Are mental illnesses stigmatized for the same reasons? Identifying the stigma-related beliefs underlying common mental illnesses

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ORIGINAL ARTICLE

Are mental illnesses stigmatized for the same reasons? Identifying the stigma-related beliefs underlying common mental illnesses

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Abstract

Background: Although mental health stigmatization has myriad pernicious consequences, it remains unknown whether mental disorders are stigmatized for the same reasons.
Aims: This study identified the stigma-related beliefs that were associated with several common mental illnesses (Study 1), and the extent to which those beliefs predicted stigmatization (Study 2).
Methods: In Study 1, we used multidimensional scaling to identify the stigma-related beliefs attributed to nine common mental disorders (e.g. depression, schizophrenia). Study 2 explored whether beliefs commonly associated with depression predicted its stigmatization.
Results: In Study 1, we found that the nine mental illnesses differed from each other on two dimensions: social desirability and controllability. In Study 2, we found that regardless of participants' own depression status, their perceptions that depression is controllable predicted depression-related stigmatization.
Conclusions: Our results suggest that stigmatization toward different mental illnesses stem from combinations of different stigmatized beliefs.

Introduction

It has been widely shown that mental illness is highly stigmatized (Corrigan & Watson, 2002), and that stigma is a major barrier preventing mentally ill individuals from seeking mental health treatment (Corrigan, 2004; Rüsch et al., 2011). However, the extant research has largely assumed that the reasons underlying stigma are the same across disorders (e.g. depression, anxiety, schizophrenia; Angermeyer et al., 2004; Crisp et al., 2000; Feldman & Crandall, 2007; Link et al., 1997; Quinn, 2006). An open question in this literature is therefore whether distinct mental disorders (e.g. depression, schizophrenia) are stigmatized for the same (e.g. they are all perceived to be controllable) or different reasons (e.g. depression is stigmatized because it is perceived to be controllable, but schizophrenia is stigmatized because it is perceived to be threatening). This is a critical question to examine because interventions designed to deemphasize the reasons underlying stigmatization (stigma-related beliefs) that are not relevant to the disorder may be less effective than if they target the disorder-relevant condition. Thus, our first goal was to determine whether perceivers associate the same or different stigma-related beliefs with common mental disorders (e.g. depression, schizophrenia; Study 1). Our second goal was to verify that the stigma-related beliefs associated

with specific mental disorders predict stigmatization toward that disorder (Study 2).

Mental health stigma has primarily been studied from two vantage points: (1) how individuals with mental illness internalize stigma (e.g. self-stigma; Livingston & Boyd, 2010); and (2) societal perceptions of mental illness (e.g. Corrigan et al., 2012). In this study, we focus on the latter. This is a theoretically important question because perceivers' public stigma about mental illness positively predicts the extent to which they internalize stigma over time (Vogel et al., 2013). Extensive social psychological research has identified the primary beliefs underlying stigmatization as including the condition's perceived: social desirability, threat, visibility, commonness, perceived reversibility (changeable/unchangeable), social status, seriousness, morality, pitiability, as well as the stigmatized individual's perceived responsibility for acquiring the condition and stigmatizing behaviors (active/passive) (Deaux et al., 1995; Frable, 1993; Jones et al. 1984; Towler & Schneider, 2005). Traditional social psychological models of stigmatization suggest that stigma-related beliefs influence perceivers' prejudice toward stigmatized individuals (Allport, 1954; Fiske et al., 2007). For instance, perceivers who endorse negative stigma-related beliefs about Black individuals are more likely to apply those beliefs to the Black individuals they encounter in everyday life, resulting in higher prejudice (e.g. Devine, 1989).

Although stigma-related beliefs differ across most stigmatized conditions (e.g. Fiske et al., 2002; Hummert et al.,

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1994), it has been largely unexplored whether stigma-related beliefs differ among mental illnesses (e.g. depression, anxiety, schizophrenia). Because prior work suggests that both mentally ill (e.g. depressed) and non-mentally ill individuals do not differ in their levels of mental health stigma (Teachman et al., 2006), it is likely that stigmas about mental illness stem from negative societal beliefs. Identifying those beliefs and determining whether they differ across common mental illnesses is thus an important question. Ultimately, this research may inform efforts to use psychoeducation as a tool to reduce the extent to which the public stigmatizes various mental health disorders (e.g. Corrigan et al., 2012).

