Impact of eating disorder type on general population perceptions of stigma and likelihood of comorbidity

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Abstract

Eating disorders carry a significant risk of mortality, necessitating further research. Previous work has examined how stigma influences treatment seeking in other mental health conditions, creating a potential area for improving disordered eating outcomes. Additionally, prior meta-analyses have discovered high comorbidity of other mental health diagnoses with disordered eating. Some work has attempted to examine the perception of comorbid mental health problems alongside eating disorders, but this construct has not been studied in depth within general populations. To date, no work has simultaneously examined stigmatization and knowledge of common mental health problems with disordered eating in this population. This study sought to examine how stigmatizing attitudes and lay beliefs about comorbidity differ by eating disorder type in a general population. We displayed two vignettes, each depicting a college student with anorexia nervosa (AN) and bulimia nervosa (BN). We hypothesized that BN would be significantly more stigmatized than AN. However, AN was rated as significantly more stigmatized than BN. Participants then completed a self-report measure of stigma and rated the likelihood that each student had four mental health diagnoses. We hypothesized that perceived comorbidities would align with actual prevalence. This was true for anxiety and obsessive-compulsive disorder (OCD). Participants considered the AN student to be significantly more likely to have OCD, while they considered the BN student to be significantly more likely to have depression. No significant differences were found for anxiety or attention-deficit hyperactivity disorder (ADHD). This work demonstrated that significant between-disorder differences exist both in stigmatization and lay beliefs about comorbid diagnoses, providing an important initial insight into general population attitudes. Future studies examining how lay beliefs about disordered eating develop and interact with stigma are warranted.

Keywords: Disordered eating, anorexia nervosa, bulimia nervosa, stigma, perception, comorbidity, lay beliefs

1 INTRODUCTION

Eating disorders have consistently been associated with a significantly high rate of mortality, risk of long-term health issues, and impaired quality of life[1]. Despite a wealth of research, chronic treatment resistance has remained high[2]. Research of potential underlying mechanisms of resistance to seeking and completing treatment may be critical to future applied work addressing the treatment of eating disorders with greater long-term efficacy. One potential proposed factor influencing attitudes toward help-seeking across mental health diagnoses is the broader population's perception of people with a mental health diagnosis[3]. Thus, we aim to investigate a general population's perception of specific types of eating disorders and how accurately they perceive the prevalence of commonly co-existing (comorbid) mental health disorders in order to gain deeper insight into these mechanisms of resistance.

Eating disorders encompass a spectrum of mental health disorders that broadly impact eating behaviors, exercise patterns, and body image. Two common eating disorders are anorexia nervosa (AN), defined by restriction of food intake, and bulimia nervosa (BN), defined by periods of consuming high amounts of food followed by behaviors intended to compensate for the high food intake (throwing up, laxative or other medication use, exercise). These disorders have high prevalence and are known commonly across the general adult population, making them a key target for research[4].

In addition to high prevalence, eating disorders have also been found to have significantly high comorbidity with other mental health diagnoses[4]. Comorbidity may be associated with worse outcomes for people diagnosed with an eating disorder, making it a critical con-

sideration in future eating disorder research[5]. Several studies have examined the actual prevalence of anxiety, depression, obsessive compulsive disorder (OCD), and attention deficit hyperactivity disorder (ADHD), which are common comorbid diagnoses with AN and BN[4,6,7] While attitudes towards mental illness have been examined, how comorbidity, or multiple diagnoses, interact or predict changes in perception is less understood.

Stigma, defined as a negative social belief towards a person or group, has been widely discussed in relation to negative downstream effects on mental health through general population perception[3]. Stigma has also been theorized to impact treatment seeking and mental health outcomes[8]. Stigma has been explored specifically within the disordered eating domain, with findings showing negative attitudes towards individuals with eating disorders unique to each diagnosis[9]. Further work exploring stigmatization in disordered eating could be approached through understanding other contributing factors, including lay beliefs.

Researchers have previously examined the perception of eating disorders, but this work has primarily been about stigma only[9]. Additional work examining eating disorders has explored perception of what people with disordered eating and the general population consider the underlying problem of someone with an eating disorder to be, but this work did not examine comorbid diagnoses[10]. To date, no studies have examined both perceived stigma and comorbid diagnoses of eating disorder patients from the perspective of the general population. We thus sought to study both perceived stigma and public knowledge of eating disorder comorbidity across different types of eating disorders to better understand the general public's perception of disordered eating, extending prior work.

