The Effect of Treatability Information and Genetic Explanations on Schizophrenia Stigma
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ABSTRACT. Attributing mental illness to genetic factors has been shown to reduce blame; however, doing so may create other negative attitudes. Genetic attributions can increase the desire to remain distant from someone with a mental illness (desire for social distance), reduce one’s beliefs that an ill person can get better (prognostic pessimism), and cause people living with mental illness to be perceived as more dangerous. Presenting information about how mental illnesses can be treated alongside a genetic causal attribution may combat these negative side effects. Participants (N = 268) were recruited through Amazon’s Mechanical Turk to read vignettes about a man (“John”) with schizophrenia. Participants randomly received either a genetic or environmental attribution for John’s illness, and then received treatability information or no information. A genetic explanation of schizophrenia led people to believe that the symptoms of schizophrenia described in the vignette were more permanent, p < .01, \(\eta_p^2 = .07\); however, this finding was qualified by a significant interaction where the type of attribution had no impact on prognostic pessimism when presented with treatability information, \(p = .04, \eta_p^2 = .01\). The present findings suggest the potential importance of emphasizing treatability information for disorders that are perceived to be genetically influenced.

Keywords: essentialist bias, treatability information, schizophrenia, stigma, genetics

Schizophrenia represents a leading cause of disability (Vos et al., 2017) and is extremely costly for society (Desai et al., 2013). In addition to the distress and impairment associated with schizophrenia, it carries significant public stigma that may lead to discrimination and negative outcomes such as barriers to care and employment (Ahmedani, 2011; Corrigan, 2000). Public stigma encompasses negative behaviors and attitudes (e.g., devaluation from others) toward a group of people. Stigma directed toward those affected by mental illness can result in struggle obtaining jobs, forming friendships, etc. (Corrigan, 1998). Given the problematic consequences of stigma, understanding potential factors that impact it is of paramount interest.

Several stigmatizing attitudes have been shown to vary based on beliefs about the cause of a problem, or causal attribution (Angermeyer et al., 2015; Gangi et al., 2016; Haslam & Kvaale, 2015; Lebowitz & Ahn, 2012; Lebowitz & Ahn, 2015; Schomerus et al., 2014). If an attribution appears to be something within an individual’s control, the individual is more likely to be blamed for it. Conversely, attribution to something outside an individual’s control is associated with less blame (Corrigan, 2000). One group of causal attributions that has been linked with perceived controllability is biological explanations for behaviors (Corrigan, 2000; Haslam & Kvaale, 2015).

A common example of a biological attribution is the use of genetic explanations. Scientists are beginning to link genetics to a broad variety of qualities, from disease vulnerabilities to attitudes and behaviors (Dar-Nimrod & Heine, 2011). Recent efforts have focused on explaining diseases and
disorders, including mental illnesses, in genetic terms in an effort to reduce stigma (Haslam & Kvaale, 2015). Genetic explanations have indeed been shown to successfully reduce blame (Haslam, 2011; Haslam & Kvaale, 2015; Kvaale et al., 2013). Genetics are perceived to be out of one’s control, and thus genetically influenced problems warrant less blame (Corrigan, 2000; Haslam & Kvaale, 2015).

Unfortunately, this reduction of blame is not without cost (Haslam & Kvaale, 2015). Genetic explanations come with a unique set of associated attitudes and biases, coined the “genetic essentialist bias” (Cheung et al., 2014; Dar-Nimrod & Heine, 2011). An essentialist bias is one where a perceived “essence” or key component of a person (for instance, race or gender) is seen as having “immutable” or unchanging properties that make groups of people different from others and influences their behaviors. In the case of genetic essentialism, genes are seen as the essence of biology and behavior, and the perceived immutable nature of genes is thought to directly predict behavior. As a result, essentialist biases are evoked when a condition, such as schizophrenia, is attributed to and explained in terms of genetic influences (Dar-Nimrod & Heine, 2011).