An additional consideration in this study was to examine whether mentally ill and non-mentally ill individuals differed in their stigmatization toward different mental disorders. Because prior work has shown that individuals who have interacted with someone who suffers from a mental illness have lower stigma (Corrigan et al., 2015), both Study 1 and Study 2 included measures of personal experience with mental illness.

Study 1

Study 1 was an exploratory study, the goal of which was to determine whether perceivers (regardless of their own familiarity with mental health treatment) dissociated between distinct mental disorders and, if so, what criteria they used to discriminate between them. Study 1 used weighted multidimensional scaling (WMDS) to identify the similarity and dissimilarity between mental disorders. WMDS is an analytic technique that creates a "similarity map" which identifies the dimensions that perceivers use to psychologically discriminate between stimuli (e.g. Viken et al., 2002).

Participants were undergraduates at a large Midwestern university. An estimated 75% of lifetime mental disorders have their first onset by age 22 (Kessler & Walters, 1998), and college students are disproportionately susceptible to mental disorders (Cooke et al., 2006; Eisenberg et al., 2011; Kessler et al., 2005). Thus, there are several benefits to examining this population: 1) the prevalence of mental illness among college students increases the likelihood that participants would be personally familiar with depression (either having sought treatment themselves, or knowing someone who sought treatment); and 2) understanding why college students stigmatize mental illnesses will ultimately inform how researchers might reduce mental health stigma among this population.

Method

Study 1 included three different tasks (each conducted with different groups of participants): the pre-test (in which we identified the mental illness stimuli to use for the main task), the similarity judgments and the stigma-related beliefs ratings. The similarity judgments task and the stigma-related beliefs ratings constituted the main task, with the ratings designed to inform the results from the similarity judgments task. Each of these tasks is described in detail below.

Pre-test

Selection of the mental illnesses

Undergraduate research assistants identified 20 different mental illnesses (available in Appendix 1) that, combined, represented the different diagnostic groups in Section II of the DSM-5 (American Psychiatric Association, 2013). Illnesses were selected based on whether they would be recognizable to undergraduates as a mental illness. We then recruited 110 undergraduates at Indiana University ($M_{age} = 19.87$ years, SD = 1.06 years; 88 female) for the pre-test. Participants were all native English speakers, all White and the majority indicated via self-report that they were not currently taking antidepressants ($N = 98$), had no history of emotional problems ($N = 92$), had never been diagnosed with a learning disorder ($N = 107$), and did not have a history of alcohol or drug abuse ($N = 108$). The participants in this pre-test were different from those who completed the main task and received partial course credit in exchange for participating. The pre-test was approved by the Indiana Institutional Review Board.

Participants saw the 20 mental illnesses intermixed with an additional 20 non-mental health stigmatized conditions. The non-mental health conditions included physical illnesses (e.g. cancer, diabetes), racial identities (e.g. Black, Asian), and other stigmatized groups (e.g. homeless, obesity). Participants were instructed to select any of the items from the list of 40 that most people would consider to be a mental illness. There was no minimum or maximum number of conditions they could identify as a mental illness. Based on participants' responses, we selected items that were identified as being a mental illness by the majority of participants (overall 80% of participants identified the items as mental illnesses), and that represented a range of different types of mental illnesses (from the DSM-5). See Appendix 1 for the nine disorders that were selected.

Main task

Similarity judgments

184 ($M_{age} = 19.82$ years, SD = 1.77 years; 100 female) undergraduates at Indiana University participated in a similarity judgment task in exchange for partial course credit. Prior work has shown that similarity matrices are highly stable – which greatly improves their validity and reliability – with more than 100 participants (see Fisher et al., 2002). Participants were all native English speakers (85.9% White, 7.6% Black, 2.7% Asian, 2.2% more than one race, 1.6% unknown/not reported), and the majority indicated via self-report that they were not currently taking antidepressants ($N = 176$), had no history of emotional problems ($N = 174$), had never been diagnosed with a learning disorder ($N = 163$), and did not have a history of alcohol or drug abuse ($N = 177$). The study was approved by the Institutional Review Board at Indiana University.

