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**A Vignette-Based Study Examining Attitudes Toward Mental and Brain Illness in the
United States and Pakistan**

Abstract

Research from both Pakistan and the United States shows a relatively higher stigma for mental than physical illness. However, research comparing mental and brain illness is limited. Therefore, using an online survey, the current study examined mental and brain illness stigma, discriminatory potential as manifested via social distance, and perceived causes (biogenetic/moral) in a cross-cultural sample. A total of 918 students (458 Pakistani and 460 American) were recruited from academic institutions. They completed a within-group design survey where measures of stigma (Attribution Questionnaire), discriminatory potential (Social Distance Scale), and Causal Beliefs were administered in the context of mental (either Depression/Schizophrenia) and brain illness (either Dementia/Traumatic Brain Injury) vignettes. The primary ANOVA results showed that Pakistan had a relatively higher stigma and discriminatory potential than the United States. However, there was no difference in stigma and discriminatory potential between mental and brain illness. Moreover, Pakistani respondents highly endorsed moral causal beliefs, whereas the United States respondents endorsed biogenetic causal beliefs which were relatively higher for mental than brain illness in both countries. Notably, these results were sensitive to covariates as investigated in the exploratory model. Hence, this study should be a precursor for future research aimed at the identification of moderators and mediators that account for cross- and within-culture variation. Lastly, given the cultural variation in causal beliefs and experiences of symptoms, it is essential to engage those with lived experience and locals to identify and include the unique cultural factors that are crucial to the success of an intervention.

Keywords: cross-cultural, stigma, mental illness, brain illness, causal beliefs, discriminatory potential.

Clinical Impact Statement: Stigma remains a significant barrier to mental health treatment worldwide.

However, research on stigma in Pakistan is limited which is exacerbated by the dearth of mental health providers. Although the literature consistently shows a relatively higher stigma for mental than other illnesses, research comparing mental and brain illness is sparse in both Pakistan and the United States. Hence, the current study assessed stigma, discriminatory potential as manifested by social distance, and perceived causes of mental and brain illness. The results highlight a relative need for increased mental and brain illness literacy via contact and psychoeducation in Pakistan and continued efforts to reduce biogenetic causal beliefs in the United States.

A Vignette-Based Study Examining Attitudes Toward Mental and Brain Illness in the United States and Pakistan

Stigma can be formally defined as a socially constructed phenomenon characterized by stereotypes and prejudice that lead to discrimination (World Health Organization, 2002). There are various types of stigma, such as public and self-stigma which involve stereotypes, prejudice, and discrimination. Common stereotypes about mental illness include beliefs, such as all people with mental illness are dangerous and unable to sustain an independent lifestyle (Angermeyer & Dietrich, 2006; Rüsch et al., 2005). When a person with a mental illness internalizes these stereotypes, it leads to poor outcomes such as low self-esteem via self-stigma (Corrigan & Watson, 2002). Although stereotypes themselves are not stigmatizing and stigma can arise without stereotypes (see Biernat & Dovidio, 2000), endorsing such stereotypes increases the potential for prejudice and public discrimination (Corrigan & Penn, 1999). Indeed, both public and self-stigma are detrimental, and irrespective of the country in discussion public stigma has been shown to propagate discrimination (World Health Organization, 2002).

Globally, 30% of the population suffers from a mental illness yearly; however, two-thirds of people receive no treatment (Kessler et al., 2005). Specifically, 75% of the population in developing countries require mental health treatment but do not receive care compared to 35%-50% in developed countries (Mascayano et al., 2015). Similarly, there is a high yearly prevalence of mental illness in the United States general population, but the utilization of services remains relatively low. This discrepancy has been attributed to 'stigma' for the past two decades in addition to structural (health insurance and transportation) and attitudinal barriers (thinking symptoms would get better by themselves) to treatment seeking (SAMHSA, 2021; Andrade et al., 2014; U.S. Department of Health & Human Services, 1999).

