially exacerbate the relationship between mental health symptoms and functional impairment.

All in all, additional research is needed to explore the relationships between mental health symptomatology, functional impairment, and perceived discrimination across racial and ethnic groups to reduce disparities in mental health outcomes in the U.S. An examination of the literature suggests that ethnic and racial minorities may experience greater mental health problems and symptomatology than Whites do, in addition to receiving less mental health care and having more unmet need (McGuire et al., 2008; Miranda, McGuire, Williams, & Wang, 2008). Research addressing how mental health symptomatology leads to functional impairment across racial and ethnic groups is valuable to begin to explain and understand the implications of this discrepancy. Additionally, work to explore facets of functional impairment will further inform the nuances of these relationships. Finally, examining moderators of these relationship (i.e., perceived bias) will provide valuable information on why and how racial and ethnic disparities in mental health continue to persist in the U.S.

Conceptual Model of Mental Health and Functioning

The International Classification of Functioning, Disability, and Health (ICF) Biopsychosocial Model of Disability is a useful framework to integrate the potential relationships between mental disorder symptoms, functional impairment, and perceived bias (World Health Organization, 2011; See Figure 1). This model was approved by the World Health Organization in 2001 and highlights the importance of assessing functional outcomes while recognizing the roles of personal and environmental factors in the

development and perpetuation of disability (Reed et al., 2009). Specifically, the ICF Biopsychosocial Model of Disability provides information about how individuals with a health condition function in daily life, rather than simply assessing the presence or absence of a health condition or mental health problem (Reed et al., 2009).

There are three major components of this model. First, health conditions include diagnosed mental health disorders (e.g., major depressive disorder). Second, functioning and disability factors include body function/body structures, activities, and participation. In mental health research, body functions/body structures can be conceptualized as mental functions, neurological systems, and symptomatology. Activity can be understood as the ability to execute and complete given tasks or actions. Participation is conceptualized as impairment in a functional domain (e.g., physical, occupational, social). Third, contextual factors (environmental factors and personal factors) moderate the relationships between body functions/body structures, activity, and participation. Environmental factors include physical and social environments while personal factors include personality traits, coping strategies, and skills (Kostanjsek, 2011).

The ICF biopsychosocial model of disability suggests that body structures/body functions, such depressive symptomatology, can lead to decreased ability to complete tasks (activity) as well as decreased functionality in life domains (participation). Given the example of depression, a high-stress environment (environmental factor) paired with maladaptive coping strategies (personal factor) might lead to a stronger relationship between depressive symptomatology and poorer functional outcomes (participation).

The Current Study

Using the ICF Biopsychosocial Model of Disability, the current study assessed the relationship between mental disorder symptomatology (body functions/body structures) and functional impairment (participation) across racial/ethnic groups. Functional impairment was assessed as a single aggregate outcome as well as explored as a multifaceted outcome variable comprising five domains of impairment (i.e., social, cognitive, role, mobility, self-care). Perceived bias, a social stressor, was conceptualized as a moderating environmental factor. The effect of perceived bias on the relationship between mental disorder symptomatology and functional impairment (as a single aggregate variable as well as with five distinct domains) was assessed across racial/ethnic groups (See Figure 2).

Notably, health conditions (diagnosed mental disorders) were not assessed in the current study given the existing literature addressing the limitations of utilizing diagnostic cutoffs in mental health outcomes research, as well as the established need for work examining functional outcomes across racial and ethnic groups (McKnight & Kashdan, 2009). Additionally, activity was not assessed and functional impairment (operationalized as participation) was examined as the primary outcome variable in the current study. Finally, personal factors were not assessed in the current study and perceived bias was examined as a sole moderator in the relationship between mental disorder symptomatology and functional impairment.

Covariates. In addition to perceived bias, numerous other factors may influence the relationship between mental disorder symptomatology and functional impairment across racial and ethnic groups. Socioeconomic status, insurance status, years in the U.S., age, and gender are all noteworthy variables. To illustrate, socioeconomic status has been

linked with mental health outcomes such that lower socioeconomic status has been associated with worse health outcomes (Cook, McGuire, & Miranda, 2007). It is likely that these health outcomes span both mental disorder symptomatology as well as functional impairment. Relatedly, insurance status has been shown to significantly affect treatment seeking, with uninsured individuals less likely to seek treatment and more likely to experience poor mental health outcomes (Jowett, Deolalikar, & Martinsson, 2004; Kataoka, Zhang, & Wells, 2002). Acculturation has been shown to be associated with mental health outcomes (Yeh, 2003) and gender disparities exist in mental health where women are more likely than men are to have depression, anxiety, or somatic symptoms (Singleton & Lewis, 2003). While these variables are of important consideration, they were controlled for in the current study to target the specific influences of perceived bias on the relationship between mental disorder symptomatology and functional impairment across racial and ethnic groups.

Descriptive hypothesis. Given the existing literature addressing mental health disparities among racial/ethnic minorities, the following descriptive hypotheses were examined: 1) racial/ethnic minorities (i.e., Black, Latinx, and Asian Americans) will endorse a higher number of mental disorder symptoms than Whites will and 2) racial/ethnic minorities will endorse greater levels of perceived bias than Whites will.

Primary hypotheses: In addition to these descriptive hypotheses, using the conceptual model based on the ICF Biopsychosocial Model of Disability and controlling for covariates (gender, insurance, years in the U.S., age, and education), the following hypotheses were assessed:

1) When comparing racial/ethnic groups, it is hypothesized that the relationship between mental disorder symptomatology and functional impairment will be stronger among racial/ethnic minorities (Black, Latinx, and Asian Americans) than among Whites (see Figure 3).

2) When comparing racial/ethnic groups, it is hypothesized that perceived bias will more strongly moderate the relationship between mental disorder symptomatology and functional impairment among racial/ethnic minorities than among Whites (See Figure 4).

Exploratory analyses: In addition to examining functional impairment as a single aggregate outcome, hypothesis 2 was also be expanded to assess each functional impairment domain (social, role, cognitive, mobility, and self-care) as a dependent variable. These analyses also aimed to assess how perceived bias moderates the relationships between mental disorder symptomatology and different types of functional impairment (social, role, cognitive, mobility, and self-care) across racial/ethnic groups. Given that little to no research currently exists comparing how mental disorder symptomatology is associated with various types of functional impairment, these analyses were exploratory in nature.

Method

Participants

The Collaborative Psychiatric Epidemiological Surveys (CPES), funded by the National Institutes of Mental Health (NIMH), combines data from three nationally

representative surveys: the National Latino and Asian American Study (NLAAS), the National Survey of American Life (NSAL), and the National Comorbidity Survey Replication (NCS-R). The CPES was designed to examine prevalence, correlates, and risk factors of mental disorders and associated health outcomes among adult populations in the U.S. These data include an oversampling of racial and ethnic minority subgroups and collectively, these surveys make up the first national data source sufficiently powered to explore cultural, racial, and ethnic influences on mental disorders and associated health outcomes.

The current study used two of the three CPES datasets: the NLAAS and the NSAL. The NSAL includes 3,570 African-Americans, 1,006 non-Hispanic Whites, and 1,623 Afro-Caribbean Blacks, for a total sample of 6,199 adults over the age of 18 years. African-Americans included Black adults who did not identify Caribbean ancestry. Afro-Caribbean Blacks were limited to Black individuals who identified Caribbean ancestry. Finally, the non-Hispanic White population included all Caucasian adults except individuals who identified as having Hispanic or Latinx ancestry. Institutionalized persons, including individuals in nursing homes, long-term medical or dependent care facilities, and jails, were excluded from the study population. Military personnel living in civilian housing were eligible for the study, however, military personnel located on a military bases or reservations were excluded. The NSAL survey population was restricted to English-speaking adults. The final overall weighted response rate was 71.5%, with 70.9% for African-Americans, 93.9% for Afro-Caribbeans, and 69.7% for non-Hispanic Whites (Heeringa et al., 2004).

The NLAAS survey population includes 4,649 Latinx (n = 2,554) and Asian American (n = 2,095) adults over the age of 18 years residing in the U.S. Latinx were categorized into four groups of interest: Mexican (n = 868), Puerto Rican (n = 495), Cuban (n = 577), and all other Latinx (n = 614). Similarly, Asian Americans were categorized into four groups of interest: Chinese (n = 600), Filipino (n = 508), Vietnamese (n = 520), and all other Asians (n = 467). Again, institutionalized persons and individuals living on military bases or military reservations were excluded from the survey. Subethnic group differences were adjusted using weighted age and gender estimates to match census distributions for Latinx and Asian American subethnic groups. The final weighted response rates for the NLAAS were 75.7% overall with 77.6% for Latinx and 69.3% for Asian Americans (Heeringa et al., 2004).