Understanding the general public's knowledge and perception of eating disorders has long-term potential for future scientific work and applied action within communities. If stigma and social perception do contribute to the desire to seek treatment or extension of support to people with eating disorders, as we theorize, understanding if there are between-disorder-type differences (AN versus BN) could help identify what the public does (and does not) know about eating disorders. This could have implications for broader education about eating disorders to the public, particularly if there is no congruence between what the research reflects on eating disorder comorbidity and what the general population believes. Education and outreach about eating disorders and mental health could then be developed and disseminated to improve knowledge and decrease stigma, which may also have a beneficial downstream impact on treatment-seeking and long-term health outcomes.

The present study is an online survey examining general public perceptions of stigma and likelihood of specific comorbid diagnoses (anxiety, depression, OCD, and ADHD) in reaction to two vignettes depicting fictional college students with anorexia nervosa and bulimia nervosa. We have five hypotheses about stigma and these four comorbid diagnoses. In line with prior results of studies examining differences between anorexia and bulimia, we hypothesize that I) there will be significantly more self-reported stigma in reaction to the vignette depicting someone with bulimia than the vignette depicting anorexia[11].

Based on prior work examining the actual prevalence of comorbidity across the four potential diagnoses that participants will be presented with, we hypothesize that public perception will align with actual comorbid prevalence in the following; II) people will perceive a diagnosis of anxiety as equally likely in AN and BN , III) people will perceive a diagnosis of depression as equally likely in AN and BN, IV) people will perceive a diagnosis of OCD as significantly more likely for the anorexia vignette condition, and V) people will perceive a diagnosis of ADHD as significantly more likely for the bulimia vignette condition.

2 METHODS AND MATERIALS

2.1 Overview

In the present study, we sought to examine how eating disorder type in a hypothetical vignette impacts stigmatizing attitudes and perception of the likelihood of another mental health diagnosis. We conducted a within-subjects experiment using randomized vignettes and self-report measures to assess our hypotheses.

2.2 IRB and Preregistration

This study was deemed exempt from Institutional Review Board oversight by the University of Denver Institutional Review Board prior to all study procedures. Planned procedures, original hypotheses, and analyses were preregistered in advance with AsPredicted[12].

2.3 Participants

An a priori power analysis indicated that a sample size of n = 90 would be necessary to achieve 80% power in each paired sample t-test[13]. As such, we aimed to collect data until a viable sample size of n = 90 was reached or until funding was depleted. We initially recruited a sample size of n = 129 participants via CloudResearch, an online crowdsourcing survey platform[14]. Participants were excluded if they did not consent to participate or use their data in our study, failed to pass the reCAPTCHA test, failed an attention or data validity test, or scored three standard deviations above the mean or higher on our disordered eating measure (see Mate-

rials). After applying our exclusion criteria, we had a final sample size of n = 110. Participants' ages ranged from 19-73 years old (M = 41.5, SD = 12.3). Participants predominantly identified as White (n = 83, 75.5%). However, a portion of participants also identified as Black (n = 13, 11.8%), Latino/a/x (n = 8, 7.3%), and Asian (n = 8, 7.3%). Participants also selected other/prefer not to say (n = 2, 2.2%). Participants identified as women (n = 62, 56.4%) and men (n = 48, 43.6%). Participants' annual household income was distributed across six categories: $0-$29,999 (n = 17, 15.5%), $30,000-$59,999 (n = 31, 28.2%), $60,000-$89,999 (n = 19, 17.3%), $90,000-$119,999 (n = 11, 10.0%), $120,000+ (n = 29, 26.4%), and "Prefer not to say" (n = 3, 2.7%).

3 MATERIALS

3.1 Vignettes

In this study, we used an adapted version of the two vignettes used by Mond et al[15]. These vignettes describe one hypothetical female college student with symptoms of AN and one hypothetical female college student with symptoms of BN. We adapted the spelling of some words to reflect the American spelling used by our target population. We removed the final sentences which describe mental health symptoms not directly related to disordered eating (i.e., doing poorly in school, withdrawing from friends and family), and minimized usage of the word "bingeing" in the BN vignette to avoid revealing the eating disorder type. See Appendix A for the full text of each vignette condition.

3.2 Stigma

In order to measure stigma, we employed the 9-item Attribution Questionnaire (AQ-9);[16], which measures stigma using nine domains (responsibility, pity, anger, dangerousness, fear, help, coercion, segregation, and avoidance), corresponding to one item per domain. This scale is a shortened version of the 27-item Attribution Questionnaire (AQ-27);[17], which measures stigma using the same nine domains but with three items corresponding to each domain instead of one. Items are rated on a 9-point Likert scale. Responses to each item range from "Not at all" to "Very Much". We opted for the short form to reduce survey completion time and alleviate participant fatigue. Scores from each item are summed to create a composite score, with higher scores representing more stigma. Overall reliability for the AQ-9 is acceptable but not excellent (α =.65).