There are cross-cultural differences in stigma that influence treatment utilization. For example, the disparity in stigma levels between East and West such that Eastern countries report a relatively

higher mental health stigma than Western countries (Krendl & Pescosolido, 2020; Mirza et al., 2019; Rao et al., 2007). However, this does not mean that stigma is non-existent in the West, instead, stigma is present but varies in strength across regions (Lauber & Rössler, 2007). Even with equal access to treatment, utilization of formal mental health care varies across cultural groups. For instance, despite comparable access to mental health services provided by the university, Asian American students showed lower help-seeking behavior relative to other ethnicities (Han & Pong, 2015). Past work also finds cultural differences in the types of support people utilize: South Asians (who have roots in the Indian subcontinent and Indo-Gangetic Plain: Bangladesh, India, Pakistan, Nepal, and Sri Lanka) were more likely to seek help from family and faith services before seeking professional help (Penny et al., 2009). The trend of lower help-seeking for formal mental health services, in favor of other sources, is partly due to the attached cultural stigma to seeking formalized mental health care. For example, family objections and stigma were common reasons for not pursuing counseling or other formal mental health treatment in Pakistan (Husain, 2019).

Given the range of sources people seek mental health care from, understanding perceptions of stigma and beliefs about mental health is an important antecedent to understanding when and why people seek out different sources of mental health care. In the current work, we aim to examine cross-cultural variations in stigma toward both mental and brain illness among South Asian (i.e., Pakistani) and North American (i.e., United States) samples.

Mental and Brain Illness Stigma

Extensive research compares mental illness stigma with other conditions such as cancer and blindness, consistently demonstrating a relatively higher stigma for mental illness than for other conditions, which is true for both the United States and Pakistan (Corrigan et al., 2000; Husain et al., 2020; Weiner et al., 1988). However, research that compares stigma across mental and brain illness is limited. The only study that compared brain and mental illness was by Subramaniam et al. (2016)

examining stigma toward mental illness and other conditions including dementia. The results showed that dementia and depression were associated with lower dangerousness (stereotype) and lower social distance (discrimination) compared to other mental illnesses such as schizophrenia. The study sample was from Singapore; however, it indicates differences in how the public views mental and brain illness conditions warranting further research.

According to the findings of a series of qualitative meetings held by the National Alzheimer's Association with people who have early-stage dementia, stigma was identified as one of the highest unmet needs (Reed & Bluethmann, 2008). As highlighted in the World Alzheimer's Report, overcoming the stigma associated with dementia is crucial since it adversely deters people with dementia from seeking appropriate care (Batsch & Mittelman, 2012). This aligns with previous findings about the attachment of shame with mental illness adversely affecting help-seeking. Hence, stigma seems to adversely impact the prognosis of not only mental but also brain illness.

Causal Beliefs

One important component to fully understanding stigma toward mental and brain illness involves causal beliefs. Causal beliefs can be formally defined as the public's attributions about the cause of a condition. For mental illnesses, causal beliefs may be divided into two categories: moral and biogenetic (Pescosolido et al., 2010). Moral attributions include individual characteristics: bad character, the way they were raised, and the will of God, whereas biogenetic attributions include a chemical imbalance in the brain and a genetic/inherited problem.

Research shows that Asians are very likely to endorse God's will as a causal belief for mental illnesses (Hatfield et al., 1996). Specifically, South Asians are shown to attribute mental illness to GOD's will as well as spiritual factors that are both associated with higher stigma (Saravanan et al., 2007; Sheikh & Furnham, 2000). Conversely, biogenetic explanations were promoted in the United States in hopes that if people understood mental illnesses as 'real' brain disorders and not 'volitional' behaviors it would

reduce stigma. However, the research findings revealed that biogenetic causal models were associated with a relatively higher desire for social distance from people with mental illness (Angermeyer et al., 2014; Speerforck et al., 2014). The influence of these biogenetic campaigns remains prevalent in the West as shown by a recent study. Krendl and Pescosolido (2020) show that Western countries have a relatively higher tendency to endorse biogenetic causal beliefs than Eastern countries which instead endorse moral causal beliefs. Moral causal beliefs are also detrimental as they are associated with increased social distance (Martin et al., 2000). Hence, this underscores the importance of assessing the public's perceptions of the etiology of mental and brain illness that can inform anti-stigma campaigns and provide a holistic picture of the cross-cultural comparison.

