Work in progress: stigma of mental health conditions and its relationship to conditions' knowledge and resource awareness among engineering students.

Abstract

This work in progress paper considers intergroup contact theory to explore how increased awareness of mental health resources and heightened contact with people living with MHCs among engineering undergraduate students reflect in lower levels of stigma of Mental Health Conditions (MHCs). Large scale interventions have shown the positive effect of campus initiatives and the availability of resources for mental health in reducing stigma among college students. However, research has shown that engineering students tend to have lower proclivity to seek help for their MHCs when needed. Stigma of MHCs is known to negatively influence help seeking attitudes. Reducing stigma through exposure and contact has the potential to enhance help seeking. Through the use of established instruments we collected stigma, contact and awareness measures in a survey (n=1,151) and we explored the relationships between MHCs stigma and (1) Knowledge of MHCs, measured as the number and strength of relationships with people living with MHCs and (2) Awareness of campus resources related to mental health. Through correlation analyzes we found consistently significant negative correlation between stigma and both measures. Analyzed through the lens of contact theory, these results support the view that exposure to knowledge about MH can reduce stigma, which on its own could have the potential to enhance students help-seeking attitudes. We discuss the implications of these results, and future work in this space of inquiry.

Background

Stigma of Mental Health Conditions (MHCs) is known to be a barrier to help seeking attitudes among the general population and among college students [1]. Unfortunately, stigma of MHCs is perpetuated by negative portrayals in media of people with MHCs as dangerous or intellectually limited [2]. These misconceptions hinder the efforts to reduce stigma of MHCs and support continued stigma prevalence in society and in academic spaces [3]. Another challenge to its reduction is the multi-dimensional nature of MHC stigma. Two levels of stigma need to be acknowledged: social stigma (i.e. public stigma), the stigma held by society in general, and self-stigma, the disapproval of the condition by those that have it [1]. It has been shown the two levels are interrelated, with social stigma directly influencing the development of self-stigma, but not the other way [4]. Strategies to reduce social stigma of MHCs have been studied at the college level, including exploring the effectiveness of targeted interventions [5]. Initiatives to reduce stigma of MHCs on college campuses are usually based on interpersonal or intergroup contact, which has been extensively documented to be an effective approach [6].

In engineering, special attention has been paid to students' help-seeking attitudes [7], [8], and studies are now paying attention to how the engineering culture is affecting such attitudes. Some projects have started to study how stigma can be a confounding element in such attitudes at the intersection of engineering culture [7]. Given that many institutions are implementing efforts to advance student wellbeing, including mental health, it would be of valuable to explore the effects

of such efforts, and how they affect different student populations. This study starts to tackle such space of inquiry by exploring the correlation between students' awareness of mental health resources and stigma towards MHCs. In addition, and in alignment with contact theory, we also explore if a higher number of relationships and strength of such relationships (e.g. close or not) correlates to stigma levels of MHCs among engineering students. The two research questions posed for this work-in-progress are as follows:

1. What correlations exist between stigma levels and the number and strength of relationships with people with MHCs among engineering students?
2. What correlations exist between stigma levels and the number and awareness of campus resources related to MHCs among engineering students?

Theoretical framework

Intergroup Contact Theory is derived from Allport's intergroup contact hypothesis [9], which describes how lowering prejudice between different groups is possible, but it requires certain conditions to be successful. His formulation has been critical to understand the dynamics of racial dis/segregation after the 1950's, and has also been useful to explain a multitude of other multi-group dynamics [10]. Pettigrew summarizes four processes that take place through contact that mediate the changes in attitudes between group members: learning about the outgroup, behavior change, generation of affective ties, and intergroup reappraisal [10]. In the context of mental health, extensive evidence exists that intergroup contact, in which those without MHCs get exposure to people and knowledge about MHCs, is effective to reduce stigma. A recent meta-analysis using data from 101 studies in 24 countries found that the effectiveness of intergroup contact interventions was consistent, and it did not depend on having actual educational components, the format of the contact, or the specific mental illness discussed. Yet, the effects they studied were found stronger in non-Western countries and among specific populations such as college students and health professionals [6]. In the context of this study, we are hypothesizing that the simple contact with a person experiencing a MHC will correlate with lower levels of stigma among engineering students in our sample. As informed by the results from [6], we also hypothesize that knowledge about campus resources about mental health will have a similar but smaller effect with stigma.

Methods

This study is conducted in the context of a larger longitudinal multi-institutional mixed methods study exploring the relationship of engineering culture and stigma of mental health conditions in help-seeking attitudes of engineering students and professionals. Such project and other related results have been described to detail in other publications [7]. For this work-in-progress we use the data collected through the first wave of an online survey deployed at two institutions in the continental United States in Fall 2022 and Spring 2023. One institution is in the US Northeast and one in the US Midwest. Both are categorized as Predominantly White Institutions. The totality of the student body at their corresponding engineering colleges were invited (~ 15300)and a total of 1,335 responses were collected for an overall approximate response rate of 8.7%. However, the distribution of the responses was uneven between the institutions due to

timing. US Northeast had 211 responses, and the rest were from US Midwest. We reached participants through a controlled list-serve to which we were granted access, or our invitation was forwarded to such list-serve by university officials. The survey was a specifically framed as a survey in mental health and that could have affected the rate responses. The gender distribution of our sample was close to the gender distribution of the corresponding college of engineering at each institution, and between 20 and 30% which aligns with the national trends in the field. For this work in progress no specific analysis was performed across any demographic variables, therefore we reserve a thorough description of the sample distribution across gender, race, major, etc., for our future work.