In the task, participants saw two conditions paired together (e.g. Bipolar + Anxiety) and were instructed to indicate how similar they thought the conditions were to one another (1 = not at all similar, 9 = very similar). The order in which

Table 1. Factor analysis results from attribute ratings. Items in red (pity and responsibility) did not meet the criteria for either factor (minimum loading of .6), and are therefore listed separately.

	Factor 1 Social undesirability	Factor 2 Uncontrollability
Active/passive	0.77	0.13
High status/low status	0.77	0.51
Socially desirable/undesirable	0.95	0.08
Moral/immoral	0.81	−0.07
Harmless/threat	0.79	0.34
Pity/no pity	−0.48	0.37
Changeable/unchangeable	0.25	0.93
Not responsible/responsible	0.27	−0.57
Common/uncommon	0.61	0.78
Invisible/visible	−0.19	0.89

the pairings were presented was counterbalanced across participants. Because our main interest in the study was to identify the dimensions by which perceivers view mental illnesses in everyday life, we also included 11 other stigmatized conditions (e.g. amputee, diabetes, homeless and obesity) in the task. In everyday life, individuals typically evaluate unique mental illnesses in the context of myriad different conditions, not necessarily relative to other mental conditions. Thus, including non-mental illness conditions reduced potential task demands. That is, asking participants to only evaluate the similarity between mental illnesses could inadvertently force them to look for differences. Including non-mental illness stigmatized conditions therefore introduced variability in participants' ratings and allowed for more sensitivity in detecting whether differences ''naturally'' emerged among the mental illnesses. We selected conditions that have been commonly identified in prior work as being stigmatized (e.g. Deaux et al., 1995; Fiske et al., 2002; Frable, 1993; Goffman, 1963; Schabert et al., 2013; Towler & Schneider, 2005). All conditions were paired with each other as described above, resulting in a total of 190 trials. However, only the trials comparing the nine mental illnesses to one another were analyzed.

Measuring participants' mental health treatment experience. At the conclusion of the similarity judgment task, participants were asked: *Have you ever sought mental health treatment?* and *Do you know anyone who suffers from a mental illness (e.g. depression) [if yes, how well: 1 = not at all; 7 = very well].* These items were included because prior work has shown that individuals who have interacted with someone who suffers from a mental illness have lower stigma (Corrigan et al., 2015).

Stigma-related belief ratings

A different group of 39 ($M_{age} = 19.13$ years, SD $= 0.86$ years; 29 female) undergraduates at Indiana University defined the dimensions resulting from the WMDS task. Participants were all native English speakers (66.7% White, 10.2% Black, 15.4% Asian, 5.1% more than one race, 2.5% unknown), none were taking antidepressants, and the majority ($N = 37$) indicated via self-report that they had no history of emotional problems, had never been diagnosed with a learning disorder ($N = 37$), and did not have a history of alcohol or drug abuse

($N = 39$). Sample size was informed by related prior work on social stigma (e.g. Deaux et al., 1995).

Participants evaluated each of the nine mental illnesses used in the similarity task described above on 11 widely-studied stigma-related beliefs, including controllability, social desirability, threat and seriousness (Table 1). Participants rated all of the stigma-related beliefs for a specific mental illness (e.g. schizophrenia) before repeating the ratings for a different mental illness (e.g. depression). However, the order in which participants rated each mental illness was pseudor-andomized (i.e. some participants rated each stigma-related belief for depression before rating them for schizophrenia, or vice versa).

Results

Multidimensional scaling solution for similarity ratings

Data from two participants on the similarity ratings task were excluded because they did not comply with task instructions. The data from the nine mental illnesses were reverse scored to create a complete, symmetrical dissimilarities matrix for each participant (with higher numbers indicating more dissimilarity). Data were analyzed using the ALSCAL (alternating least-squares scaling) program in SPSS version 22(SPSS Inc., Chicago, IL). An INDSCAL model was specified. INDSCAL (also known as WMDS) assumes that participants have the same relative position of the stimuli within the solution, but differences in the distances they perceive between stimuli. This approach thereby identifies information about individual differences in the absolute distances between stimuli.

The analysis yielded a map of the nine mental illnesses in two, three, four and five-dimensional space. The stress (and R^2) values for the each solution were 0.31 (0.61), 0.20 (0.76), 0.15 (0.85) and 0.12 (0.90), respectively. Visualization of the three-dimensional solution revealed that the mental illnesses in our task primarily diverged on the first two dimensions, and did not systematically differ on the third dimension. We therefore focused on the two-dimensional solution based on the greater interpretability of those dimensions (e.g. Kruskal & Wish, 1978; Young, 1987) (Figure 1).