Procedures:

The NSAL data were collected between January 2001 and November 2003, assessing the nature, severity, and impairment associated with mental disorders. Trained Survey Research Center (SRC) interviewers contacted each sample housing unit and asked adult household informants to supply the age, gender, race, and ethnic ancestry status of each household member. This demographic data was recorded on a household roster, and the interviewer identified the subset of household members eligible to be selected as a NSAL participant. Using four-stage national area probability sampling, a total of 26,495 sample housing units were screened for eligible adults and a resultant total of 6,199 eligible respondents completed interviews. All respondents were interviewed

using a modified version of the World Health Organization's Composite International Diagnostic Interview (WHO-CIDI; Heeringa et al., 2004).

The NLAAS data were collected via in-person interviews between May 2002 and November 2004. Trained Survey Research Center (SRC) interviewers contacted each sample housing unit in person and asked an adult household informant to supply the age, gender, and race of each household member. Using four-stage national area probability sampling, a total of 27,026 sample housing units were screened for eligible adults. Of the sample screened, 4,649 respondents completed interviews. All respondents were interviewed using a modified version of the WHO-CIDI (Heeringa et al., 2004). The resultant combined sample consisted of 10,371 individuals.

Measures

Demographic variables. Years of education was used as a proxy to assess socioeconomic status and was categorized into four groups and dummy coded: 1 = "0-11 years", 2 = "12 years," 3 = "13-15 years," and 4 = "greater than or equal to 16 years." Gender was dummy coded 0 = "male" and 1 = "female." Age was measured as a continuous variable ranging from 18 to 65 years. Insurance status consisted of a composite of several items assessing the extent and nature of insurance coverage and was dummy coded 0 = "no" and 1 = "yes." Number of years living in the U.S. was used as a proxy for acculturation and was categorized into four groups and dummy coded: 0 = "born in the U.S.," 1 = "less than 5 years," 2 = "5-10 years," 3 = "11-20 years," and 4 = "greater than 20 years." A total of 98% of Whites, 78.1% Blacks, 21.7% Asian American, and 36.3% Latinx reported being in the U.S. The income to needs ratio was calculated

using total family income and the corresponding poverty threshold. Education, insurance status, years in the U.S, age, and gender served as covariates.

Race/Ethnicity. Self-identified race/ethnicity were collected for all respondents as part of the screening process for interviews. For the NLAAS survey, participants were grouped into eight categories: Vietnamese, Filipino, Chinese, all other Asian, Mexican, Puerto Rican, Cuban, and all other Hispanic/Latinx. For the NSAL survey, participants were grouped into three categories: Afro-Caribbean, Black, and non-Hispanic White. In the current study, all Non-Hispanic Whites, Blacks, Latinx, and Asian Americans were grouped to create four racial/ethnic categories.

Mental disorder symptomatology. Mental disorder symptomatology was assessed according to an expanded version of the World Health Organization Composite International Diagnostic Interview (WHO-CIDI; Alegria et al., 2015). This expanded version created by the World Mental Health Survey Initiative (Kessler & Ustun, 2004) provides diagnoses consistent with the DSM-IV (American Psychiatric Association, 2000) and International Classification of Diseases (ICD; WHO, 1993). Symptomatology for any past-year anxiety disorder (panic disorder, agoraphobia without panic, specific phobia, social phobia, generalized anxiety disorder, posttraumatic stress disorder, and separation anxiety disorder), mood disorder (bipolar I and II disorders, major depressive disorder, and dysthymia), and substance use disorder (alcohol, nicotine, and other substance abuse and dependence) was assessed with 36 items. Items were scored dichotomously where participants could endorse or not endorse symptoms (yes/no). Reported symptoms were summed to create a total score ranging from 0 to 36 with greater scores indicative of more mental disorder symptomatology.

Functional impairment. Functional impairment was assessed using the World Health Organization Disability Assessment Schedule II (WHO-DAS-II). This assessment consists of 36 items and six subscales examining various domains of impairment: social impairment, role impairment, time out of role, mobility impairment, cognitive impairment, and self-care impairment. Role impairment was excluded from analyses as this subscale was not administered to NLAAS participants.

Respondents were asked about their difficulty experienced in performing activities within the last 30 days. Respondents were also asked about the number of days in the past month that they experienced impairment. The WHO-DAS-II generates an aggregate count score of general functional impairment, by weighting number of days functional impairment was experienced with each domain of impairment. Each domain was scored and converted to count score from 0 (no impairment) to 100 (full impairment; Üstün, Kostanjsek, Chatterji, Rehm, 2010).

Perceived bias. Perceived bias was assessed using nine items assessing frequency of lifetime bias experiences (e.g., "In your day-to-day life, how often have you been treated with less courtesy than other people?", "In your day-to-day life, how often do people act as if they think you are dishonest?") Respondents indicated frequency of bias experiences on a six-point scale ranging from 1, "never," to 6 "almost every day." Items were summed to create a perceived bias sum score. This measure has been used reliably in previous work with the same sample (Kim, Sellbom, & Ford, 2014) and was found to be reliable across racial/ethnic groups in the current study (Cronbach's alpha = 0.90, 0.88, 0.91, and 0.91 among White, Black, Asian American, and Latinx, respectively).

Data Analysis

Preliminary analyses. All analyses were conducted in SPSS 25 and R 3.5.3. The total combined sample was 10,731 individuals of which almost half were Black and with the smallest group being the White sample. Individuals will data missing on any of the variables of interest (N = 455) were excluded with listwise deletion for a total resultant sample of 10,276 individuals (see Table 1).

Additional preliminary analyses were conducted to evaluate age, years of education, number of years in the U.S., insurance status, and income-to-needs ratio. Survey reliabilities, means, standard deviations, skew, kurtosis, and outliers were calculated and accessed for normality and homogeneity of variance. Mental disorder symptomatology was log-transformed to meet standard cutoffs for skew and kurtosis (George & Mallery, 2010).

Preliminary analyses were conducted to assess the descriptive hypotheses of the current study. These analyses aimed to 1) compare mental disorder symptomatology across racial/ethnic groups and 2) compare perceived bias across racial/ethnic groups. To assess these relationships, a one-way analysis of variance was conducted to determine if there were significant differences in mental disorder symptomatology and perceived bias across racial/ethnic groups. The dependent variables in these analyses were mental disorder symptomatology and perceived bias. In all analyses, the independent variable was race/ethnicity. The *t*-test for these analyses was two-tailed with the probability of rejecting the null hypothesis set at $p < .05$ (Statistical Solutions, 2013).

Primary analyses. To test Hypotheses 1, Pearson product-moment *r* correlations were conducted to assess the relationship between mental disorder symptomatology and

functional impairment across all racial/ethnic groups. Pearson *r* correlation is a measure of the relationship between two variables. Given that Hypotheses 1 aims to assess the relationships between these variables, Pearson *r* correlations are appropriate statistical tests. Correlation coefficients vary from 0 (no relationship) to 1 (perfect linear relationship) or -1 (perfect negative linear relationship). Positive coefficients indicate a direct relationship whereas negative correlation coefficients suggest an inverse relationship. Cohen's standard was used to evaluate the correlation coefficient (Cohen, Cohen, West, & Aiken, 2003). Post-hoc comparisons using the Fisher *r*-to-*z* transformation with Bonferroni corrections were conducted to examine differences between correlation coefficients across groups.

To test Hypothesis 2, zero-inflated negative binomial regressions were conducted to assess the moderating effects of perceived bias on the relationship between mental disorder symptomatology and functional impairment across racial/ethnic groups. In these analyses, the logistic model is used to predict structural zeros (i.e., scores that would always be zero; lack of impairment) and sampling zeros (scores that could be non-zero, but are zero due to sampling variability) in functional impairment. The negative binomial count model is used to predict changes in functional impairment associated with the predictors (O'Rourke & Vazquez, 2019). The independent variables of the regression were mental disorder symptomatology, perceived bias, and the interaction between mental disorder symptomatology and perceived bias. Gender, age, insurance status, education, and years in the U.S. were added to the regression as covariates. The two-way interaction between mental disorder symptomatology and perceived bias was created by multiplying these two variables together after both were centered at a mean of 0. The

dependent variable was functional impairment. Moderation was supported by a significant interaction. This moderation analysis was conducted across all racial/ethnic groups (Cohen, Cohen, West, & Aiken, 2003).