In the case of mental illness, the genetic essentialist bias, evoked by biogenetic explanations for the illness in question, often gives rise to negative stigmatizing attitudes (Ahmedani, 2011). For instance, the desire for social distance, which encompasses how comfortable people are with others entering their lives, such as marrying into the family or moving next door (Link et al., 1999), typically increases when people are presented with genetic explanations for mental illnesses (Angermeyer et al., 2015; Schomerus et al., 2014). Lebowitz and Ahn (2012) found that attributing borderline personality disorder and schizophrenia to genetic factors resulted in laypersons being less willing to work with individuals with these disorders and less agreeable to having people with these disorders become their neighbor or marry into the family. Other factors, especially perceived dangerousness (i.e., the degree to which someone feels that the target has the capacity to be violent toward others; Link et al., 1999) and prognostic pessimism (i.e., the perceived permanence of the target’s symptoms; Haslam & Kvaale, 2015), are also associated with genetic explanations for disorders (Dar-Nimrod & Heine, 2011; Lebowitz & Ahn, 2012; Lebowitz & Ahn, 2015). Haslam and Kvaale’s (2015) Mixed Blessings Model asserts that the perceived uncontrollability of genes causes the reduction in blame, but the perceived essential differences between laypersons and those affected by mental illness creates the other stigmatizing attitudes such as perceived dangerousness, prognostic pessimism, and desire for social distance.

The relationship between genetic attributions of mental illness and stigma depends on the disorder in question, however. For example, Schomerus et al. (2014) found in a comparative study of genetic attributions on depression, schizophrenia, and alcohol dependence that genetic explanations were associated with greater desire for social distance in the cases of depression and schizophrenia, but were not associated with decreased desire for social distance in the case of alcohol dependence. Further, Lee et al. (2014) found that genetic explanations for schizophrenia caused greater desire for social distance when compared to bipolar disorder and major depression, and that the greater desire for social distance was mediated by higher perceived dangerousness of individuals with schizophrenia. Additionally, Angermeyer et al. (2015) found that, when participants were given vignettes describing a person with a diagnosis of either schizophrenia or depression, participants were more likely to endorse biogenetic causes for schizophrenia than depression and desire more social distance from the vignette target with schizophrenia than the one with depression.

In summary, it appears that biogenetic explanations for mental illness are more common in the case of schizophrenia and have more powerful adverse effects on stigma for schizophrenia than many other mental health conditions. Thus, understanding factors that magnify stigma of individuals with schizophrenia is of particular interest and may lead to potential strategies to combat its negative effects, potentially improving quality of life and lessening struggles associated with this difficult illness.

One possible solution to the negative social stigma that comes from genetic explanations for schizophrenia is treatability information (McGinty et al., 2015). In some contexts, providing information about a disorder’s treatability may reduce stigma (McGinty et al., 2015). This information might be especially impactful when paired alongside biogenetic explanations. For example, in a study by Lebowitz and Ahn (2012), participants received biogenetic explanations for schizophrenia and borderline personality disorder. Participants who also received information about successful ways those conditions could be treated reported less desire for social distance in comparison to those who only
received biogenetic explanations. Although this study has very promising implications for preventing some of the negative effects of biological explanations for mental illness, results from other studies have been inconsistent. For example, Gangi et al. (2016) conducted an experiment using vignettes about an individual with depression in which both treatability information and causal attribution were manipulated. The authors found that treatability information did not interact with causal attribution in impacting desire for social distance from people with depression. One possible explanation for this inconsistency may be that the studies looked at different disorders. Gangi et al. (2016) examined depression, whereas Lebowitz and Ahn (2012) looked at schizophrenia and borderline personality disorder. Gangi et al. (2016) suggested that people are much more likely to be familiar with depression than they are with schizophrenia or borderline personality disorder, and that may account for the inconsistencies in their findings when compared to Lebowitz and Ahn (2012).