Factor analysis on stigma-related belief ratings

We used the stigma-related belief ratings to identify the beliefs underlying the two dimensions identified in the WMDS analysis. Reliability on 10 of the 11 stigma-related belief ratings was good (Cronbach's $\alpha \geq 0.80$ for all), but was low for seriousness (Cronbach's $\alpha = 0.68$), which suggested that participants' interpretation of this item was inconsistent (Tavakol & Dennick, 2011). Seriousness was thus excluded. We conducted a principal components analysis on the remaining 10 items with varimax rotation, limiting the solution to two factors (to parallel the WMDS results). The factors were extracted from the rotated components matrix. Items were retained if they had a factor loading value of .40 or above on the primary factor and less than .40 on all other factors (e.g. Fabrigar et al., 1999). The two-factor solution accounted for 71.81% of the overall variance on the model. The first factor accounted for 47.63% of the total variance and loaded onto the perceived social undesirability
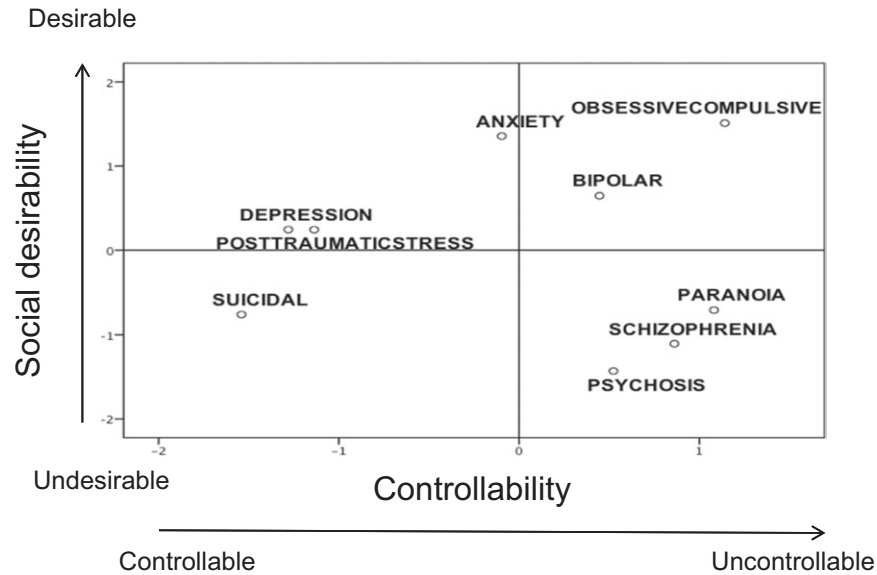
Figure 1. Two-dimensional multidimensional scaling solution for nine common mental disorders varying along the social desirability and controllability domains.

Table 2. Multiple regression solution predicting dimension 1 and dimension 2 weights, respectively, in the MDS analysis from the factor scores extracted from the attribute ratings.

Variable	Dimension 1 β	Dimension 2 β	R	R^2
Social undesirability	−0.221	−0.907[b]	0.797	0.636
Uncontrollability	0.769[a]	−0.148	0.919	0.844

[a]$p < 0.05$,
[b]$p = 0.01$.

of the disorder (see Towler & Schneider, 2005, for a similar interpretation). It included the stigma-related beliefs active/passive, social status, social desirability, pity, morality and threat. The second factor accounted for an additional 24.18% of the overall variance of the model, and loaded onto the perceived uncontrollability of the disorders. It included the stigma-related beliefs changeability, responsibility, visibility and commonness (Table 1).

Defining dimensions of multidimensional scaling solution with stigma-related belief rating factors

We then conducted two separate multiple regressions in which we used the factor scores extracted from the factor analysis of the stigma-related belief ratings above to determine which, if any, of the factors contributed to the interpretation of each dimension. Perceived uncontrollability (but not social undesirability) accounted for 63.6% of the variance in the dimension 1 coordinates, $F(2, 8) = 5.233$, $p = 0.048$. However, perceived social undesirability (but not uncontrollability) predicted the dimension 2 coordinates, $F(2, 8) = 16.24$, $p = 0.004$, accounting for 84.4% of the overall variance (see Table 2).