Current Study

Extending past research where Eastern, developing countries report a relatively higher mental illness stigma than Western, developed countries (see Krendl & Pescosolido, 2020), our study will examine stigma, discriminatory potential, and causal beliefs in Pakistan (a South Asian country with limited resources devoted to mental health exacerbated by a dearth of mental health professionals) and the United States (a North American country which has had relatively better mental health awareness and resource devotion). In addition, mental illness has been consistently shown to be more stigmatized than other illnesses, and there is a dearth of literature examining mental and brain illness stigma together. Hence, to bridge the gap in the literature, we will assess attitudes toward mental and brain illness in a cross-cultural sample. We hypothesize that there will be a relatively higher stigma and discriminatory potential in Pakistan and for mental illness than in the United States and for brain illness. In addition, we hypothesize Pakistan will show a relatively higher endorsement of moral causal beliefs for mental than brain illness, whereas the United States will show a relatively higher endorsement of biogenetic causal beliefs for mental than brain illness.

Method

Participants

Participants were recruited from the University of North Carolina Wilmington in the United States via the Psychology Department's Research Sign-Up System (SONA, an online research recruitment and management tool). Given that Pakistani universities did not have a similar centralized participant recruitment pool and psychology departments were smaller than in the United States, recruitment at several universities in Pakistan was warranted. Hence, snowball sampling was implemented in Pakistan and convenience sampling in the United States. An email/text equivalent to the recruitment Ad posted on SONA was sent to professors and enrolled students. Information regarding the response rate is not available.

A total of 927 participants completed the survey from April 2022 to March 2023 with 458 participants from Pakistan and 469 from the United States. Nine participants from the United States sample were removed due to electronic glitches early in the data collection phase leaving 460 from the United States and a final sample of 918 ($M_{Age} = 21.33$, $SD_{Age} = 4.06$). The mean age for the United States sample ($M = 19.35$, $SD = 2.68$) was lower than the Pakistani sample ($M = 23.46$, $SD = 4.16$). This difference was significant, $t(890) = 17.59$, $p < .001$. Only 79 participants from Pakistan took the survey in Urdu and the rest in English with no differences among these participants. There were more females in the United States ($n = 359$) than in the Pakistani sample ($n = 324$), whereas there were more males in the Pakistani ($n = 134$) than in the United States sample ($n = 101$). This difference was significant, $\chi^2(1, N = 918) = 6.42$, $p = .01$.

Detailed information about the education and religious affiliation breakdown is provided in Supplemental Materials (see S1). Notably, both samples had 99% of participants with 12 or more years of education, but there was a significant difference country-wise such that the sample from Pakistan ($M = 4.9$, $SD = 1.16$) had a higher education level than the United States ($M = 3.62$, $SD = .83$), $t(916) = 19.51$, $p < .001$. Note the education variable was converted from a categorical to a numerical variable and used

as such for all analyses. In terms of religion, 98% of the sample from Pakistan identified as Muslim. In contrast, 63% of the sample in the United States identified as Christian. The demographic distribution of the United States was such that it was predominantly White/non-Hispanic/European ($n = 376$), with Hispanic/Latino ($n = 28$), Biracial ($n = 24$), Black/African American ($n = 15$), Asian/Asian American ($n = 13$), American Indian/Alaska Native ($n = 2$), and Native Hawaiian or Pacific Islander ($n = 2$).

Materials and Measures

Survey Translation

The survey was translated into Urdu (the national language of Pakistan) by a native Urdu speaker and back-translated into English by one of the authors who is fluent in both Urdu and English according to the translating guidelines set forth by the American Educational Research Association, American Psychological Association, National Council on Measurement in Education (2014). The focus was on translating constructs and ideas instead of a word-by-word translation. Respondents in Pakistan were instructed to choose between the English and Urdu language surveys depending on their reading and comprehension proficiency. As both English and Urdu are considered the official languages of Pakistan, offering surveys in both languages was appropriate.