The current study aimed to clarify and build off of previous studies by investigating how presenting treatability information alongside a genetic explanation of schizophrenia relates to stigmatizing attitudes that have been associated with genetic attributions. Social distance, prognostic pessimism, and dangerousness were the target dependent variables. This study was the first known study to investigate how all three of the target variables can be affected by the interaction between attribution and treatability in the case of schizophrenia. Dangerousness was of particular interest for this study because neither Lebowitz and Ahn (2012) nor Gangi et al. (2016) examined dangerousness despite previous research showing that schizophrenia tends to be seen as more dangerous than other mental health conditions such as depression (Link et al., 1999). By presenting carefully controlled vignette conditions in a 2 (causal attribution) x 2 (treatability) design with an MTurk sample, the aim was to help clarify the conflicting research about the impact of causal attribution and treatability information on stigma in schizophrenia.

We hypothesized that there would be a main effect for causal attribution such that participants who received the genetic explanation for schizophrenia would score significantly higher on the dependent variables (desire for social distance, prognostic pessimism, and perceived dangerousness) than participants who received the environmental explanation. Based on the results of Lebowitz and Ahn (2012), no main effect for treatability on the dependent variables was expected. Finally, an interaction effect was expected between causal attribution and treatability, such that the presence of treatability information would not have a significant impact in the environmental condition, but participants in the genetic condition who received treatability information would score significantly lower on all dependent variables (less stigmatizing attitudes) than those who did not receive treatability information.

Method

Participants
After obtaining approval from the University of Indianapolis institutional review board, participants were recruited through Amazon’s Mechanical Turk (MTurk), a database where people can sign up to complete online tasks, called “HITs” (Human Intelligence Tasks) for compensation. Two-hundred eighty-seven participants completed at least part of the study. Nineteen individuals were excluded from analyses due to a failure to complete or pass attention checks, yielding a final sample of 268 (mean age 39.15 years, SD = 12.38). The sample encompassed a broad range of ages, from 20 to 72 years old. There were 139 women, 128 men, and one person who reported being “Agender / Gender non-conforming / Androgynous.” Consistent with other MTurk research (Buhrmester et al., 2011), the composition of the sample was primarily European American (85.8%), followed by African (5.6%), Hispanic/Latino (4.9%), East Asian (4.5%), Native American/Alaskan Native (2.2%), South Asian (1.1%), Middle Eastern (0.7%), Pacific Islander (0.4%), and other (0.4%), and close to an even split between men and women. Although not representative of the general population (Berinsky et al., 2012), MTurk samples tend to be more diverse than convenience samples, such as university populations (Buhrmester et al., 2011).

Only “Turkers” ages 18 and older within the United States who had more than one thousand HITs and a 97% or higher approval rating were permitted to participate, (i.e., participants had to have completed one thousand or more tasks and successfully completed at least 97% of them to the specifications of the entities who posted the HITs to qualify for the study). These criteria have been shown to increase the quality of data obtained from MTurk (Buhrmester et al., 2011). Assuming a small main effect and a small interaction effect (Cohen’s $f = .18$, $\alpha = .05$, a minimum sample size of 245 was
required to achieve .80 power; as such, the study was well-powered to address the research questions. Participants were offered 50 cents as incentive for completing the study. After clicking on the HIT, participants were directed to the study materials on Qualtrics, where they provided their consent to participate. After completion of the survey, participants were thanked for participation. A code was given to them to redeem their reward on MTurk. Additionally, a link to the National Institute of Mental Health’s “Help for Mental Illnesses” page was provided in case participants questioned their own mental health after the study or simply wanted to learn more about schizophrenia and other mental illnesses. The entire procedure took 5 to 10 minutes.