Hypotheses 2 is reflected in the following equation: $Functional\ Impairment = \beta_0 + \beta_1 Symptomatology + \beta_2 Bias + \beta_3 Gender + \beta_4 Age + \beta_5 Insurance + \beta_6 Education + \beta_7 Years + \beta_8 SymptomatologyxBias$

In this equation for the negative binomial count model, β_0 represents the level of functional impairment for respondents whose mental disorder symptomatology, perceived bias, age, education, and years in the U.S are equal to the group means, and for respondents who are female (gender was dummy coded: 0 = female; 1 = male) and have insurance (insurance status was dummy coded: 0 = insurance coverage; 1 = no insurance coverage). β_1 represents the slope of the relationship between mental disorder symptomatology and functional impairment and β_2 represents the slope of the relationship between perceived bias and functional impairment. $\beta_3, \beta_4, \beta_5, \beta_6,$ and β_7 were added to the regression equation as covariates where years in the U.S (1 = less than 5 years; 2 = 5-10 years; 3 = 11-20 years; 4 = 20+ years) and education (1 = 0-11 years; 2 = 12 years; 3 = 13-15 years) were dummy coded. Finally, β_8 represents the interaction between mental disorder symptomatology and perceived bias. Each regression equation included 13 possible variables including dummy coded covariates, however, the White and Black groups did not include each covariate level due to missing participants in each covariate level.

For the logistic model, β_0 represents the likelihood of the non-structural zero outcomes in functional impairment for respondents whose mental disorder

symptomatology, perceived bias, age, education, and years in the U.S are equal to the group means, and for respondents who are female (gender was dummy coded: 0 = female; 1 = male) and have insurance (insurance status was dummy coded: 0 = insurance coverage; 1 = no insurance coverage). β_1 represents the likelihood of structural zeros in functional impairment predicted by mental disorder symptomatology. β_2 represents the likelihood of structural zeros in functional impairment predicted by bias. $\beta_3, \beta_4, \beta_5, \beta_6,$ and β_7 were added to the regression equation as covariates where years in the U.S (1 = less than 5 years; 2 = 5-10 years; 3 = 11-20 years; 4 = 20+ years) and education (1 = 0-11 years; 2 = 12 years; 3 = 13-15 years) were dummy coded. Finally, β_8 represents the likelihood of structural zeros in functional impairment predicted by the interaction between mental disorder symptomatology and perceived bias. Each regression equation included 13 possible variables including dummy coded covariates, however, the White and Black groups did not include each covariate level.

Exploratory analyses: Zero-inflated negative binomial regressions were conducted to assess the moderating effect of perceived bias on the relationships between mental disorder symptomatology and each functional impairment domain (social, role, cognitive, mobility, and self-care). These analyses separately test the logistic model for predicting structural zeros in functional impairment and the negative binomial count model for predicting changes in functional impairment associated with the predictors, as indicated with zero-inflated count data. The independent variables were mental disorder symptomatology, perceived bias, and the interaction between mental disorder symptomatology and perceived bias. Gender, age, insurance status, education, and years in the U.S were added to the regression equation as covariates. The two-way interaction

between mental disorder symptomatology and perceived bias was created by multiplying these two variables together after both were centered at a mean of 0. The dependent variable was each functional impairment domain (social, role, cognitive, mobility, and self-care impairment). Moderation was supported by a significant interaction term. This moderation analysis was conducted separately across all racial/ethnic groups (Cohen, Cohen, West, & Aiken, 2003).

These exploratory analyses are reflected in the following equations:

$$Functional\ Impairment\ Domain = \beta_0 + \beta_1 Symptomatology + \beta_2 Bias + \beta_3 Gender + \beta_4 Age + \beta_5 Insurance + \beta_6 Education + \beta_7 Years + \beta_8 SymptomatologyxBias$$

In this equation, β_0 represents the level of impairment for respondents whose mental disorder symptomatology, perceived bias, age, education, and years in the U.S are equal to the group means, and for respondents who are female (gender was dummy coded: 0 = female; 1 = male) and have insurance (insurance status was dummy coded: 0 = insurance coverage; 1 = no insurance coverage). β_1 represents the slope of the relationship between mental disorder symptomatology and impairment and β_2 represents the slope of the relationship between perceived bias and impairment. $\beta_3, \beta_4, \beta_5, \beta_6$, and β_7 were added to the regression equation as covariates where years in the U.S (1 = less than 5 years; 2 = 5-10 years; 3 = 11-20 years; 4 = 20+ years) and education (1 = 0-11 years; 2 = 12 years; 3 = 13-15 years) were dummy coded. Finally, β_8 represents the interaction between mental disorder symptomatology and perceived bias. Each regression equation included 13 possible variables including dummy coded covariates, however, the White and Black groups did not include each covariate level.

For the logistic model, β_0 represents the likelihood of the non-structural zero outcomes in impairment for respondents whose mental disorder symptomatology, perceived bias, age, education, and years in the U.S are equal to the group means, and for respondents who are female (gender was dummy coded: 0 = female; 1 = male) and have insurance (insurance status was dummy coded: 0 = insurance coverage; 1 = no insurance coverage). β_1 represents the likelihood of structural zeros in impairment predicted by mental disorder symptomatology. β_2 represents the likelihood of structural zeros in impairment predicted by bias. $\beta_3, \beta_4, \beta_5, \beta_6,$ and β_7 were added to the regression equation as covariates where years in the U.S (1 = less than 5 years; 2 = 5-10 years; 3 = 11-20 years; 4 = 20+ years) and education (1 = 0-11 years; 2 = 12 years; 3 = 13-15 years) were dummy coded. Finally, β_8 represents the likelihood of structural zeros in impairment predicted by the interaction between mental disorder symptomatology and perceived bias. Each regression equation included 13 possible variables including dummy coded covariates, however, the White and Black groups did not include each covariate level.

Power analysis. Given the large sample size of the CPES dataset (N = 10,276), it was anticipated that the current study would be sufficiently powered to detect hypothesized relationships.

Results

One-Way Analysis of Variance: Preliminary Analyses

A one-way analysis of variance was conducted to compare mental disorder symptomatology across racial/ethnic groups (see Table 3). Results indicated that mental disorder symptomatology differed significantly across groups ($p < .001$). Post hoc

comparisons using the Tukey HSD test indicated that mental disorder symptomatology among Blacks (M = 0.69, SD = 1.84) was significantly greater than that of Whites (M = 0.46, SD = 1.28) and Asian Americans (M = 0.33, SD = 1.27; $p < .01$). Latinx (M = 0.72, SD = 2.00) reported significantly greater mental disorder symptomatology than Whites and Asian Americans ($p < .001$).

A one-way analysis of variance was also conducted to compare perceived bias across racial/ethnic groups (see Table 3). Bias differed significantly across racial/ethnic groups ($p < .001$). Post hoc comparisons using the Tukey HSD test indicated that perceived bias was significantly greater among Blacks (M = 19.92, SD = 8.10) than Latinx (M = 15.83, SD = 7.44), Asian Americans (M = 15.99, SD = 6.53), and Whites (M = 17.17, SD = 6.77; $p < .01$). However, Whites reported greater perceived bias than Asian Americans and Latinx ($p < .01$).

Correlation Analyses: Hypothesis 1

Pearson product-moment r correlation analyses were conducted to assess the relationship between mental disorder symptomatology and functional impairment across racial/ethnic groups (see Table 4). Results indicated that there was a significant positive association between mental disorder symptomatology and functional impairment across all racial/ethnic groups ($p < .001$), with the strongest association found in the Latinx group and the weakest association found in the Asian American group. Overall, effect sizes across the racial/ethnic groups magnitude ranged from 0.31 to 0.44 (Cohen, 1998). Post-hoc comparisons using the Fisher r-to-z transformation with Bonferroni corrections indicated that the correlation between mental disorder symptomatology and functional

impairment was significantly stronger among the Latinx group than the Black ($z = 4.01$, $p < .001$) and Asian American groups ($z = 5.15$, $p < .001$). This relationship was also significantly stronger in the White group than the Asian American group ($z = 3.24$, $p < .01$).