Data Collection

Established instruments were used to gauge a variety of constructs related to stigma of MHCs and help-seeking attitudes. Here we describe only those related to the analyses presented in this work-in-progress. ***Stigma*** was gauged through the items proposed by the *College Toolbox Project* (CTP) [5], which has three sub-constructs: *general prejudice* (8 items), *college-specific prejudice* (9 items), and *college-specific social distance* (11 items). A subsection of the last subscale (5 items) was adapted to make it more specific to the engineering context, and to adjust for the possibility of in-person and online spaces for engineering students' interactions.

We also captured students' ***knowledge of MHCs***, by providing students with a list of thirteen mental health conditions that they could gauge in familiarity with respect to the scale "somebody close to me has it" (5) – "an acquaintance has it"(4) – "I have heard of it in school"(3) – "I have heard about it in TV or in social media"(2) – "I have never heard about it" (1).

In addition, ***awareness of campus resources about MHCs*** was gauged asking participants to mark all the resources in their campus that they were aware of. Each institution had between 8 and 9 specific resources, including counseling services, apps for self-help, college-level and institutional-level initiatives, student led initiatives, and different wellness programs.

The survey was administered through Qualtrics, participants were compensated with $10 for their entries. All procedures were approved by the Institutional Review Board at the involved universities. Details of the three areas of the survey collecting the described items are presented in Appendix A.

Data Preparation and Analysis

The variable Knowledge of Mental Illness was created as the total scores provided for each of the thirteen mental health conditions listed in the corresponding question, therefore its values ranged between 13 and 65. We interpreted this as the higher the values the more relationships and the closer such relationships were. The variable awareness of campus resources was a simple count of the number of resources participants marked as knowing of, as such it ranged between zero and ten.

The performance of the stigma sub-scales was evaluated through confirmatory factor analysis to ensure faithful measuring of the constructs of interest; with all of them achieving satisfactory CFI (>0.95), TLI (>0.90), and suitable to modest RMSEA (from 0.3 to 0.8) [11]. The hypothesized relationships were tested through correlation analysis.

Results

Table 1 presents the Pearson correlations between knowledge of mental illness and stigma measures among the full sample under analysis. All correlations were negative and statistically significant, which means that higher knowledge of mental illness correlated with lower stigma levels. In other words, the more and closer the contact with people with MHCs was the lower the stigma among our sample of students.

Table 1. Pearson Correlations between Knowledge of Mental Illness and stigma measures (n=1151)

Scales	0	1	2	3	4	5
0. Knowledge of Mental Illness	1					
1. General Prejudice	-0.26**	1				
2. College-Specific Prejudice	-0.25**	0.51**	1			
3. College-Specific Social Distance	-0.44**	0.52**	0.45**	1		
4a. Engineering-Specific Social Distance (in person)	-0.32**	0.44**	0.48**	0.65**	1	
4b. Engineering-Specific Social Distance (online)	-0.30**	0.39**	0.42**	0.61**	0.86**	1
*+p<0.10, *p<0.05, **p<0.01*						

Table 2 presents the Pearson correlations between awareness of mental health resources on campus and stigma measures, the size of the correlations was all smaller, and one was no significant. The only non-significant correlation was that of engineering specific social distance online, the rest of them demonstrated that to higher awareness of mental health resources, the lower stigma levels among our sample of students.

Table 2. Pearson Correlations between Awareness of MH Resources on Campus and stigma measures (n=1151)

Scales	0	1	2	3	4	5
0. Awareness of MH Resources on Campus	1					
1. General Prejudice	-0.11**	1				
2. College-Specific Prejudice	-0.10**	0.51**	1			
3. College-Specific Social Distance	-0.09**	0.52**	0.45**	1		
4a. Engineering-Specific Social Distance (in person)	-0.07*	0.44**	0.48**	0.65**	1	
4b. Engineering-Specific Social Distance (online)	-0.04	0.39**	0.42**	0.61**	0.86**	1
*+p<0.10, *p<0.05, **p<0.01*						

Discussion and Future Work

Our results confirm the hypothesis posed based in contact theory [12] that higher levels of knowledge of mental illness correlate with lower levels of stigma. Knowledge of mental illness was derived from different levels of exposure to persons with mental illness, supporting the existing body of literature showcasing that contact alone is sufficiently effective in reducing stigma [6]. Awareness of mental health resources on campus did not have the same strength of correlations to stigma, which makes sense under contact theory, as knowledge of these resources do not imply use, which is the ultimate potential execution of contact.