Design and Measures
Each participant began the study by reading a vignette about John, a man with schizophrenia. They received the same description of his symptoms, including disorganized behavior (e.g., muttering to himself), paranoia, and hearing voices. These are all key symptoms of the most updated diagnostic criteria recognized in the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (American Psychiatric Association, 2013). Participants were randomly assigned to receive either a genetic (“In John’s case, his condition is predominantly caused by genetics; that is to say, John’s DNA is largely responsible for his condition.”) or nongenetic, that is, environmental (“In John’s case, his condition is predominantly caused by environmental factors; that is to say, John’s environment is largely responsible for his condition.”) causal attribution. Participants were also randomly assigned to receive treatability information (“People with schizophrenia are able to achieve significant improvement in their symptoms with therapy and medication. Research shows that these methods are effective in helping people like John recover.”) or no such information. To help ensure that participants paid attention to these manipulations, participants were not allowed to progress past the vignettes until 25 seconds had elapsed. The structure of this vignette manipulation is analogous to the methods used by Lebowitz and Ahn (2012), which increased the comparability of their results to the results from this study.1

Social Distance
Participants first completed Link et al.’s (1999) Social Distance Scale, where participants were asked from 1 (definitely) to 4 (definitely not) how willing they would be to engage in various social behaviors with John, such as working closely with him, having him move next door, becoming friends, etc. This scale has been used to measure social distance in multiple studies (see, e.g., Link et al., 1999; Pescosolido et al., 2010). The items were averaged to create a single social distance score; internal consistency was high in our sample (α = .93).

Perceived Dangerousness
Perceived dangerousness was assessed by asking participants how likely they believed John to be capable of doing something violent toward other people from 1 (definitely not) to 4 (definitely). This item was modeled from the question in the General Social Survey that inquires about perceptions of likelihood that individuals with mental health issues will cause harm to others. The General Social Survey is a representative sample of adults in the United States, and some of the key studies documenting stereotypes that individuals with mental health issues are dangerous have utilized this survey (Link et al., 1999; Pescosolido et al., 2010); as such, we chose the same item for the current study. This item was reverse-scored for all analyses so that, consistent with the other dependent variables, lower scores would indicate less stigma.

Prognostic Pessimism
Prognostic pessimism was measured by asking participants to rate how permanent they believed John’s symptoms would be from 1 (not at all) to 5 (extremely so). This item was modeled from the question assessing perceptions of the likelihood that mental health symptoms will be permanent outlined in Lebowitz and Ahn (2015).

In the current study, the three dependent variable measures were modestly correlated with each other (α = .59), consistent with research demonstrating relationships between different stigma facets.

Attention and Manipulation Checks
Attention checks were used to identify participants who might have engaged in random responding or failed to pay attention to the vignettes. Midway through the survey, each participant was given multiple-choice questions asking which mental illness the person in the vignette was experiencing (the correct answer was “schizophrenia” across all conditions) and other details about the vignette. Additionally, participants were asked to mark

1Please contact the first author for supplemental information regarding the methods, including the vignettes used and the full measures.
“45” on a sliding scale of 0 to 50. Participants were also asked an open-ended question to test their attentiveness and understanding of English. These measures helped identify participants who do not care about the quality of their responses, or “spammers,” people who may not comprehend English, or programs meant to fill out surveys automatically, also called “bots” (Mason & Suri, 2012). Researchers such as Berinsky et al. (2013) suggested that multiple attention check items are better at testing for comprehension and attentiveness than singular screeners.

For a manipulation check, participants endorsed how much they believed genetics and environmental factors influenced John’s condition from 1 (not at all) to 5 (extremely so). If the manipulation was successful, participants in the genetic condition should have endorsed genetics significantly more, whereas participants in the environmental condition should have endorsed environmental factors significantly more. The treatability manipulation was checked by asking, “On a scale of 1 (very ineffective) to 5 (very effective), to what extent does research show that medication and/or therapy are effective for treating John’s condition?” Participants who received treatability information should have endorsed therapy and medication as significantly more effective than those who did not receive any treatability information.

**Demographics**
Finally, participants were asked several demographic questions. They were asked to report their age, ethnicity, gender, marital status, income, self-perceived economic class, and level of education attained. Additionally, participants were asked if a close friend or family member had been diagnosed with a serious mental health condition.