Flattened weights

We extracted the flattened subject weights from the WMDS solution to examine whether participants' familiarity with depression affected how they used the dimensions of

uncontrollability and social undesirability, respectively, in evaluating the nine mental disorders. Flattened subject weights are calculated by normalizing weights within and then across participants (Young & Lewyckyj, 1996). Here, positive values indicate greater attention to the uncontrollability dimension, whereas negative values indicate greater attention to the social undesirability dimension.

Of the total, 135 participants responded to the self-report measures regarding personal familiarity with mental health treatment (whether they had ever sought mental health treatment, and whether they knew someone who suffers from a mental illness). Of those, 15 (11.11%) indicated that they had personally sought mental health treatment, 38 (28.15%) of participants indicated that they did not know anyone who suffered from a mental illness, 14 (10.37%) indicated that they knew someone who suffered from a mental illness, although minimally (4 or lower) and 82 (60.74%) of the participants indicated that they knew someone very well (5 or higher) who suffered from a mental illness. We entered the flattened weights into a one-way ANOVA with personal familiarity (none, minimal, very well) as the independent variable. Results revealed no effect of familiarity ($F < 1$, $p = 0.59$).

Discussion

The results from Study 1 demonstrated that commonly identifiable mental illnesses are dissociated from one another along two key dimensions: their relative social desirability

and their relative controllability. Within the nine common mental illnesses measured in this study, schizophrenia, paranoia and psychosis were dissociated from bipolar, anxiety and obsessive compulsive on the first dimension, suggesting that the former were more socially undesirable than the latter. However, schizophrenia (as well as paranoia and psychosis) was dissociated from depression (as well as post traumatic stress and suicidal) on the second dimension, suggesting that the latter was perceived to be more controllable than the former. Moreover, participants' self-reported personal experience with mental health treatment did not affect our findings.

It is important to note that prior research has shown that the two primary dimensions dissociating stigmatized conditions include their perceived threat and controllability (e.g. Deaux et al., 1995; Frable, 1993). However, those studies measured a smaller range of stigma-related beliefs (e.g., threat, commonness, visibility; Deaux et al., 1995; Frable, 1993, Study 1; see also Feldman & Crandall, 2007) as compared to this study. Moreover, our interpretation of the first dimension as being related to social desirability is consistent with work that had used similar stigma-related beliefs (e.g. Towler & Schneider, 2005). In this work, the authors also found that social desirability, status, morality and threat contributed to the first dimension of social stigma, and labeled the dimension as social undesirability with ''dangerousness overtones'' (Towler & Schneider, 2005; pg. 6).

With that framing in mind, our findings suggest that the extent to which a mental illness is perceived to be threatening may contribute to its overall social undesirability. Moreover, the extent to which it is perceived to be immoral or low status may also contribute to its overall social undesirability. Consistent with this interpretation, prior work has shown that multiple stigmatized traits are attributed to mentally illness, including threat, unpredictability, incompetence, inferiority and confusion (Crisp et al., 2000; Feldman & Crandall, 2007; Quinn, 2006). In Study 2, we sought to further refine the results from Study 1 and directly connect them to stigmatization.

Study 2

The main goal of Study 2 was to show that specific stigma-related beliefs predicted perceivers' prejudice toward mental illnesses (stigmatization). Simply put, do perceivers' beliefs about the mental illness (e.g. whether it is controllable or socially undesirable) equally contribute to their prejudice? A secondary goal was to determine whether stigmatization of a specific mental disorder differed if perceivers had that disorder. In order to accomplish these goals, it was necessary to focus on one mental disorder. We chose to focus on depression for several reasons. First, it is the most common mental illness among college students (American College Health Association, 2009). Second, the WMDS results from Study 1 demonstrated that depression was dissociated from other mental disorders (e.g. schizophrenia, bipolar) on the dimension of controllability. Thus, we hypothesized that stigma-related beliefs related to depression's controllability, but not its social desirability, would predict perceivers' stigmatization of depression. Finally, because there are well-validated measures of depression, we could identify perceivers' depressive symptoms using a subjective measure and

thereby determine whether perceivers' current mental health status affected their stigmatization of depression. We hypothesized that perceivers' mental health status would not affect their stigmatization, which would replicate prior work (e.g. Teachman et al., 2006).