3.3 Perceived Comorbid Diagnoses and Baseline Diagnoses

To achieve a baseline measurement of perceived mental health diagnoses uninfluenced by disordered eating pathology, participants were asked to rate the likelihood that an average 19 year old, female college student would be diagnosed with depression, anxiety, ADHD, and OCD on a 7-point Likert scale where 1 corresponded to "Extremely Unlikely" and 7 corresponded to "Extremely Likely". Participants completed the same four items for both the AN and BN conditions. Single-item mean scores were utilized for each diagnosis. Each item was novel and created for this study, and they have not been studied in other work to date.

3.4 Disordered Eating

As part of our exclusion criteria, we had participants complete a self-report scale to measure disordered eating. The Eating-Disorder Examination Questionnaire (EDE-Q-6);[18] is a 28-item survey that utilizes a 7-point Likert scale to measure disordered eating behaviors of the past 28 days. The possible responses to each item range from 1 "No Days" to 7 "Everyday". This scale includes items about body image, eating behaviors, exercise behaviors, and purging behaviors. Due to incomplete responses on the final seven items, we had to exclude these from the composite score calculation. Mean scores from each item are averaged to create a composite score. The modified version we used indicated excellent reliability (α = 0.93).

3.5 Procedure

Participants gave consent and passed a reCAPTCHA screening test. Failure to consent or successfully complete the reCAPTCHA screener would send the participant to the end of the survey, and they would not be permitted to participate. Participants rated how likely they believed a female, 19-year-old college student would be to have anxiety, depression, OCD, or ADHD (see Materials). Participants then read one vignette describing a fictional female college student displaying symptoms of either AN or BN. After reading the vignette, participants filled out the AQ-9 and the perceived comorbid diagnosis items, then repeated the process for the other vignette condition. The order in which participants read each vignette was randomized to protect against order effects. After completing both vignette conditions, participants filled out the EDE-Q-6, as well as demographic questions on their race, gender, age, and income. Pilot testing indicated that the average completion time was ten minutes or less.

3.6 Power

A sensitivity analysis was conducted (a = 0.05, 1-B = 0.80). Results indicated the ability to detect a small effect size of d = 0.24. Therefore, we were adequately powered to detect our intended effect of d = 0.30.

4 RESULTS

4.1 Hypotheses

The following hypotheses were tested: I) that participants would stigmatize BN more than AN, II) that participants would not rate anxiety or III) depression as significantly more likely for BN or AN, IV) that participants would rate OCD as significantly more likely for AN, and (V[8.1][GN8.2][9.1]) that participants would rate ADHD as significantly more likely for BN.

4.2 Stigma

We conducted a paired samples t-test to evaluate whether there was a significant difference between stigma in each ED condition. AN (M = 3.10, SD = 1.14) was significantly more stigmatized than BN (M = 2.95, SD = 1.09), t(109) = -2.75, p = .007, d = -.26, 95% CI [-.45, -.07] (Figure 1). Thus, our first hypothesis that there would be more stigma towards someone with bulimia nervosa was not supported.

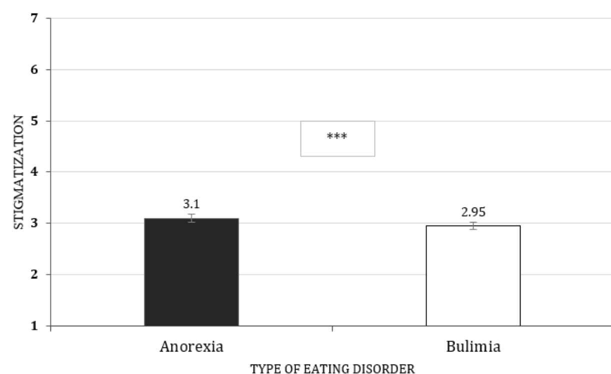

Figure 1. *Note: This figure demonstrates the difference between ratings of stigma for AN and BN. This difference, on a seven-point Likert scale, indicates that they are significant at the level, p<.001.*