**Data Analyses**
The primary aim of this study was to learn whether treatability information reduced the negative attitudes associated with genetic explanations for schizophrenia. First, to verify the manipulation checks, t tests were conducted for both causal attribution and treatability. These were put in place to help ensure that the manipulations created group-level differences. A separate factorial analysis of variance was then conducted for each dependent variable (social distance, prognostic pessimism, and perceived dangerousness) to test the main effects of the manipulations and the interaction effect.

**Results**
Two-hundred sixty-eight individuals were randomly assigned to the four experimental conditions and provided responses for the measures of the dependent variables. For a complete summary of the demographic information collected on the participants, please see Table 1. Demographic characteristics for each of the four conditions were compared through one-way analyses of variance and Chi-square analyses; all ps > .05, suggesting that randomization was successful.

Participants who received a genetic causal attribution (M = 4.73, SD = 0.57) endorsed genetics as a cause of John’s schizophrenia significantly more, t(266) = 19.58, p < .001, d = 2.37, than participants in the environmental condition (M = 2.50; SD = 1.20). Participants who received treatability information endorsed therapy and medication as effective treatments for schizophrenia (M = 4.20; SD = 0.76) significantly more, t(266) = 7.66, p < .001, d = .93, than those who did not receive such information (M = 3.41; SD = 0.92). These results suggest that the manipulations were successful in creating distinct groups by altering people’s beliefs about the causal attribution and treatability of John’s schizophrenia.

For each dependent variable, a separate 2 (causal attribution) x 2 (treatability information) factorial analysis of variance was conducted to test the main effect of condition, namely attribution and treatability information, as well as the interaction between these variables. Please see Table 2 for cell means.

**Social Distance**
There was no main effect of attribution on social distance, F(1, 264) = 0.32, p = .57, η² = .001. There was a significant main effect of treatability information on social distance, F(1, 264) = 5.38, p = .02, η² = .02. Participants who received treatability information desired less social distance from John than those who received no such information. The interaction between attribution and treatability information was not significant for social distance, F(1, 264) = 0.57, p = .45, η² = .002 (see Table 2).

**Dangerousness**
The main effect of attribution on dangerousness was not significant, F(1, 264) = 2.98, p = .08, η² = .01. There was no main effect of treatability information on dangerousness, F(1, 264) = 0.90, p = .34, η² = .003. There was no significant interaction effect between attribution and treatability information for perceived dangerousness, F(1, 264) = 1.93, p = .17, η² = .007 (see Table 2).
Prognostic Pessimism

A main effect was found for attribution on prognostic pessimism, $F(1, 264) = 21.01, p < .01, \eta^2 = .07$. Participants in the genetic condition were more likely to believe that John’s condition was permanent than participants in the environmental condition. The main effect of treatability information on prognostic pessimism was not significant, $F(1, 264) = 3.60, p = .06, \eta^2 = .01$. The main effect of attribution was qualified by a significant interaction between attribution and treatability information for prognostic pessimism, $F(1, 264) = 4.11, p = .04$, $\eta^2 = .01$. Analyses of simple effects revealed that the presence of treatability information negated the effect of genetic attributions increasing prognostic pessimism, resulting in no significant differences between the environmental and genetic conditions when treatability information was present (see Figure 1). In other words, the prognostic pessimism scores were not affected by the type of attribution if the information was paired with treatability information; however, when no treatability information was given, prognostic pessimism scores were significantly higher (indicating greater pessimism about recovery), $F(1, 132) = 24.25, p < .001, \eta^2 = .15$, when genetic attributions were given.

Discussion

In the current study, we investigated the impact of attributions of schizophrenia’s etiology (genetic versus environment) and treatability information on three important stigma variables: desire for social distance, perceived dangerousness, and prognostic pessimism. Hypothesis 1 stated that there would be a main effect of attribution on all dependent variables. This was partially supported by a significant effect of attribution on prognostic pessimism. Hypothesis 2 stated that there would be no significant effect of treatability on the dependent variables. This hypothesis was only partially supported, as there was a significant effect of treatability on social distance. Hypothesis 3 stated that there would be an interaction between attribution and treatability on the dependent variables. This hypothesis was partially supported by a significant interaction between attribution and treatability on prognostic pessimism. Providing treatability information removed the negative consequence of increasing prognostic pessimism that stemmed from a genetic attribution of schizophrenia.