Regression Analyses: Hypothesis 2

Zero-inflated negative binomial regression analyses were conducted to evaluate the association of mental disorder symptomatology, perceived bias, and the two-way interaction between mental disorder symptomatology and perceived bias with functional impairment across racial/ethnic groups (see Table 6). Across all groups and controlling for covariates (age, gender, years in the U.S, education, and insurance), the hypothesized model fit significantly better than the null model ($p < .001$) with the best model fit found in the Black group. Within the logistic model where functional impairment was assessed in terms of structural zero (i.e., true zero scores; lack of functional impairment) or sampling zero outcomes (i.e., zero scores due to sampling variability), symptomatology was significantly less likely to predict lack of functional impairment within the Black, Latinx, and Asian American groups. Perceived bias was significantly less likely to predict lack of functional impairment across all racial/ethnic groups. Within the count model, symptomatology was found to be significantly associated with functional impairment within the Black group and the Asian American group, with higher rates of symptomatology associated with greater functional impairment. Perceived bias was found to negatively predict functional impairment within the Latinx group such that increased perceived bias was associated with less functional impairment. The interaction between

symptomatology and perceived bias was also found to be significant within the Latinx group, suggesting that the impact of symptomatology on functional impairment varies as a function of perceived bias. More specifically, symptomatology was found to be more strongly associated with functional impairment among individuals reporting low perceived bias than individuals reporting high perceived bias. Within the count model, in assessing covariates, increased age was significantly associated with functional impairment across all groups ($p < .001$) and fewer years in the U.S was negatively associated with functional impairment within the Black group ($p < .05$).

Exploratory Analyses

Functional impairment by domain across racial/ethnic groups. Zero-inflated negative binomial regression analyses were conducted to evaluate the differential effects of mental health symptomatology, perceived bias, and two-way interaction between mental disorder symptomatology and perceived bias on five domains of functional impairment: social, role, mobility, cognitive, and self-care. All analyses were conducted across racial/ethnic groups. Correlations between social, role, mobility, cognitive, and self-care impairment were assessed. (see Table 5). All functional impairment domains were significantly correlated with one another.

Social impairment. Controlling for covariates, the hypothesized model fit significantly better than the null model ($p < .001$) across all racial/ethnic groups with the best model fit found in the Black group (see Table 7). Within the logistic model, symptomatology was significantly less likely to predict lack of social impairment within the Asian American and Latinx groups. Perceived bias was less likely to predict lack of

social impairment within the White, Black, and Asian American groups. Within the count model, symptomatology was found to predict social impairment within the Asian American group, with increased symptomatology associated with greater social impairment. When assessing covariates, low education was associated with social impairment within the White group ($p < .01$) and fewer years in the U.S. was negatively associated with social impairment within the Asian American group ($p < .05$).

Role impairment. Controlling for covariates, the hypothesized model fit significantly better than the null model across all racial/ethnic groups ($p < .001$) with the best model fit found in the Black group (see Table 8). Within the logistic model, mental disorder symptomatology and perceived bias were found to both be less likely to predict lack of role impairment across all racial/ethnic groups. Within the count model, symptomatology was found to predict role impairment within the Asian American group such that increased symptomatology was associated with greater role impairment. Within the Latinx group, perceived bias was found to negatively predict role impairment such that increased perceived bias was associated with less role impairment. Additionally, the interaction term was a significant predictor of role impairment within the Latinx group, suggesting that the association between symptomatology and role impairment varies as a function of perceived bias. Specifically, the association between symptomatology and role impairment was stronger among those who reported low perceived bias compared with those reporting high perceived bias. When assessing covariates, increased age was associated with role impairment within the all groups ($p < .001$). Low education was associated with increased role impairment within the Black, White, and Asian American

groups ($p < .01$) and fewer years in the U.S was negatively associated with role impairment within the Black group ($p < .01$).

Cognitive. Controlling for covariates, the hypothesized model fit significantly better than the null model ($p < .001$) with the best model fit found in the Black group (see Table 9). Within the logistic model, mental disorder symptomatology was significantly less likely to predict lack of cognitive impairment in the White, Black, and Asian American groups. Perceived bias was less likely to predict lack of cognitive impairment across all racial/ethnic groups. Within the count model, mental disorder symptomatology was found to significantly predict cognitive impairment within the Black and Asian American groups, suggesting that increased symptomatology was associated with increased cognitive impairment. When assessing covariates, increased age was associated with cognitive impairment across all groups ($p < .001$). Lower education was associated with cognitive impairment across the White, Black, and Latinx groups ($p < .01$). Female sex and fewer years in the U.S were associated with cognitive impairment within the Latinx group ($p < .05$).

Mobility impairment. Controlling for covariates, the hypothesized model fit significantly better than the null model ($p < .001$) with the best model fit found in the Black group (see Table 10). Within the logistic model, symptomatology, perceived bias, and the interaction term were found to be less likely to predict lack of mobility impairment across all racial/ethnic groups. Within the count model, perceived bias was found to negatively predict mobility impairment within the White and Black groups, suggesting that increased perceived bias was associated with decreased mobility impairment. The interaction term was found to positively predict mobility impairment

within the White group, suggesting that the association between symptomatology and mobility impairment varies as a function of perceived bias. Specifically, the association between symptomatology and mobility impairment was stronger among those reporting high perceived bias compared with those reporting low perceived bias. When assessing covariates, increased age was associated with mobility impairment in the White, Black, and Asian American groups ($p < .01$). Low education was associated with mobility impairment across all groups ($p < .05$). Male sex was associated with mobility impairment within the Asian American group ($p < .01$). Finally, fewer years in the U.S was negatively associated with mobility impairment within the Black and Latinx groups ($p < .01$).

Self-care. Controlling for covariates, the hypothesized model fit significantly better than the null model ($p < .001$) with the best model fit found in the Black group (see Table 11). Within the logistic model, symptomatology was found to be less likely to predict lack of self-care impairment across all racial and ethnic groups. Perceived bias was found to be less likely to predict lack of self-care impairment within the Black, Asian American, and Latinx groups. Within the count model, perceived bias was found to negatively predict self-care impairment within the Asian American group, suggesting that increased perceived bias was associated with decreased self-care impairment. The interaction term was significant within the Latinx group, suggesting that the association between symptomatology and self-care impairment varies as a function of perceived bias. Specifically, the association between mental disorder symptomatology and self-care impairment is stronger among those reporting higher perceived bias compared with those reporting lower perceived bias. When assessing covariates, increased age was associated

with self-care impairment within the White and Latinx groups ($p < .01$). Low education was associated with self-care impairment within the White and Latinx group ($p < .05$). Lastly, fewer years in the U.S was negatively associated with self-care impairment within the Latinx and Asian American groups ($p < .05$).

Discussion

The current study used the International Classification of Functioning, Disability, and Health (ICF) Biopsychosocial Model of Disability (World Health Organization, 2011) to assess the association of mental disorder symptomatology, perceived bias, and functional impairment across racial/ethnic groups within the Collaborative Psychiatric Epidemiological Surveys (CPES). Mental health disparities in the U.S., especially among racial/ethnic minorities, are a serious public health issue. While substantial research exists addressing the magnitude of health disparities in the U.S., less is known about their developmental mechanisms and impact on quality of life. Overall, results were found to be generally consistent with previous work demonstrating differential rates of mental disorder symptomatology, perceived bias, and functional impairment across racial/ethnic groups. Findings from the current study also reflect some challenges associated with health disparities research that have been highlighted in the literature including the examination of cultural variables within diverse populations, methodological variation, and assessment and conceptualization of bias.

First, as hypothesized in the current study and consistent with the existing literature, mental disorder symptomatology was found to vary across racial/ethnic groups. Specifically, Blacks and Latinx were found to endorse the greatest rates of mental disorder symptomatology compared with Asian Americans and Whites. These findings

parallel previous work with the CPES indicating that Blacks and Latinx may endorse higher rates of psychotic symptoms than Asian Americans and Whites (Cohen & Marino, 2013). Additionally, Asian Americans were found to report the lowest rates of mental disorder symptomatology, which aligns with previous research similarly identifying low rates of mood (Smith et al., 2006), anxious (Asnaani et al., 2010), substance use (Smith et al., 2006), and psychotic symptoms (Cohen & Mariano, 2013) among Asian Americans. However, this finding conflicts with research suggesting that all racial/ethnic minorities, including Asian Americans, exhibit higher rates of mental disorder symptomatology than Whites (U.S. Department of Health and Human Services, 2001; Miranda, McGuire, Williams, & Wang, 2008).