Mental and Brain Illness Vignettes

Two mental and brain illnesses were included that applied to a wide age range and to increase generalizability more than one illness was included in each category (mental/brain). A systematic review was conducted to select vignettes that were relatively equal in length and did not mention the cause/controllability of the illness, which might influence responses (see Link et al., 1999 for depression and schizophrenia; Foster et al., 2013 for TBI; and Subramaniam et al., 2016 for dementia). In addition, the names used in the vignettes were multicultural to be applicable in both countries. Lastly, the perceived age associated with the names was matched with the age range of the disorders (Newman et al., 2018). Vignettes and name selections are available in Supplemental Materials (S2,3, and 4).

Attribution Questionnaire (AQ-9)

The scale was developed by Corrigan et al. (2003). The AQ-9 comprises of nine questions answered on a 9-point Likert scale (*None at all–Very much*). Each question presents a stereotype about people with mental illness such as dangerousness (i.e., people with mental illness are not safe). A higher endorsement of the stereotypes is indicative of a higher public stigma and only the helping behavior item is reverse scored. This scale was adapted to also ask about brain illness. Scale reliability was assessed using McDonald's omega, as recommended by Hayes and Coutts (2020). Reliability in the current sample was adequate for both mental ($\omega = .83$) and brain illness ($\omega = .84$).

Social Distance Scale

The scale was developed by Link et al. (1999) which consists of 6 items ($\alpha = .86$) that ask about participants' willingness for a specific interaction e.g., as a friend. The responses are answered on a 4-point Likert scale (*Definitely willing–Definitely unwilling*). This scale was adapted to ask about brain illness. The scale's internal consistency in the current sample was adequate for both mental ($\omega = .88$) and brain illness ($\omega = .84$).

The Level of Familiarity Scale

The scale was developed by Holmes et al. (1999) which consists of 11 items (dichotomous: yes or no) that vary in their strength of familiarity ($\alpha = .62$). A higher accumulative score is indicative of having high familiarity with mental illness. This scale was adapted to ask about brain illness. The internal consistency of the scale in the current sample was adequate for both mental ($\omega = .77$) and brain illness ($\omega = .76$).

Causal Beliefs

Participants provide information about the etiology of mental illness due to moral or biogenetic attributions on a 4-point Likert scale (*Very Likely–Not Likely At All*) (Pescosolido et al., 2010). Higher scores indicate a lower endorsement of that belief. To aid in interpretation such that higher scores

indicate higher endorsement of the belief, all items are reverse scored. The scale's internal consistency in the current sample was acceptable for mental illness moral ($\omega = .59$) and biogenetic ($r = .45$)¹ given the relatively small number of items. For brain illness, moral ($\omega = .68$) and biogenetic ($r = .44$) were also in the acceptable range.

Age-Universal Religious Orientation Scale: Intrinsic Religiosity

The Age Universal Religious Orientation Scale was developed by Gorsuch and McPherson (1989) which consists of extrinsic and intrinsic religiosity subscales, but only the intrinsic religiosity subscale was included in this study. The intrinsic religiosity subscale consists of 5 items ($\alpha = .73$) answered on a 5-point Likert scale (*Strongly disagree–Strongly agree*). The scale's internal consistency in the current sample was good ($\omega = .91$).

Procedure

The research protocol was approved by the Institutional Review Board at UNCW, IRB: 22-0211. Participants first completed the informed consent form, indicating their voluntary participation and confirming they were 18 or above. They then completed demographics and a measure of internal religiosity, after which they read the mental and brain illness vignettes. This study used a within-subjects design such that all participants read a vignette from mental and brain illness conditions. Within vignette conditions, participants were randomly assigned to read one of the two illnesses from each category (mental illness: depression or schizophrenia; brain illness: TBI or dementia) to ensure results were not limited to a single illness within that illness type. In addition, whether a female or male version was given was also randomized among participants.

In the mental illness vignette condition, participants completed the Level of Familiarity Scale followed by the presentation of a vignette either for depression or schizophrenia Male/Female. Next, the participants completed a set of questionnaires that were randomized to control order effects. The

^[1] Pearson- r correlation was computed for scales with only two items.

questionnaires included the following: AQ-9 to measure stigma, the Social Distance Scale to measure discrimination manifested as social distance, and causal beliefs to measure the etiology of illness. The brain illness vignette condition followed the same structure. Participants first completed the adapted Level of Familiarity scale, followed by the presentation of a TBI or dementia Male/Female vignette. After the vignette, the same questionnaires adapted for brain illness are presented in a random order. The survey ends with a debriefing document. UNCW students received psychology research course credit and all other participants received no compensation.