The analyses of the main effect of attribution type were generally consistent with the literature demonstrating that genetic attributions of mental illness can have adverse effects on stigma. Consistent with the Mixed Blessings Model (Haslam & Kvaale’s, 2015), when given genetic explanations, participants were more likely to view John’s disorder

TABLE 1

| TABLE 1 | Descriptive Statistics of Demographic Characteristics of Participants |
|---------|-------------------------------------------------|
| Age     | M      | SD    |
| 39.15   | 12.38  |
| Gender identity | n | % |
| Female   | 139 | 51.9 |
| Male     | 128 | 47.8 |
| Agender / Gender nonconforming / Androgynous | 1 | 0.4 |
| Ethnicity | n | % |
| African | 15 | 5.6 |
| European American | 230 | 85.8 |
| East Asian | 12 | 4.5 |
| Hispanic / Latino | 13 | 4.9 |
| Middle Eastern | 2 | 0.7 |
| Native American / Alaskan Native | 6 | 2.2 |
| Pacific Islander | 1 | 0.4 |
| South Asian | 3 | 1.1 |
| Other    | 1    | 0.4  |
| Marital status | | |
| Single   | 102  | 38.1 |
| Cohabiting | 32 | 11.9 |
| Married  | 133  | 49.6 |
| Separated | 1  | 0.4  |
| Household income | | |
| Less than $5,000 | 5 | 1.9 |
| $5,000–$11,999 | 13 | 4.9 |
| $12,000–$15,999 | 9 | 3.4 |
| $16,000–$24,999 | 22 | 8.2 |
| $25,000–$34,999 | 33 | 12.3 |
| $35,000–$49,999 | 44 | 16.4 |
| $50,000–$74,999 | 66 | 24.6 |
| $75,000–$99,999 | 37 | 13.8 |
| $100,000 and greater | 37 | 13.8 |
| Missing  | 2    | 0.7  |
| Socioeconomic class | | |
| Working class | 112 | 41.8 |
| Middle class | 152 | 56.7 |
| Upper class  | 4    | 1.5   |

Note. For ethnicity above, participants could report more than one category. Table continued on the next page.
as permanent. However, we did not replicate the results of prior studies showing that genetic explanations increase desire for social distance (Angermeyer et al., 2015; Lebowitz & Ahn, 2012; Schomerus et al., 2014). With respect to the main effect of treatability information, unlike Lebowitz and Ahn (2012), the results indicated a significant effect on social distance. Although Lebowitz and Ahn (2012) did not find this relationship, other more recent research by McGinty et al. (2015) suggested that people do view those with mental illnesses more positively when their symptoms are successfully treated.

With respect to the interaction between social distance and treatability information, results were inconsistent with Lebowitz and Ahn (2012), as there was not a significant interaction for social distance. However, there was an interaction between attribution and treatability for prognostic pessimism such that the presence of treatability information cancelled out the increase in prognostic pessimism seen in the genetic/no treatability condition. Notably, Lebowitz and Ahn (2012) did not explicitly measure prognostic pessimism, but postulated that it would be impacted by the interaction between treatability information and causal attribution.

There are several reasons why some of these results might not have been as expected. With regard to the lack of significant effects on perceived dangerousness, it could be that people’s judgments of danger may be more durable than other social perceptions, making it more difficult to sway their perceptions of dangerousness with manipulations of causal attribution. Additionally, the measures of prognostic pessimism and perceived dangerousness in this study were limited to a single item each, increasing risk of measurement error. More robust measures should be developed for these constructs to strengthen research conducted on them in the future.