There are a number of potential explanations for these discrepancies. First, many studies that highlight greater rates of mental disorder symptomatology among Asian Americans have addressed specific Asian American populations, particularly those with a history of trauma or refugee status such as Vietnamese, Cambodian, and Laotian Americans (Chung & Kagawa-Singer, 1993), that may be more likely to endorse mental disorder symptomatology. Additionally, other studies assessing symptomatology among Asian Americans have incorporated assessment of somatic complaints, which have been shown to be more common among Asian Americans with mood or depressive disorders than among other racial/ethnic groups (Chang, 1985; Hsu & Folstein, 1997). In the current study, Asian American groups were combined and somatic symptoms were not assessed, potentially contributing to an underestimation of mental disorder symptomatology among Asian Americans in the sample. Alternatively, it is possible that Asian Americans may be generally less likely to report mental health concerns due to

stigmatized cultural conceptions of mental health issues within Asian populations (Sue, Cheng, Saad, & Chu, 2012), leading to underrepresentation of mental disorder symptomatology within this group.

The hypothesized association between mental disorder symptomatology and functional impairment was supported in the current study, which was consistent with previous findings (Buist-Bouwman et al., 2006; Mathers & Loncar, 2006; Prince, Harwood, Thomas, & Mann, 1998). Additionally, the relationship between mental disorder symptomatology and functional impairment was found to vary across racial/ethnic groups. Some previous findings suggest that Blacks may experience higher rates of functional impairment related to diagnosed mental disorders (Marques et al., 2011; Williams et al., 2007). However, to our knowledge, no research exists assessing the differential association between general mental disorder symptomatology and functional impairment across racial/ethnic groups. In the current study, the association between mental disorder symptomatology and functional impairment was stronger among Whites than among Blacks, but not significantly so. It is possible that the effects of mental disorder symptomatology and diagnosed mental disorders on functional impairment differ across groups. More specifically, diagnosed mental disorders may be more likely to lead to service utilization and treatment among Whites than among Blacks, resulting in decreased impairment among Whites with mental disorder diagnoses (Breslau et al., 2017). However, mental disorder symptomatology may be less likely to lead to treatment seeking among both Blacks and Whites, resulting in similar levels of associated functional impairment.

Interestingly, in the current study, the relationship between mental disorder symptomatology and functional impairment was found to be strongest within the Latinx group. Similar findings have been highlighted in comparing the relationship between symptomatology and functional impairment in Latinx and White adults (Bowen & Ruch, 2015). It is possible that moderating factors unique to the Latinx group, such as Latinx ethnic identity, language use, or social preferences (Keyes, Martins, Hatzenbuehler, Blanco, Bates, & Hasin, 2012), may decrease mental health service utilization and in turn increase functional impairment within this group.

In the current study, rates of perceived bias were found to vary by race/ethnicity, as illustrated in previous research (Clark et al., 1999; Williams, Spencer, & Jackson, 1999; Pascoe & Richman, 2009). Interestingly, while Blacks endorsed the highest rates of perceived bias, Whites also endorsed high rates of perceived bias compared with Asian Americans and Latinx, who endorsed the lowest rates of perceived bias. One potential explanation for this finding highlights the items used to address perceived bias in the CPES questionnaire. While questionnaire items addressing perceived bias aimed to target race/ethnicity-related bias, these questions may have been interpreted more broadly as addressing general stigma or prejudice, which can be experienced by all individuals regardless of ethnic/racial minority status. For example, participants were asked, “In your day-to-day life, how often are you treated with less courtesy than other people?” While being treated uncourteously can be associated with race/ethnicity-related bias, this experience can also be attributed to a number of other factors unelated to race/ethnicity such as gender, ability, socioeconomic status, weight status, sexual orientation, etc.

Importantly, perceived bias, prejudice, and stigma, unrelated to race/ethnicity, have been shown to be impactful in eliciting stress, negative emotional affectivity, and psychological distress (Clark, Anderson, Clark, & Williams, 1999; Cohen et al., 1995; Phelan, Link, & Dovidio, 2008). Indeed, while race/ethnicity-related discrimination has often been conceptualized as distinct from other forms of bias, these experiences may differ little in terms of elicited psychosocial stress and effects on mental health outcomes (Phelan, Link, & Dovidio, 2008). Indeed, many have advocated for the bridging of research traditions examining differential facets of prejudice, perceived bias, and stigma to enhance the field and broaden the scope of existing work on chronic psychosocial stress (Stuber, Meyer, & Link, 2008). Focusing on singular experiences or forms of bias may discount the meaning and salience of other intersections of identity and status. Findings from the current study speak to the need for broader conceptualizations of bias, prejudice, stigma and their impacts on health across diverse groups.

Notably, perceived bias was also found to be differentially associated with impairment across functional domains as well as across racial/ethnic groups. For example, perceived bias was negatively associated with mobility impairment within the White and Black groups. Within the Asian American group, perceived bias was negatively associated with self-care impairment. Within the Latinx group, perceived bias was negatively associated with general functional impairment and role impairment. These positive outcomes, especially in light of adversity and psychosocial stress, can be conceptualized as resilience (i.e., "achieving a positive outcome in the face of adversity; McEwen, Gray, & Nasca, 2015). There are a several potential explanations for these indicators of resilience in response to perceived bias. First, individuals who have

experienced increased bias are more likely to have developed effective coping strategies that protect them from their negative psychological effects (Sellers, Caldwell, Schmeelk-Cone, & Zimmerman, 2003). Another explanation is illustrated by social identity theory, which suggests that experiences of perceived bias attack an individual's group membership and self-concept, which can lead to a sense of exclusion from the majority group or dominant culture. Social rejection from a majority group may in turn lead individuals to seek a sense of acceptance and belonging within their in-group communities (Tajfel & Turner, 2004). Increased community ties and social support networks have been linked with greater mental health outcomes and resiliency (Kawachi & Berkman, 2001; Ozbay, Jounson, Dimoulas, Morgan, Charney, & Southwick, 2007).

Culture and intersectional identity may also impact the ways in which resilience can be found within groups and across domains of impairment in the presence of perceived bias. For example, perceived bias was found to be negatively associated with general functional impairment and role impairment within the Latinx group. Cultural community and social support may contribute to increased resilience and reduced functional and role impairment within this group, especially in the presence of high perceived bias. In particular, familism is a Latinx cultural value referring to the importance of closeness, community, familial loyalty, and contributing to the wellbeing of the nuclear family, extended family, and kinship networks (Chauce & Domenech-Rodriguez, 2000). Familism values may be emphasized in times of chronic stress to support individuals in their role responsibilities, which can be shared by the community (Hernandez & Bamaca-Colbert, 2016), as well as in their general day-to-day functioning (Chauce & Domenech-Rodriguez, 2000).

To that end, perceived bias was found to attenuate the association of mental disorder symptomatology and functional impairment within the Latinx group. This effect was also found when addressing role impairment within the Latinx group. Again, cultural values of familism and social support (Katiria Perez & Cruess, 2014) may be elicited by experiences of perceived bias against cultural and ethnic communities. In turn, familism and community support may buffer the association between mental disorder symptomatology and functional impairment (Kawachi & Berkman, 2001) and contribute to resilience against chronic psychosocial stressors.

Perceived bias was also found to be negatively associated with mobility impairment within the White and Black groups. Furthermore, within the White group, perceived bias was found to attenuate the effects of mental disorder symptomatology on mobility impairment. It is possible that mental disorder symptomatology is less likely to manifest in physical symptomatology and impairment among Blacks and Whites compared with Asian Americans and Latinx. Indeed, some research has found that Asian Americans and Latinx are more likely to report physical and somatic symptoms of mental disorders (Angel & Guarnaccia, 1989; Chang, 1985; Hsu & Folstein, 1997), which are more likely to be associated with impairment in mobility. Furthermore, Asian Americans and Latinx have been shown to report especially low rates of treatment-seeking for mental health problems (Abe-Kim et al., 2006; Barragan, Yamada, Lee, & Barrio, 2016; Wang et al., 2005), which might contribute to increased physical and mobility impairment.