4.3 Perceived Likelihood of Diagnoses

4.3.1 *Anxiety*

We conducted a repeated-measures analysis of variance (ANOVA) to evaluate the effect of condition (AN, BN, or baseline) on perceived likelihood of an anxiety diagnosis (Figure 2). Mauchly's test indicated that the assumption of sphericity had been violated, χ^2 (2) = 34.76, *p* < .001; therefore, statistics will be reported using the Huynh-Feldt correction. The effect of condition type on perceived likelihood of anxiety diagnosis was significant, *F*(1.59, 173.00) = 25.55, *p* < .001. Post-hoc pairwise comparisons (Least Significant Difference) were conducted to test where significant differences were present. There was no significant difference in perceived likelihood of an anxiety diagnosis between the AN and BN conditions (*p* = .903). However, perceived likelihood of an anxiety diagnosis was significantly higher in the AN condition (*M* = 5.99, *SE* = 0.11) than the baseline condition (*M* = 5.35, *SE* = 0.10), *p* < .001. Additionally, perceived likelihood of anxiety diagnosis was also significantly higher in the BN condition (*M* = 5.98, *SE* = 0.10) than the baseline condition (*M* = 5.35, *SE* = 0.10), *p* < .001.

4.3.2 *Depression*

We conducted a repeated-measures analysis of variance (ANOVA) to evaluate the effect of condition (AN, BN, or baseline) on perceived likelihood of a depression diagnosis (Figure 2). Mauchly's test indicated that the assumption of sphericity had been violated, χ^2 (2) = 32.38, *p* < .001; therefore, statistics will be reported using the Huynh-Feldt correction. The effect of condition type on perceived likelihood of depression diagnosis was significant, *F*(1.61, 175.30) = 42.66, *p* < .001. Post-hoc pairwise comparisons (Least Significant Difference) were conducted to test where significant differences were present. Perceived likelihood of a depression diagnosis was significantly higher in the BN condition (*M* = 5.69, *SE* = 0.12) than the AN condition (*M* = 5.51, *SE* = 0.13), *p* = .047. Perceived likelihood of a depression diagnosis was significantly higher in the AN condition (*M* = 5.51, *SE* = 0.13) than the baseline condition (*M* = 4.65, *SE* = 0.11), *p* < .001. Additionally, perceived likelihood of a depression diagnosis was also significantly higher in the BN condition (*M* = 5.69, *SE* = 0.12) than the baseline condition (*M* = 4.65, *SE* = 0.11), *p* < .001.

4.3.3 *ADHD*

We conducted a repeated-measures analysis of variance (ANOVA) to evaluate the effect of condition (AN, BN, or baseline) on perceived likelihood of an ADHD diagnosis (Figure 2). Mauchly's test indicated that the assumption of sphericity had been violated, χ^2 (2) = 9.03, p = .011; therefore, statistics will be reported using the Huynh-Feldt correction. The effect of condition type on perceived likelihood of ADHD diagnosis was not significant, F(1.88, 205.15) = 2.41, p = .095.

4.3.4 *OCD*

We conducted a repeated-measures analysis of variance (ANOVA) to evaluate the effect of condition (AN, BN, or baseline) on perceived likelihood of an OCD diagnosis (Figure 2). Mauchly's test indicated that the assumption of sphericity had been violated, χ^2 (2) = 12.51, p

= .002; therefore, statistics will be reported using the Huynh-Feldt correction. The effect of condition type on perceived likelihood of an OCD diagnosis was significant, $F(1.83, 199.61) = 75.73$, $p < .001$. Post-hoc pairwise comparisons (Least Significant Difference) were conducted to test where significant differences were present. Perceived likelihood of an OCD diagnosis was also significantly higher in the AN condition ($M = 5.07$, $SE = 0.14$) than the BN condition ($M = 4.75$, $SE = 0.15$), $p = .007$. Perceived likelihood of an OCD diagnosis was also significantly higher in the AN condition ($M = 5.07$, $SE = 0.14$) than the baseline condition ($M = 3.39$, $SE = 0.13$), $p < .001$. Additionally, perceived likelihood of an OCD diagnosis was also significantly higher in the BN condition ($M = 4.75$, $SE = 0.15$) than the baseline condition ($M = 3.39$, $SE = 0.13$), $p < .001$.