Note: Desire for social distance and perceived dangerousness ranged from 1 to 4 and prognostic pessimism ranged from 1 to 5, with lower scores indicating less stigmatizing attitudes (dangerousness reverse scored).
Hold true for real-world interactions, instead of it would also be interesting to see if these findings there is consistency and/or contrast the differences. with a variety of mental health conditions to see if research should seek to replicate studies like this findings to mental illnesses as a whole. Future severity, it prevents the generalization of these this condition was specifically selected due to its which is heavily stigmatized (Dickerson et al., 2002). Although the exact genetic mechanisms that contribute to schizophrenia are not thoroughly understood, large amounts of research are being focused on this topic, which will lead to further understanding of this illness in terms of genetics (U.S. National Library of Medicine, 2018). As genetic explanations proliferate, it is extremely important to understand how they may negatively impact people living with schizophrenia. Based on these results and the conclusions of Lebowitz and Ahn (2012), the emphasis on treatability and subsequent reduction of prognostic pessimism can help combat stigma. In other words, when doctors, mental health professionals, family members, etc. provide genetic explanations for schizophrenia, they should also include information about how the condition can be treated to prevent the genetic attribution from increasing prognostic pessimism. When surrounded by people with more optimistic outlooks on their condition, people with schizophrenia may feel more supported and motivated to adhere to treatment plans to keep their symptoms under control.

Limitations and Strengths
This study had several limitations. First, we explored only one mental illness: schizophrenia. Although this condition was specifically selected due to its severity, it prevents the generalization of these findings to mental illnesses as a whole. Future research should seek to replicate studies like this with a variety of mental health conditions to see if there is consistency and/or contrast the differences. It would also be interesting to see if these findings hold true for real-world interactions, instead of simply people’s attitudes toward a hypothetical vignette. For instance, the attitudes of people in the mental health field working with patients who have real-life conditions like schizophrenia could be measured to see if these findings generalize to real-life settings that could affect patient outcomes. Further, although we extended the investigation of Lebowitz and Ahn (2012) by measuring dangerousness and prognostic pessimism, future research should attempt to include additional dependent variables related to mental health stigma. Possible variables might include help-seeking stigma, strength of social support networks, other facets of dangerousness (such as perceived likelihood of harm to self), and for studies of individuals with serious mental health issues, self-stigma. Future research should also examine how manipulations involving different types of treatability information (e.g., medications versus therapies) impact the results. Finally, although we utilized the vignette manipulations of genetic versus environmental to be consistent with past literature, it is important to note that participants might have had varied interpretations of environmental, and future investigations should explore the impact of different environmental explanations (e.g., childhood trauma, social relationships).

This study was also somewhat limited by its sample. Despite the broad range of ages and nearly even numbers of men and women, the sample was still predominantly White with higher educational attainment than the general population. Future researchers should strive to find more ethnically and socioeconomically diverse samples. Nearly half (41.8%) of the sample also reported proximity to serious mental illness, which might have affected their attitudes toward the target of the vignette. Although the number of participants with direct proximity to schizophrenia was likely low, this is something that future researchers should be aware of when conducting similar studies because the pattern of results could vary based on familiarity with mental health stigma (Corrigan & Nieweglowski, 2019). This could be especially important when considering possible samples for future studies because convenience samples of psychology students may have a different level of familiarity with mental illnesses than laypersons.

Additionally, in the current investigation, the statistical analyses did not address more complex models for how social distance, dangerousness, and prognostic pessimism relate to each other. Future researchers could attempt to make the model of
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attribution and treatability information on mental health stigma clearer. Lebowitz and Ahn (2012) suggested that attribution affects whether or not a condition is perceived as controllable, and by extension affects beliefs about blame, establishes its perceived permanence, and potentially produces prognostic pessimism. They believed that the prognostic pessimism from biogenetic attributions affects other attitudes such as the desire for social distance, and that the presence of treatability information combats these negative attitudes by challenging prognostic pessimism. The results from the current study do not completely support this explanation. A main effect of treatability information on social distance was present, suggesting that treatability information can directly affect at least some stigmatizing attitudes regardless of attribution, but more research needs to be conducted to parse out the intricacies of how attribution and treatability information affect different stigmatizing attitudes, and how those stigmatizing attitudes may intertwine with each other.