Finally, perceived bias was negatively associated with self-care impairment within the Asian American group. Asian Americans have been found to be more likely to

adhere to collectivist cultural values, where priorities of the in-group collective are emphasized over those of the individual. Mental health problems are often seen as stressors that must be handled individually as to not burden others of the collective network (Kim, Atkinson, & Umemoto, 2001). Thus, Asian Americans may be more likely to overemphasize or value their ability to care for oneself (i.e., bathe, get dressed, eat) as to not be seen as a burden to others. This emphasis on self-care and autonomy may contribute to decreased self-care impairment seen in the Asian American group.

There are a number of notable limitations in the current study. First, while addressing mental disorder symptomatology as a multifaceted construct (i.e., including depressive, anxious, and substance use symptomatology) leads to increased generalizability and application to diverse clinical populations, previous work has largely targeted singular domains of symptomatology. Thus, it is difficult to establish direct comparisons across studies in addressing the role of symptomatology on functional outcomes, especially given the existing mixed findings in the literature (Saluja, Iachan, Scheidt, Overpeck, Sun, & Giedd, 2004; Smith, Stinson, Dawson, Goldstein, Huang, & Grant, 2006). Similarly, while the results of the current study expand upon the extant body of literature, the small effects found suggest that many other factors in addition to mental disorder symptomatology and perceived bias impact functional impairment outcomes across racial/ethnic groups. These findings speak to the need for additional work evaluating alternative mechanisms and correlates of impairment. Additionally, while the sample was categorized into four racial/ethnic groups, substantial intragroup diversity exists within groups, which was not assessed in the current study. Differential item functioning and measurement invariance has been shown to pose as a barrier in

achieving accurate assessment of health across racial/ethnic groups (Teresi & Fleishman, 2007). Furthermore, cultural conceptions of mental health problems have been shown to elicit stigma among some racial/ethnic groups and may lead to underreporting of mental disorder symptomatology (Sue, Cheng, Saad, & Chu, 2012). Finally, while years in the U.S was examined as a covariate and proxy for acculturation, future research should assess adherence and assimilation to the dominant U.S. culture to more accurately elucidate the impact of acculturation on mental health outcomes.

There are a number of important takeaways in the current study. First, symptomatology was not found to universally predict impairment across all racial/ethnic groups and functional domains. This finding speaks to the need for additional research on predictors of mental health outcomes, such as social support, community, and other resiliency factors. Additionally, the need for broader conceptualizations of how bias, prejudice, stigma, and intersectional identity may impact health and wellbeing across diverse populations is illustrated in this work. The value of multifaceted conceptualizations of impairment and the utility of models such as the World Health Organization ICF Biopsychosocial Model of Disability are highlighted. Finally, findings from the current study illustrate the continued existence of differential outcomes in mental health across racial/ethnic groups and reify the need for additional work to address developmental mechanisms, prevention, and impact of health disparities on quality of life across diverse populations.

Figure 1. ICF Biopsychosocial Model of Disability

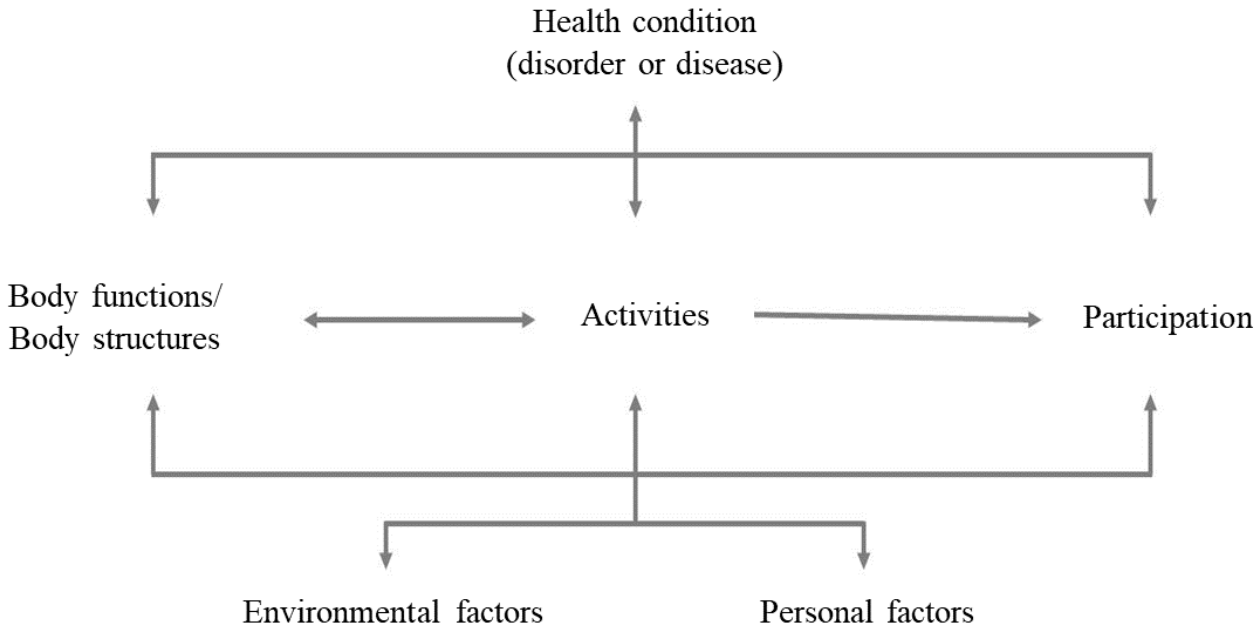


Figure 2. Modified conceptual model for the current study.

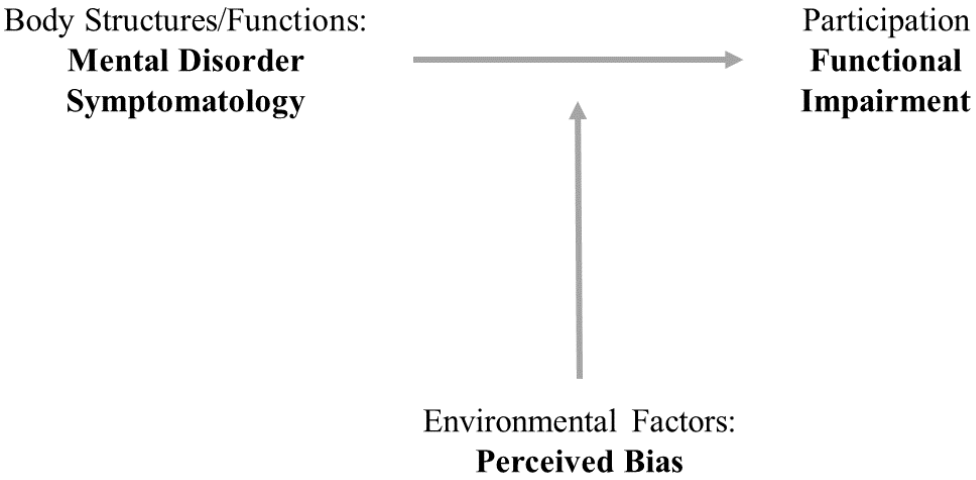


Figure 3. Hypothesized relationship between mental disorder symptomatology and functional impairment across racial/ethnic groups (Hypothesis 1).