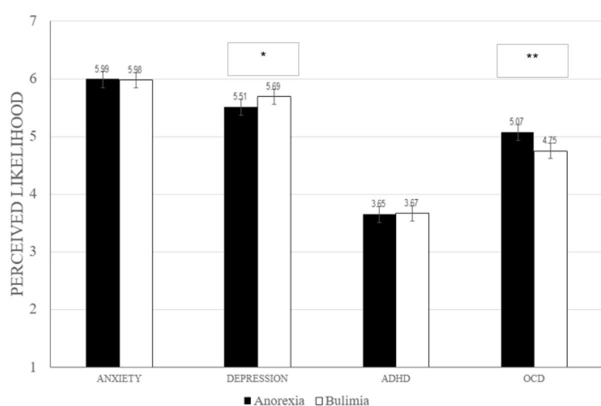

Figure 2. *Note: This figure summarizes the perceived likelihood of the four commonly comorbid health disorders between AN and BN. These scores were calculated by subtracting BN by baseline and AN by baseline for each of the disorders. Significance levels are denoted as follows: *p<.05, **p<.01, ***p<.001.*

5 DISCUSSION

This study sought to explore the general population's stigmatizing beliefs and understanding of comorbidity with eating disorders, as well as examine whether these constructs were differentiated by type of eating disorder. We found significant disorder-type differences in stigma, with participants rating the AN condition higher on stigma compared to the BN condition. This contradicted our original hypothesis (I) that BN would be significantly more stigmatized than AN. Additionally, we found significant disorder-type differences in perceived likelihood of comorbidity for depression, with the BN condition perceived as more likely to have comorbid depression than the AN condition. This also contradicted our original hypothesis (III) that depression would not be rated significantly differently. We also found perceived likelihood of comorbidity was significantly different for OCD, with participants rating the AN condition as more likely to have comorbid OCD than the BN condition. This did validate our original hypothesis (IV) that OCD would be rated as significantly more likely for the AN condition. However, the perceived likelihood of a comorbid anxiety or ADHD diagnosis was not significantly different in either eating disorder condition. This validated our hypothesis (II) that we would not find a significant difference for anxiety but did not validate our hypothesis (V) that ADHD would be significantly more likely for the BN condition.

While several of our analyses were significant, there are key limitations to the findings of this research. This study only examined anorexia nervosa and bulimia nervosa in its vignette conditions, and it is possible that the effect size or significance would change with different eating disorders or testing of all DSM-5-TR diagnoses. Additionally, we chose not to define each diagnosis for study participants to examine uninfluenced ratings, but providing these definitions may have changed or clarified comorbidity ratings for participants who are less familiar with psychiatric diagnostic criteria. It is possible that explaining the criteria or exactly what disorders we were referring to would have resulted in higher accuracy of diagnosis ratings. This study also solely examined knowledge of eating disorders through comorbidity with specific diagnoses, and it is possible that the general population has or does not have knowledge in other domains relating to eating disorders, such as symptoms or treatment, not reflected within this research. Additionally, we were unable to obtain complete data on the EDE-Q-6, which may have resulted in a higher number of excluded participants or failed to capture participants with relevant disordered eating. Critically, we also did not ask about personal or familial history of eating disorders, and it is possible that participants who themselves have had or know someone who has had an eating disorder would have less stigma or more accurate knowledge about comorbidity.

These results fill a critical gap in the literature surrounding general population attitudes and beliefs about eating disorders, helping to extend the broader literature on mental health stigma and lay beliefs about psychopathology from a general population previously not heavily used in the context of eating disorders. These results help to characterize the general population's stigmatizing attitudes and understanding of two specific eating disorders, which can provide a baseline metric for public knowledge and attitudes while simultaneously benchmarking where progress still remains in providing accurate mental health knowledge to the public. These findings demonstrated stigmatizing attitudes towards hypothetical people with eating disorders, as well as discrepancies between what the general public understands about eating disorder comorbidity and what is reflected within actual prevalence. This work also contradicted prior work that found higher stigma

associated with bulimia compared to anorexia, necessitating future work clarifying how eating-disorder type can differentiate stigmatizing attitudes[10, 11]. This could also mean that lay beliefs about comorbidity are not consistent and may be more heterogeneous across the population than previously expected.

Further qualitative work examining how the general population forms impressions and attitudes towards people with eating disorders, as well as how their lay beliefs surrounding comorbidity are developed, could be used to directly extend this work and further clarify our mixed findings on disorder-type differences. Further research examining stigmatizing attitudes across the full spectrum of eating disorders, as well as research examining knowledge of eating disorders beyond specific comorbidity, is warranted. Future research could also specifically explore if additional comorbid diagnoses impact the stigmatization of people with eating disorders. Additional research into the development and testing of specific eating disorder educational programs to examine if accurate education about eating disorders reduces stigma and raises the accuracy of eating disorder knowledge within the general population could yield beneficial results. Improving empirical understanding of general population mental health knowledge can yield critical findings for changing the long-term trajectory and treatment seeking of those suffering from eating disorders.

6 EDITOR'S NOTES

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