Analytic Strategy

The code and data are publicly available on the Open Science Framework at <https://osf.io/JVWUT/>. All analyses were run in R (version 4.2.2). An alpha level of .05 was used for all analyses and effect sizes are reported following recommendations in Bakeman (2005) and Lakens (2013). We first ran a series of mixed-model ANOVAs to investigate differences in stigma, discriminatory potential, and causal beliefs across vignette type and country. The full sample was used for primary analyses ($N = 918$), and no missing data on the primary variables of interest was present. Exploratory analyses tested the same effects when controlling for a series of covariates (age, gender, education, intrinsic religiosity, familiarity, and moral/biological causal beliefs). The correlation matrix is available in Supplemental Materials (see S5) which rationalizes the addition of the aforementioned covariates. In some cases, there was inherently absent data (e.g., if participants chose unaffiliated for religion, they had missing data for the intrinsic religiosity because the scale was not presented to unaffiliated religion participants). Detailed missing data per covariate and country information is available in Supplemental Materials (see S6). For the control analyses participants with missing data on any variables in the model were excluded. Therefore, ANOVAs with all control variables had a lower sample size ($N = 745$). Lastly, when familiarity is controlled for, it reflects aggregated familiarity with mental and brain illness for ease

of interpretation. The descriptive statistics for the primary study variable broken down by country are available in Supplemental Materials (see S7).

Results

Differences in Religiosity and Familiarity Across Countries

Before running primary analyses, three independent samples *t*-tests were used to test if there was a difference in intrinsic religiosity and familiarity with brain and mental illness between countries. The results showed a significant difference between both groups $t(764) = 13.18, p < .001, d = .97$, 95% CI [.70, .94], such that intrinsic religiosity was higher in Pakistan ($M = 4.27, SD = .72$) than in the United States ($M = 3.45, SD = 1.01$). There was also a significant difference in familiarity with mental illness between countries, $t(914) = 7.41, p < .001, d = .49$, 95% CI [.54, .92], such that it was higher for the United States ($M = 3.42, SD = 1.57$) than Pakistan ($M = 2.69, SD = 1.42$). In addition, there was a significant difference in familiarity with brain illness between countries, $t(914) = 17.59, p = .004, d = .19$, 95% CI [.08, .43], such that it was higher for Pakistan ($M = 2.12, SD = 1.37$) than the United States ($M = 1.87, SD = 1.36$).

Effect of Country and Vignette on Stigma

To test whether there is a difference in stigma across countries (Pakistan/United States) and vignette type (mental/brain illness) a 2 x 2 mixed model ANOVA was run with repeated measures on the latter factor. There was a significant difference in stigma between countries, $F(1, 916) = 93.20, p < .001, \eta^2 = .08$. As shown in Figure 1, there was a relatively higher stigma found in Pakistan ($M = 3.47, SD = 1.34$) than the United States ($M = 2.77, SD = 1.02$). However, there was not a significant difference in stigma between vignette types, $F(1, 916) = 2.41, p = .121, \eta^2 = .0004$. In addition, the interaction (country x vignette type) was not significant, $F(1, 916) = 1.92, p = .167, \eta^2 = .0003$.

When all covariates were simultaneously controlled (age, gender, education, intrinsic religiosity, familiarity, and moral/biological causal beliefs), the main effect of country was no longer significant, $F(1,$

743) = .09, $p = .764$, and the vignette type remained insignificant, $F(1, 743) = .66$, $p = .418$. However, the interaction became significant, $F(1, 743) = 4.10$, $p = .043$, $\eta^2 = .0009$. Upon probing the interaction, brain illness stigma was relatively lower than mental illness stigma in the United States, $t(308) = -2.31$, $p = .022$, although this effect was small ($d = -.13$). The difference in mental and brain illness stigma levels among participants in Pakistan was not significant, $t(435) = .15$, $p = .883$, $d = .01$.