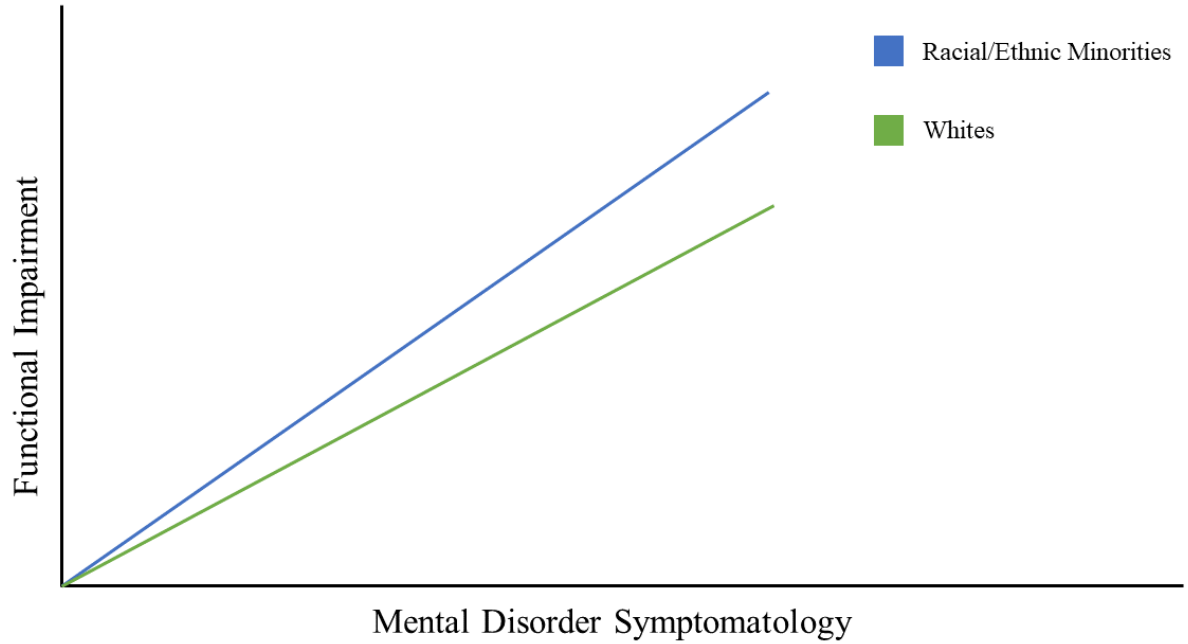


Figure 4. Hypothesized moderating effect of perceived bias on the relationship between mental disorder symptomatology and functional impairment across racial/ethnic groups (Hypothesis 2).

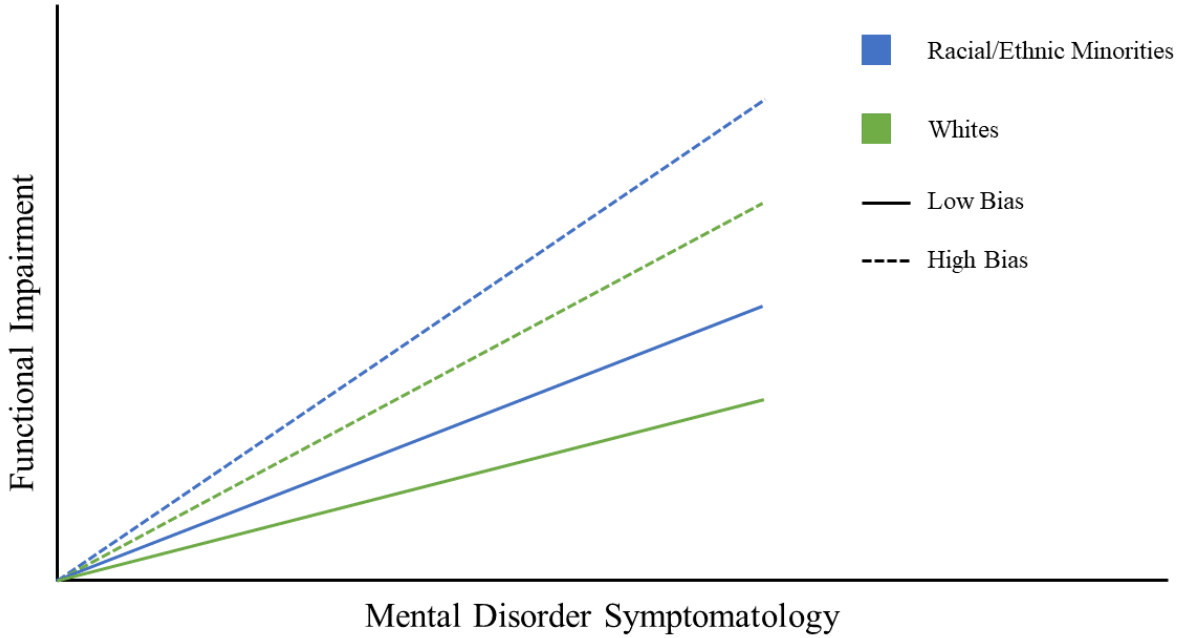


Table 1
Sample demographics

	White N = 859	Black N = 4,705	Asian American N = 2,020	Latinx N = 2,692	Total N = 10,276
Gender					
Male	357	1,722	973	1,192	4,244
Female	502	3,983	1,047	1,500	6,032

Table 2

Descriptives and covariates by race/ethnicity.

	White			Black			Asian American			Latinx		
	M	*SD*	Range	*M*	*SD*	Range	*M*	*SD*	Range	*M*	*SD*	Range
Symptomatology	0.46	1.28	10.00	0.69	1.84	19.00	0.33	1.27	14.00	0.72	2.00	19.00
Bias	17.17	6.77	44.00	19.92	8.10	45.00	15.99	6.53	45.00	15.83	7.44	45.00
Impairment	23.70	49.53	328.00	21.04	47.12	450.00	8.39	32.11	500.00	16.66	44.99	400.00
Age	47.59	16.95	73.00	42.54	16.11	76.00	41.22	14.77	77.00	40.61	15.66	79.00
Education	2.60	1.05	3.00	2.34	1.02	3.00	2.94	1.09	3.00	2.14	1.08	3.00
Years in the U.S.	4.95	0.38	4.00	4.56	0.97	4.00	3.24	1.34	4.00	3.74	0.29	4.00
Insurance	0.72	0.45	1.00	1.00	0.00	1.00	0.86	0.35	1.00	0.72	0.45	1.00
Income to Needs	3.47	3.69	17.00	2.67	2.41	17.00	5.64	4.90	17.00	3.47	3.69	17.00

Dummy coded variables - Education: 1 = 0-11 years, 2 = 12 years, 3 = 13-15 years, 4 = 16+ years. Years in the U.S.: 1 = less than 5 years, 2 = 5-10 years, 3 = 11-20 years, 4 = greater than 20 years, 5 = born in the U.S. Insurance status: 1 = yes, 0 = no.

Table 3

Results of one-way analysis of variance comparing mental disorder symptomatology and perceived bias across racial/ethnic groups.

	Sum of Squares	*df*	Mean Square	*F*
Symptomatology				
Between	36.16	3	12.05	42.61***
Within	3,034.43	10,727		
Total	3070.60	10,730		
Bias				
Between	39,195.33	3	13,065.11	229.56***
Within	594,077.06	10,438		
Total	633,272.39	10,441		

Table 4

Results of correlation analyses for mental disorder symptomatology and functional impairment across racial/ethnic groups.

		1	2
White	1. Symptomatology		
	2. Impairment	0.42***	
Black	1. Symptomatology		
	2. Impairment	0.35***	
Asian	1. Symptomatology		
	2. Impairment	0.31***	
Latinx	1. Symptomatology		
	2. Impairment	0.44***	

* p < .05; **p < .01; ***p < .001

Table 5

Results of correlation analyses for social, role, cognitive, mobility, and self-care impairment across racial/ethnic groups.

			1	2	3	4	5
White	1.	Social					
	2.	Role	0.37***				
	3.	Cognitive	0.56***	0.42***			
	4.	Mobility	0.26***	0.61***	0.35***		
	5.	Self-Care	0.29***	0.38***	0.20***	0.36***	
Black	1.	Social					
	2.	Role	0.36***				
	3.	Cognitive	0.55***	0.43***			
	4.	Mobility	0.35***	0.55***	0.45***		
	5.	Self-Care	0.33***	0.31***	0.35***	0.49***	
Asian	1.	Social					
	2.	Role	0.33***				
	3.	Cognitive	0.73***	0.44***			
	4.	Mobility	0.45***	0.54***	0.49***		
	5.	Self-Care	0.68***	0.40***	0.62***	0.60***	
Latinx	1.	Social					
	2.	Role	0.40***				
	3.	Cognitive	0.43***	0.45***			
	4.	Mobility	0.36***	0.60***	0.40***		
	5.	Self-Care	0.32***	0.40***	0.22***	0.56***	

*p < .05; **p < .01; ***p < .001

Table 6

Results of zero-inflated negative binomial regression analyses evaluating the association of mental disorder symptomatology, perceived bias, and the two-way interaction term with functional impairment across racial/ethnic groups.