We measured perceivers' stigma-related beliefs of individuals with depression using a reverse correlation paradigm (Dotsch et al., 2008; Dotsch & Todorov, 2012). Of interest is whether participants' perceptions that depression is a controllable condition (measured through reverse correlations) predicted their stigmatization of depression.

Methods

Participants

Of the total, 83 undergraduates ($M_{age} = 18.96$ years, SD = 1.01 years; 55 female) from Indiana University who were all native English speakers (86.7% White, 2.4% Black, 9.6% Asian, 1.2% more than one race) were recruited for Study 2. The majority of participants indicated via self-report that they were not currently taking antidepressants ($N = 76$), had no history of emotional problems ($N = 71$), had never been diagnosed with a learning disorder ($N = 79$), and did not have a history of alcohol or drug abuse ($N = 80$). Sample size was determined with G*Power (Faul et al., 2007) using a medium effect size $f = 0.20$, $\alpha = 0.05$, for 95% power. The study was approved by the Institutional Review Board at Indiana University.

Reverse correlation task

Upon arrival to the laboratory, participants completed a face judgment task using a reverse correlation paradigm (Dotsch et al., 2008; Dotsch & Todorov, 2012). The reverse correlation task is a data-driven task that is designed to model participants' mental representations of a specific belief related to a social group (e.g. depressed individuals) in an unconstrained way. This data-driven technique is advantageous because researchers place no restrictions on which features might be diagnostic of perceivers' beliefs.

On each trial, participants were presented with two faces side-by-side. These faces were the same base-face, but each had its own randomly generated visual noise mask placed over it that randomly varied its apparent features. Over 100 trials, participants were asked to select one face from each pair that looked most like someone suffering from depression. They also completed an additional block (also of 100 trials each) in which they identified the individual who looked to be most like someone who was healthy (which served as the control condition). The base faces for the depression and healthy conditions were two unique young male faces, and were each grey-scaled. The faces were counterbalanced across diagnosis conditions, and the order in which participants completed the blocks was pseudorandomized across participants.

Following the procedure of previous research (Dotsch & Todorov, 2012), for each participant, we averaged the faces selected across all trials for each block into a grand-average depressed face, and a grand average healthy face. This resulted in a composite (averaged) face for each participant reflecting his or her mental representation of depression and his or her mental representation of healthy.

Table 3. Summary of regression predicting willingness to recommend mental health treatment. Betas reflect difference scores (depression – healthy).

Step	Variable	β	t	R	R^2
				0.180	0.032
Step 1	PHQ-9	0.180	1.591		
Step 2				0.365	0.133
	PHQ-9	0.167	1.541		
	Social desirability	−0.487	−1.904[a]		
	Controllability	0.682	2.668[b]		

[a]0.061,
[b]$p < 0.01$.

Survey measures. Upon completion of the reverse correlation task described above, participants completed the 9-item Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001) to measure their depressive symptoms, and the 12-item Perceived Devaluation and Discrimination Scale (PDDS; Link, 1987), which is a widely-used measure of perceivers' awareness of stigma toward mental illness. The PHQ-9 is one of the best-validated depression measures used in over 1000 research studies (Kroenke et al., 2010), and provided a subjective measure of participants' current depressive symptoms.

Five participants (4 female) did not complete the PHQ-9, and their data were therefore excluded from the analyses. We modified the PDDS (Link, 1987) from its original versions to refer specifically to depression instead of mental illness. Pretesting with 2549 (1530 female) undergraduates at Indiana University (all of whom were born in the US.) showed good interitem reliability on the revised scale (Cronbach's $\alpha = 0.85$).

Face ratings

We had two separate groups of undergraduates at Indiana University evaluate the composite images for the depressed and healthy individuals on two dimensions (one dimension per group): *How socially desirable is this person* [how likely is it that the individual pictured would be accepted by others/be liked/popular]? ($N = 21$; $M_{age} = 19.05$ years, SD = 1.56 years; 16 female; 85.6% White, 9.5% Asian, 4.8% more than one race/unknown) and *How much control does this person have to change his health on his own?* ($N = 25$; $M_{age} = 19.36$ years, SD = 1.93 years; 20 female; 88% White, 4% Asian, 8% Black). Participants were all native English speakers. In both groups, participants' self-reports indicated that the majority of participants were not taking anti-depressants (at least 88% in both groups), had no history of emotional problems (at least 72% in both groups), had never been diagnosed with a learning disorder (at least 85% in both groups), and did not have a history of alcohol or drug abuse (100% in both groups). Interrater reliability for all items was good (all Cronbach's $\alpha > 0.80$).