Effect of Country and Vignette on Discriminatory Potential

To test whether there is a difference in discriminatory potential assessed via social distance across countries and vignette type a 2 x 2 mixed model ANOVA was run with repeated measures on the latter factor. There was a significant difference in discriminatory potential between countries, $F(1, 916) = 29.36$, $p < .001$, $\eta^2 = .02$. As shown in Figure 2, discriminatory potential was relatively higher in Pakistan ($M = 2.25$, $SD = .61$) than in the United States ($M = 2.05$, $SD = .64$). However, there was no significant difference in discriminatory potential between vignette type, $F(1, 916) = .01$, $p = .918$, $\eta^2 > .01$. In addition, the interaction was not significant, $F(1, 916) = 1.06$, $p = .303$, $\eta^2 > .01$. When all covariates were controlled simultaneously, none of the effects were significant: country, $F(1, 743) = .31$, $p = .576$; vignette type, $F(1, 743) = .03$, $p = .862$; and interaction, $F(1, 743) = 1.44$, $p = .230$.

Effect of Country and Vignette on Causal Beliefs

Moral. To test whether there is a difference in moral causal beliefs across countries and vignette type a 2 x 2 mixed model ANOVA was run with repeated measures on the latter factor. There was a significant difference in moral causal beliefs between countries, $F(1, 916) = 176.59$, $p < .001$, $\eta^2 = .12$ such that there was a relatively higher endorsement by respondents from Pakistan ($M = 2.59$, $SD = .58$) than the United States ($M = 2.15$, $SD = .64$). In addition, there was a significant difference between moral causal belief and vignette-type, $F(1, 916) = 132.59$, $p < .001$, $\eta^2 = .04$ such that there was a relatively higher endorsement for mental ($M = 2.49$, $SD = .58$) than brain illness ($M = 2.25$, $SD = .69$). The main effects are qualified by a significant interaction between country and vignette type, $F(1, 916) = 5.43$, $p =$

.020, $\eta^2 = .002$. Upon probing the interaction country-wise (see Figure 3), respondents from the United States had a relatively higher endorsement of moral causal beliefs for mental than brain illness, $t(459) = 9.31, p < .001, d = .43$. Likewise, respondents from Pakistan also had a relatively higher endorsement of moral causal beliefs for mental than brain illness, although this mean difference was smaller than that of respondents in the United States, $t(457) = 6.87, p < .001, d = .32$. Upon probing the interaction, the other way, respondents from Pakistan had a relatively higher endorsement of moral beliefs than the United States when reading the brain illness vignette, $t(916) = 11.52, p < .001, d = .76$. This remained true for mental illness such that respondents from Pakistan had a relatively higher endorsement of moral beliefs than the United States, $t(916) = 11.02, p < .001, d = .73$. When all covariates were controlled simultaneously (age, gender, education, intrinsic religiosity, familiarity, biogenetic causal beliefs), the vignette type effect remained significant, $F(1, 743) = 76.13, p < .001, \eta^2 = .03$. However, the country main effect and interaction effects were no longer significant: country, $F(1, 743) = .39, p = .534$; interaction, $F(1, 743) = .83, p = .362$.

Biogenetic. To test whether there is a difference in biogenetic causal beliefs across countries and vignette type a mixed model ANOVA was run with repeated measures on the latter factor. There was a significant difference in biogenetic causal beliefs between countries, $F(1, 916) = 6.39, p = .012, \eta^2 = .004$ such that there was a relatively higher endorsement from respondents in the United States ($M = 3.16, SD = .84$) than Pakistan ($M = 3.05, SD = .74$). In addition, a significant difference in biogenetic causal beliefs between vignette type was found, $F(1, 916) = 88.06, p < .001, \eta^2 = .03$ such that there was a relatively higher endorsement of biogenetic causal belief for mental ($M = 3.25, SD = .72$) than brain illness ($M = 2.96, SD = .87$). The main effects were qualified by a significant interaction between country and vignette type, $F(1, 916) = 37.76, p < .001, \eta^2 = .01$. As shown in Figure 4, upon probing the interaction country wise, respondents from the United States had relatively higher endorsement of biogenetic causal beliefs for mental than brain illness vignettes, $t(459) = 9.88, p < .001, d = .46$. Respondents from Pakistan also