Despite these limitations, the current study also had many strengths. It was a well-controlled experiment that expanded on the current state of the literature. Schizophrenia was selected to improve comparison to Lebowitz and Ahn (2012). The vignette was consistent with common symptoms of schizophrenia as described by the DSM-V. This study also improved upon previous studies by explicitly measuring prognostic pessimism and perceived dangerousness. Additionally, these results were strengthened by verified manipulation checks and a sample more diverse than the university samples typically used for this type of research.

Conclusion

The present study extended the current literature by adding clarity as to whether providing information about ways to treat schizophrenia alongside genetic explanations for the illness can reduce stigmatizing attitudes. The primary results of this study are that condition, genetic or environmental, significantly affects prognostic pessimism, with genetic attributions resulting in high prognostic pessimism. This was qualified by an interaction effect between attribution and treatability information such that the presence of treatability information combatted the increase in prognostic pessimism associated with a genetic attribution for schizophrenia. Future researchers should extend this literature to other mental health conditions using varied samples.
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Link, B. G., & Phelan, J. C. (2001). Conceptualizing stigma. Annual Review of Sociology, 27(1), 363–385. https://doi.org/10.1146/annurev.soc.27.1.363

Link, B. G., Phelan, J. C., Bresnahan, M., Stueve, A., & Pescosolido, B. A. (1999). Public conceptions of mental illness, Labels, causes, dangerousness, and social distance. American Journal of Public Health, 89(9), 1326–1333. https://doi.org/10.2105/ajph.89.9.1328

Mason, W., & Suri, S. (2012). Conducting behavioral research on Amazon's Mechanical Turk. Behavior Research Methods, 44(1), 1–23. https://doi.org/10.3758/s13428-012-0124-6

McGinty, E. E., Goldman, H. H., Pescosolido, B., & Barry, C. L. (2015). Portraying mental illness and drug addiction as treatable health conditions: Effects of a randomized experiment on stigma and discrimination. Social Science & Medicine, 126, 73–85. https://doi.org/10.1016/j.socscimed.2014.12.010

National Institute of Mental Health. (February, 2016). Schizophrenia. Retrieved from https://www.nimh.nih.gov/health/topics/schizophrenia/index.shtml

Pescosolido, B. A., Martin, J. K., Long, J. S., Medina, T. R., Phelan, J. C., & Link, B. G. (2010). A disease like any other? A decade of change in public reactions to schizophrenia, depression, and alcohol dependence. American Journal of Psychiatry, 167(11), 1231–1330. https://dx.doi.org/10.1176/appi.ajp.2010.09121743

Schomerus, G., Matschinger, H., & Angermeyer, M. C. (2014). Causal beliefs of the public and social acceptance of persons with mental illness: A comparative analysis of schizophrenia, depression and alcohol dependence. Psychological Medicine, 44(2), 303–314. https://doi.org/10.1017/S003329171300072X

U.S. National Library of Medicine. (April 11, 2018). Schizophrenia. Retrieved from https://ghr.nlm.nih.gov/condition/schizophrenia#inheritance

Vos, T., Abajobir, A. A., Abate, K. H., Abbafati, C., Abbasi, K. M., Abd-Allah, F., Abdulkader, R. S., Abdulle, A. M., Abebo, T. A., Abera, S. F., Aboyans, V., Abu-Raddad, L. I., Ackerman, I. N., Adamu, A. A., Adetokunboh, Afarideh, M., Afshin, A., Agarwal, S. K., Aggarwal, R., … Murray, C. J. L. (2017). Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990–2016: A systematic analysis for the Global Burden of Disease Study 2016. Lancet (London, England), 390(10100), 1211–1259. https://doi.org/10.1016/S0140-6736(17)32154-2

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