Results

The composite images of the depressed faces were rated as being less socially desirable ($M = 3.334$, SD = 0.576) than those of healthy faces ($M = 4.020$, SD = 0.718; t (77) = −5.429, $p < 0.001$, 95% CI [−0.435, −0.938]), as well as having less control to change their health ($M = 3.783$, SD = 0.600) as compared to healthy faces ($M = 4.681$, SD = 0.63; t (77) = −7.310, $p < 0.001$, 95% CI [−0.653, −1.142]).

We conducted a hierarchical regression to determine whether participants' mental representations of social desirability and controllability for depression predicted their awareness of stigma toward depression (using their PDDS score), even when controlling for their own current depressive symptoms. To control for individual differences in perceptions of what constitutes social desirability and controllability, we subtracted the ratings for the healthy faces from those for the depressed faces for social desirability and controllability. The first block (their PHQ-9 score) was not significant (F (1, 77) = 2.533, $p = 0.116$), but the second block (controllability, social desirability) was: (F (3, 77) = 3.780, $p = 0.014$), accounting for 13.3% of the overall variance in their PDDS score. Critically, controllability, but not social desirability, drove this effect. See Table 3 for statistics.

General discussion

The results of this study demonstrated that two stigma-related beliefs dissociate commonly identifiable mental illnesses from each other: their perceived social desirability, and their perceived controllability. Depression is dissociated from certain mental disorders (e.g. bipolar, schizophrenia) based on perceptions that it is controllable. In Study 2, we extended these findings by demonstrating that perceiver's mental representations that depression is a controllable disorder (but not their perceptions of its social desirability) predicted their stigmatization toward depression. Finally, participants' own experience with depression (either themselves or close other) did not affect their attributions of controllability, or the impact of controllability on their stigmatization.

Why might depression be perceived to be more controllable than other common mental illnesses? One possibility may be that perceivers view depressive symptoms (e.g. trouble concentrating, anhedonia) as being more behaviorally-based (and therefore more malleable), whereas they view symptoms of schizophrenia (e.g. changes in personality, increased hostility) as being more personality-based (and therefore more fixed). Consistent with this assertion, prior work has shown that young adults who view depression as being relatively controllable (e.g. having psychological versus biological causes) have higher stigmatization (Goldstein & Rosselli, 2003). Future work should further explore this possibility.

At first glance, it may seem surprising that across both studies, participants' beliefs that depression is controllable did not differ as a function of their personal experience with depression (Study 1) or their current depressive symptoms

(Study 2). Indeed, one might expect that perceptions that depression is controllable would be lower amongst individuals who have some experience with the illness. However, two factors should be considered here. First, Study 2 assessed current depressive status through the PHQ-9. There are several limitations to this approach. First, there may have been participants not included in this group who had previously (albeit not recently) experienced depressive symptoms. Although we asked participants if they had ever sought mental health treatment or been diagnosed with an emotional disorder, we did not specifically ask about depression. Second, participants who were experiencing depressive symptoms at the time of the task may not have necessarily identified as being depressed, which may have impacted their sensitivity to stigma (e.g. Pinel, 1999).

Our findings suggest that stigmatization toward different mental illnesses may stem from combinations of different stigmatized beliefs. For instance, schizophrenia differed from other highly identifiable mental illnesses (e.g. obsessive compulsive disorder) based on its social undesirability. However, schizophrenia was seen as being relatively uncontrollable (as compared to depression). These findings suggest that there may be combinations of stigma-related beliefs (e.g. high/low controllability and high/low social desirability) that underlie perceivers' stigmatization of mental illness. This is consistent with parallel models of stigma from the field of social psychology (e.g. Stereotype Content Model; Fiske et al., 2002), which suggests that unique combinations of warmth and competence (e.g. low warmth/low competence, low warmth/high competence) elicit disparate negative affective responses (e.g. disgust, envy) toward stigmatized individuals (for review, see Fiske et al., 2007). Thus, an important direction of future research is to identify the affective responses and differences in behaviors associated with high/low controllability and high/low social desirability to inform potential interventions (e.g. Corrigan et al., 2016) designed to reduce mental health stigmatization. Moreover, it will be important for future research to disentangle whether the stigma-related beliefs associated with distinct mental illnesses affect perceivers' attitude toward the condition itself, or their attitude toward the individual who has the condition (and if so, how). Although prior work on social stigma (e.g. Fiske et al., 2002; Fiske et al., 2007) suggests the latter, these findings should be validated in the context of mental illness stigmas.