had a relatively higher endorsement of biogenetic causal beliefs for mental than brain illness, but this mean difference was again smaller compared to for respondents in the United States, $t(457) = 2.62, p = .009$. When probed by vignette type, there was no significant difference in biogenetic causal beliefs for brain illness between respondents from the United States and Pakistan, $t(916) = 1.45, p = .146, d = .09$. However, there was a significant difference among countries in their biogenetic causal beliefs for mental illness such that endorsement was relatively higher from respondents in the United States than Pakistan $t(916) = 6.36, p < .001, d = .42$. When all covariates were controlled simultaneously (age, gender, education, intrinsic religiosity, familiarity, moral causal beliefs) no changes in results were observed. The main effects of country, $F(1, 743) = 8.39, p = .003, \eta^2 = .007$, and vignette type, $F(1, 743) = 46.24, p < .001, \eta^2 = .02$, remained significant. The interaction, $F(1, 743) = 21.70, p < .001, \eta^2 = .009$ also remained significant.

Discussion

Utilizing a large sample, the primary results indicate a relatively higher stigma and discriminatory potential in Pakistan than in the United States. This supports our hypothesis as well as prior research that suggests greater stigma and discriminatory potential in Eastern than in Western countries (Krendl & Pescosolido, 2020; Mirza, 2019). However, there was not a significant difference in stigma or discriminatory potential between mental and brain illness vignettes presented to the respondents. In addition, the interaction between country and vignette type was not significant. Hence, the country (Pakistan/United States) did not moderate differences in stigma or discriminatory potential between vignette types.

In terms of causal beliefs, primary results showed country-moderated differences in moral causal belief endorsement between vignette types such that respondents from both Pakistan and the United States endorsed moral causal beliefs relatively higher for mental compared to brain illness. This aligns with previous literature that showed respondents from Eastern countries endorse moral causal

attributions more than Western countries (Krendl & Pescosolido, 2020). Similar to moral causal belief primary results, country-moderated differences in biogenetic causal belief endorsement between vignette types. When responding to the brain illness vignettes, there were no country differences. However, for the mental illness vignettes, respondents from the United States endorsed biogenetic causal beliefs more than respondents from Pakistan.

When exploratory covariates in the model were included, the country-level effects were no longer significant for stigma, discriminatory potential, and moral causal beliefs. These results may suggest that the country-level differences observed in the primary ANOVA model may be driven by country-level differences in control factors such as familiarity with mental health, or intrinsic religiosity. No changes in results occurred for biogenetic causal beliefs. Notably, these models had substantial reductions in reduced sample size. Additionally, some covariates showed country-level differences, which some scholars advise against for statistical controls (Miller & Chapman, 2001). Thus, this interpretation is limited due to loss of power and natural exclusion of participants who indicated no religious affiliation. Given the post-hoc, exploratory nature of these control analyses, future research can expand on these results by focusing on identifying potential mechanisms behind the overall country-level effects.

Strength and Implications

This is the first study known to researchers that compares brain and mental illness stigma together and cross-culturally. Hence, it was important to include the primary model in addition to the exploratory model. Although there is literature comparing mental and physical illnesses in both countries, brain illness stigma has been historically neglected. This has occurred despite the World Alzheimer's report that mentions the detrimental effect of stigma attached to dementia which plays a role in reduced help-seeking (Batsch & Mittelman, 2012). With an aging population expected to reach 2 billion by 2050, a concerted effort should be made to fund research and interventions that aim to reduce

public stigma and focus on self-stigma, which may contribute to lower help-seeking. This is important given that the study did not find lower brain illness stigma compared to mental illness contrary to mental and physical illness comparisons.

To combat brain illness stigma, interventions that have been successful with mental illness stigma may continue to be effective. This includes but is not limited to contact and psychoeducation/literacy which can be particularly useful to increase brain illness familiarity in the United States and both mental and brain illness familiarity in Pakistan (see Public Illness & Policy Solutions section; Corrigan et al., 2014). Finally, anti-stigma interventions can be implemented at the classroom level as well (see Mann & Himelein, 2008). However, it is important to note that intervention effectiveness may vary across countries due to cultural variation. As reviewed earlier, there are cultural differences in whom people seek help as well as unique barriers to help-seeking such as family objections to not pursuing formal treatment present in Pakistan (Husain, 2019). In addition, as reflected by differences in causal beliefs as suggested by the current study and previous literature, it is imperative to target cultural conceptualization in psychoeducation.