Strategies to reduce social stigma of MHCs have been studied at the college level, including exploring the effectiveness of targeted interventions. Initiatives to reduce stigma of MHCs on college campuses are usually based on interpersonal or intergroup contact, which has been extensively documented to be an effective approach. Given that many institutions are

implementing efforts to advance student wellbeing, including mental health, it would be of valuable to explore the effects of such efforts, and how they affect different student populations. Such exploration will be the next step in our analysis.

Similarly, the multi-institutional nature of this project will allow to explore some causal directions of effects between experiences and resources available about MH into reductions of stigma. The institutions in our sample are of different nature and have a different set of resources for students' management of their mental health. We envision to contribute to the growing evidence on the factors affecting students' wellbeing through tangentially measuring the effects of established programs at the two institutions in our study and consequently inform areas of improvement to better support students.

This analysis based on contact theory will also contribute to larger quantitative analysis under execution through structural equation modeling techniques, in which we will be able to gauge the effect of knowledge of mental illness and awareness of resources as moderating effects in the relationships between stigma and help-seeking attitudes.

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Appendix A - Survey questions analyzed in this study.

Knowledge of MHCs - Please indicate the level of exposure you have had to each of these mental health conditions?
Responses: Somebody close to me has it; An acquaintance has it; I have heard of it in school; I have heard about it in TV or in social media; I have never heard about it

Conditions:

- Depression
- Anxiety
- Substance Abuse
- Attention Deficit Hyperactivity Disorder (ADHD)
- Eating Disorders (e.g. Bulimia, Anorexia)
- Obsessive Compulsive Disorder (OCD)
- Post Traumatic Stress Disorder (PTSD)
- Seasonal Affective Disorder (SAD)
- Bipolar Disorder
- Borderline Personality Disorder
- Psychosis
- Schizophrenia
- Sleeping Disorders
- Others, please describe

General Prejudice (Stigma 1) - Next we would like to get your opinions on individuals with mental illness. Remember there are no right and wrong answers, just what you really think . . .
Responses: Strongly Agree, Somewhat Agree, Somewhat Disagree, Strongly Disagree

- Being around a person with mental illness would make me feel uncomfortable
- Mental illnesses are actually brain diseases
- People who are violent are more likely to have a mental illness
- Medications for mental illness are as effective as medications for physical illness
- I am frightened to be around persons with mental illness
- I don't think mental illness can be controlled
- People with a mental illness are hard to talk to
- Most mental illnesses can be successfully treated
- Receiving treatment for a mental illness is a sign of personal failure
- People with a mental illness are unpredictable
- Mental illnesses are caused by genetic inheritance
- People with mental illness are likely to be dangerous

College-Specific Prejudice (Stigma 2) - Now we would like to get your opinions on individuals at your University with Mental illnesses
Responses: Strongly Agree, Somewhat Agree, Somewhat Disagree, Strongly Disagree

- Students who have a mental illness should keep it secret from others
- it would make me feel nervous to be around a student with a mental illness
- Students who have a mental illness should not be admitted to this University
- Although they may seem alright, it is important to remember that students who have a mental illness may be dangerous
- Students who have a mental illness should be checked regularly to make sure they are taking their medications
- Most students in this university would treat a student with mental illness just as they would anyone else
- Students who have a mental illness are just as likely to succeed at this university as anyone else
- Students should be instructed to avoid other students who show signs of mental illness
- Students should be ashamed to let others know that there is a mental illness in their family
- Students who have a mental illness are hard to talk to
- Students who have a mental illness are unpredictable
- Students who have a mental illness should not be allowed on the University's athletic teams

College Social Dist (Stigma 3) - Next, how willing would you be to do the following...
Responses: Definitely Willing, Probably Willing, Probably Unwilling, Definitely Unwilling

...spend an evening "hanging-out" with a student with a history of mental illness?
...make friends with a student with a history of mental illness?

...have a casual sexual hook up with a student who has a history of mental illness?
...have a serious romantic relationship with a student with a history of mental illness?
...have students who have a history of mental illness living in your dorm?
... have a student with a history of mental illness marry into your family?

Engineering Specific Social Dist InPerson/Online (Stigma 4a/4b) - Next how willing would you be able to do the following engineering tasks in a regular Face to Face setting (columns in the center) and in an online setting (columns on the far right).
Responses: Definitely Willing, Probably Willing, Probably Unwilling, Definitely Unwilling

... have a student with a mental illness in one of your engineering classes
... work closely with a student with a mental illness on an engineering class project
... work closely with a student with a mental illness on an engineering team
... be in an engineering study group with a student with a mental illness
... take a class taught by an engineering professor with a mental illness

Awareness of Campus Resources - Please mark all the resources you are aware of that exist at UB to support your mental health (mark all that apply): 8 options Institution 1, 9 options Institution 2.
E.g.

- Counseling Services
- Student Wellness Offices
- Coaching
- Self-help resources (e.g., apps)
- Student organizations
- Others…