			Logistic Model			Count Model		
	Variable	Log Likelihood	*β*	*SE β*	*Z*	*β*	*SE β*	*Z*
White		-2,486***						
	Symptomatology		-0.31	0.80	-0.38	0.15	0.11	1.31
	Bias		-0.06	0.02	-3.55***	-0.01	0.01	-0.47
	Symptomatology x Bias		-0.05	0.06	-0.91	0.00	0.01	0.62
Black		-11,730***						
	Symptomatology		-0.68	0.14	-4.70***	0.08	0.03	2.56**
	Bias		-0.03	0.01	-6.55***	0.00	0.00	-0.34
	Symptomatology x Bias		0.01	0.01	0.99	0.00	0.00	0.45
Asian		-5,094***						
	Symptomatology		-0.37	0.16	-2.37**	0.13	0.04	3.82***
	Bias		-0.04	0.01	-4.71***	0.01	0.01	1.15
	Symptomatology x Bias		-0.02	0.01	-1.96	0.00	0.00	-0.86
Latinx		-3,019***						
	Symptomatology		-2.85	0.73	-3.91***	-0.17	0.13	-1.32
	Bias		-0.07	0.01	-5.10***	-0.03	0.01	-2.14**
	Symptomatology x Bias		0.06	0.02	2.55*	0.01	0.00	2.51**

* p < .05; **p < .01; ***p < .001

Table 7

Results of zero-inflated negative binomial regression analyses evaluating the association of mental disorder symptomatology, perceived bias, and the two-way interaction term with social impairment across racial/ethnic groups.

			Logistic Model			Count Model		
	Variable	Log Likelihood	*β*	*SE β*	*Z*	*β*	*SE β*	*Z*
White		-524***						
	Symptomatology		6.25	5.25	1.19	0.24	0.28	0.84
	Bias		-0.16	0.07	-2.17**	0.00	0.04	0.00
	Symptomatology x Bias		-0.79	0.54	-1.45	0.01	0.01	0.67
Black		-2,284***						
	Symptomatology		-0.44	0.38	-1.17	0.06	0.07	0.95
	Bias		-0.05	0.01	-3.56***	0.01	0.01	0.58
	Symptomatology x Bias		-0.02	0.01	-1.56	0.00	0.00	0.22
Asian		-870***						
	Symptomatology		-0.35	0.07	-5.23***	0.18	0.06	2.90***
	Bias		-0.05	0.02	-3.39***	-0.02	0.02	-0.78
	Symptomatology x Bias		-0.00	0.00	0.93	0.00	0.00	-0.15
Latinx		-356***						
	Symptomatology		-0.52	0.31	-1.66*	-0.06	0.21	-0.27
	Bias		-0.04	0.03	-1.37	0.03	0.04	0.85
	Symptomatology x Bias		0.01	0.01	0.47	0.01	0.01	1.64

* p < .05; **p < .01; ***p < .001

Table 8

Results of zero-inflated negative binomial regression analyses evaluating the association of mental disorder symptomatology, perceived bias, and the two-way interaction term with role impairment across racial/ethnic groups.

			Logistic Model			Count Model		
	Variable	Log Likelihood	*β*	*SE β*	*Z*	*β*	*SE β*	*Z*
White		-2,162***						
	Symptomatology		-0.10	0.04	-2.60***	0.10	0.11	0.91
	Bias		-0.06	0.00	-3.96***	0.00	0.01	-0.43
	Symptomatology x Bias		0.02	0.00	1.01	0.00	0.00	0.63
Black		-10,300***						
	Symptomatology		-0.51	0.11	-4.83***	0.03	0.03	0.98
	Bias		-0.03	0.01	-5.98***	0.00	0.00	-0.89
	Symptomatology x Bias		0.00	0.00	0.86	0.00	0.00	0.96
Asian		-4,391***						
	Symptomatology		-0.25	0.12	-2.04**	0.10	0.03	3.31***
	Bias		-0.04	0.01	-4.92***	0.01	0.01	1.29
	Symptomatology x Bias		-0.01	0.01	-1.88*	0.00	0.00	-1.23
Latinx		-2,689***						
	Symptomatology		-0.60	0.30	-2.00**	-0.17	0.11	-1.57
	Bias		-0.05	0.01	-4.70***	-0.03	0.01	-2.59***
	Symptomatology x Bias		0.00	0.01	0.01	0.01	0.00	2.48**

* p < .05; **p < .01; ***p < .001

Table 9

Results of zero-inflated negative binomial regression analyses evaluating the association of mental disorder symptomatology, perceived bias, and the two-way interaction term with cognitive impairment across racial/ethnic groups.

			Logistic Model			Count Model		
	Variable	Log Likelihood	*β*	*SE β*	*Z*	*β*	*SE β*	*Z*
White		-692***						
	Symptomatology		-0.59	0.27	-2.17**	0.18	0.16	1.14
	Bias		-0.06	0.02	-3.04***	0.01	0.02	0.40
	Symptomatology x Bias		-0.01	0.01	0.90	0.01	0.01	0.82
Black		-3,194***						
	Symptomatology		-1.16	0.29	-4.00***	0.12	0.06	2.01**
	Bias		-0.04	0.01	-3.44***	0.01	0.01	0.77
	Symptomatology x Bias		0.01	0.01	0.48	0.00	0.00	-0.36
Asian		-1,354***						
	Symptomatology		-1.09	0.36	-3.02***	0.14	0.07	1.20**
	Bias		-0.06	0.02	-3.20***	0.01	0.02	0.47
	Symptomatology x Bias		-0.00	0.02	0.03	0.00	0.00	-0.61
Latinx		-713***						
	Symptomatology		-1.88	2.77	-0.68	0.26	0.30	0.90
	Bias		-0.10	0.03	-3.13***	0.01	0.03	0.19
	Symptomatology x Bias		-0.06	0.21	-0.29	0.01	0.01	0.72

* p < .05; **p < .01; ***p < .001

Table 10

Results of zero-inflated negative binomial regression analyses evaluating the association of mental disorder symptomatology, perceived bias, and the two-way interaction term with mobility impairment across racial/ethnic groups.

			Logistic Model			Count Model		
	Variable	Log Likelihood	*β*	*SE β*	*Z*	*β*	*SE β*	*Z*
White		-1,204***						
	Symptomatology		-0.69	0.24	-2.90***	-0.12	0.13	-0.93
	Bias		-0.06	0.02	-3.63***	-0.05	0.02	-2.71***
	Symptomatology x Bias		0.01	0.01	1.69*	0.01	0.01	1.88*
Black		-5,388***						
	Symptomatology		-0.43	0.07	-6.36***	0.04	0.04	0.97
	Bias		-0.04	0.01	-6.66***	-0.01	0.01	-1.98**
	Symptomatology x Bias		-0.01	0.00	2.75***	0.00	0.00	0.66
Asian		-2,386***						
	Symptomatology		-0.35	0.07	-5.38***	0.04	0.04	1.00
	Bias		-0.04	0.01	-4.62***	-0.01	0.01	-0.49
	Symptomatology x Bias		0.01	0.00	1.86*	0.00	0.00	0.66
Latinx		-1,061***						
	Symptomatology		-0.90	0.33	-2.72***	-0.18	0.21	-0.86
	Bias		-0.06	0.02	-3.02***	-0.05	0.03	-1.39
	Symptomatology x Bias		0.02	0.01	1.88*	0.01	0.01	1.31

* p < .05; **p < .01; ***p < .001

Table 11

Results of zero-inflated negative binomial regression analyses evaluating the association of mental disorder symptomatology, perceived bias, and the two-way interaction term with self-care impairment across racial/ethnic groups.

			Logistic Model			Count Model		
	Variable	Log Likelihood	*β*	*SE β*	*Z*	*β*	*SE β*	*Z*
White		-346**						
	Symptomatology		-0.50	0.20	-2.50**	0.06	0.18	0.35
	Bias		-0.01	0.03	-0.37	-0.01	0.04	-0.28
	Symptomatology x Bias		0.01	0.01	0.80	0.00	0.01	0.12
Black		-1,653***						
	Symptomatology		-0.28	0.06	-4.60***	0.01	0.05	0.14
	Bias		-0.02	0.01	-2.35**	0.00	0.01	-0.28
	Symptomatology x Bias		0.00	0.00	1.13	0.00	0.00	0.72
Asian		-858***						
	Symptomatology		-0.27	0.06	-4.25***	0.05	0.07	0.72
	Bias		-0.05	0.02	-3.31***	-0.04	0.02	-2.44**
	Symptomatology x Bias		0.00	0.00	1.24	0.00	0.00	0.17
Latinx		-369***						
	Symptomatology		-0.35	0.15	-2.27**	-0.09	0.16	-0.55
	Bias		-0.05	0.02	-2.03**	-0.01	0.03	-0.27
	Symptomatology x Bias		0.00	0.01	0.40	0.01	0.01	1.71*

* p < .05; **p < .01; ***p < .001

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