To do so, it is imperative to include people local to the community and those with lived experience. This is important because conceptualization and experiences of illnesses may differ across cultures. For instance, people from the United States describe hallucinatory experiences as negative, punitive voices, while people from India and Ghana describe positive hallucinatory experiences (Luhmann et al., 2015). Therefore, it is extremely important to involve members of the local community as well as those who have lived with the illness in that community to identify the unique cultural aspects that will need to be addressed in stigma interventions for them to be effective. Hence, grounding psychoeducation and interventions in culture to improve specificity and sensitivity to the population is critical for its success and impact.

Limitations

The sample was highly educated i.e., 99% of the participants from both countries had 12 years or higher education, and there was a statistically significant difference between the sample such that Pakistan has a more highly educated sample than the United States. This difference may have arisen from sampling approach differences. The centralized participant pool in the United States was strictly limited to undergraduates, whereas the snowball sampling may have led to participants enrolled in programs higher than undergraduates and generally there is more variability in the education levels in respondents from Pakistan as inferred from S1. Other significant differences in demographics between the samples include age and an unequal distribution of sex assigned at birth. Although uneven, the sex assigned at birth distribution is reflective of the National Center for Educational Statistics (2020) which shows a higher percentage of female students in the United States. Therefore, to remediate this limitation, sex assigned at birth, age, and education were both added as covariates in the exploratory model. Although not reported here, we also individually controlled for all these variables separately and none of these variables independently resulted in a change from the primary analysis findings.

Given the convenience sample of students recruited from an academic setting, results should not be widely generalized, and future research should focus on replicating the findings with a larger community sample. In addition, future research should focus on studying these attitudes for each illness separately as there may be key differences in the perception and experiences with different illnesses. Given some cultures seek help from religious leaders for psychological concerns the role of religion should be explored and continued to be added as a covariate. In addition, the focus should be on measuring adherence to religion instead of religious affiliation which may not gauge to what extent religion is important to them and guide their behavior. Lastly, cultural factors pertinent to Pakistan should be studied, such as supernatural causal beliefs associated with schizophrenia and the absence of nursing homes due to multigenerational households which could potentially contribute to lower stigma toward dementia.

Conclusion

This study bridged the literature gap by comparing attitudes toward mental and brain illness in Pakistan and the United States. The results supported the hypothesis of a relatively higher stigma and discriminatory potential in Pakistan, albeit sensitive to covariates. Respondents from Pakistan were found to have a lower familiarity with mental illness. This emphasizes the need for psychoeducation and increased literacy regarding mental illness, along with promoting accurate causal beliefs. In the United States, although there was relatively lower stigma and discriminatory potential, biogenetic causal beliefs remain pervasive for mental illness, warranting revisiting the anti-stigma framework. Additionally, the differential endorsement of causal beliefs highlights the importance of culturally specific stigma reduction strategies. Without a doubt, the anti-stigma efforts have been fruitful in the United States as stigma towards depression has declined as shown by Pescosolido et al. (2021), but continued efforts are necessary. This is underscored by United States Surgeon General Vivek Murthy's categorization of youth mental illness as a crisis at the American Psychological Association 2022 convention. Indeed, approximately 75% of mental illnesses have an age onset before 24 years, emphasizing the need for continued efforts in both countries (Kessler et al., 2005).

Although financial barriers are omnipresent, prioritizing mental well-being is imperative and may be associated with a country's happiness. For example, Scandinavian countries are always in the top ten happiest countries in the world. This is not surprising considering their governments allocate ten or more percent of their budgets to mental health, which illuminates the pivotal role of mental well-being and the need for advocacy. This study should be a precursor for stimulating future research that should continue to study the cross-and within-culture variation among mental and brain illnesses. In addition, they should aim to identify potential moderators and mediators for these studied relationships. This is vital to promoting policy and intervention work that will benefit the present and future generations.

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