There are several important caveats to this study. First, we only used nine highly identifiable mental illnesses, which may have limited the dimensions that emerged from the WMDS analysis in Study 1. For instance, it is possible that the stigma-related beliefs identified in this study may be more nuanced when compared to a larger group of mental illnesses. Indeed, Feldman & Crandall (2007) tested 40 different mental illnesses, and identified a third dimension (rarity) that dissociated mental illnesses from one another. Second, the similarity task in Study 1 included both mental illnesses and non-mental illness social stigmas. Thus, although the WMDS solution reflects how mental illnesses are evaluated relative to each other, it is important to note that perceivers' judgments may have been influenced by the non-mental illness stigma conditions they also evaluated. Given these caveats, these results should therefore be interpreted with caution.

Second, our measure of stigma (Study 2) assessed perceived stigma, not internalized stigma (which measures self-stigmatization). Prior work has shown that perceived stigma does not differ between healthy and diagnosed populations (Teachman et al., 2006). This may be because perceived stigma assesses perceivers' awareness that mental illness is stigmatized, but does not measure the extent to which they internalize those stigmas. Because internalizing mental health stigma positively predicts symptom severity, but negatively predicts treatment adherence (Livingston & Boyd, 2010), future research should determine whether healthy and clinical populations' perceptions that depression is controllable predict their internalized stigma.

Additionally, it is important to note that the current studies were conducted with participants who were primarily White female undergraduates, which limits the overall generalizability of these results. Although women are more than twice as likely to suffer from depression as compared to men (American Psychological Association, 1996), prior work suggests that stigma interacts with attitudes toward treatment differently as a function of perceivers' race (e.g. Brown et al., 2010; Givens et al., 2007) and ethnicity (e.g. Georg Hsu et al., 2008; Rao et al., 2007). Future research should extend these findings to other racial and ethnic groups, as well as other age groups, and incorporate a larger sample of men to examine whether gender differences underlie these effects.

Finally, it should be noted that personal familiarity in Study 1 was operationalized as either knowing someone who suffered from a mental illness, or having sought mental health treatment oneself. Because the data in Study 1 were skewed in favor of the former ($N = 84$), not the latter ($N = 15$), familiarity in this study is best interpreted in the context of participants who have not previously sought mental health treatment. Moreover, in this study, we asked participants if they had sought treatment, but not whether they had been diagnosed with a mental illness. This is an important distinction because participants who indicated that they sought mental health treatment might have sought treatment for reasons unrelated to mental illness, such as navigating general life stressors.

Together, the results of this study demonstrate that various mental illnesses are not stigmatized for the same reasons. Specifically, perceivers discriminate between mental disorders based on the extent to which they perceive them to be socially desirable and/or controllable. This finding may inform efforts to tailor psychoeducation to reduce the extent to which the public stigmatizes various mental health disorders. Moreover, because prior work suggests that both mentally ill (e.g. depressed) and non-mentally ill individuals do not differ in their levels of explicit or implicit mental health stigma (Teachman et al., 2006), characterizing the underlying causes of stigmatization may contribute to future work designed to reduce stigma in order to promote mental health treatment and adherence.

Declaration of interest

No potential conflict of interest was reported by the authors.

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Appendix 1. Labels used in Study 1 pretesting based on common mental illnesses identified in Section II of the DSM-5. *denotes the nine illnesses that were included in the similarity task.

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*Depression
*Schizophrenia
*Paranoia
*Bipolar
*Post traumatic stress
Borderline personality
*Anxiety
*Obsessive compulsive
Psychopathy
Attention deficit hyperactivity
*Psychosis
Anorexia
Phobia
Kleptomania
Alzheimer?s
Autism
*Suicidal
Compulsive gambler
Alcoholic
Drug addict