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Comparing Stigmatizing Attitudes Toward Anorexia Nervosa, Binge-Eating Disorder, Avoidant-Restrictive Food Intake Disorder, and Subthreshold Eating Behaviors in College Students

Running Head: Stigmatization of Clinical and Subthreshold Eating Behavior

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Abstract

Objective: The relative stigmatization of various eating disorders (ED) remains understudied, and there is no research examining stigma toward avoidant-restrictive food intake disorder (ARFID) or adult picky eating. The present study examined the relative stigmatization of various EDs and the subthreshold eating behaviors that are risk factors for their development, and the relation of gender differences to stigma.

Method: A sample of 1147 college students were recruited and completed the study online. Participants were randomized and presented with a vignette representing a clinical ED [anorexia nervosa (AN), binge-eating disorder (BED), ARFID] or a subthreshold eating presentation (restrained eating, emotional eating, picky eating). Participants completed measures of stigma and perceived psychopathology. A 6 (target eating behavior) × 2 (target gender) × 2 (participant gender) MANOVA and subsequent ANOVAs were employed.

Results: Measures of stigma revealed significant main effects for eating presentation and participant gender. There were also significant interactions between eating presentation and participant gender. Men reported more stigmatizing views toward BED and AN compared to women. Overall, restraint was stigmatized less than the other targets, and AN received the greatest amount of stigma. Participants rated BED and AN as more pathological than all other targets, emotional eating and ARFID as more pathological than picky eating and restrained eating, and restrained eating as less pathological than all other targets.

Conclusions: Future research should explore how the severity of eating behavior influences perceptions and at what level behaviors such as restriction are recognized as disordered.

Keywords: stigma; eating disorders; anorexia nervosa; binge-eating disorder; avoidant/restrictive food intake disorder

Comparing Stigmatizing Attitudes Toward Anorexia Nervosa, Binge-Eating Disorder, Avoidant-Restrictive Food Intake Disorder, and Subthreshold Eating Behavior

Stigma toward disordered eating has been found to be more pronounced than stigma toward other mental health conditions such as depression (Roehrig & McLean, 2010). Individuals with eating disorders (EDs) who experience stigmatization are more likely to report greater symptomatology and poorer health outcomes (Griffiths, Mond, Murray, & Touyz, 2014). Additionally, fear of stigmatization can prevent individuals from seeking treatment for an ED (Ali et al., 2017). Despite these findings, the stigmatization of individuals with EDs, and the degree to which society views different EDs and subthreshold eating behavior as pathological, remains under-researched.

A small number of studies have found that stigmatizing attitudes and perceived psychopathology vary by ED diagnosis. In a study where college students were assigned to respond to a vignette, participants endorsed less stigmatizing attitudes toward binge-eating disorder (BED) than anorexia nervosa (AN) and bulimia nervosa (BN), which may be related to the finding that individuals with BED are perceived as less functionally impaired than those with AN or BN (Murakami, Esayli, & Latner, 2016). This is consistent with other findings that BED symptoms are perceived as less severe and more likely to represent "a lack of willpower/self-control" as opposed to a mental illness when compared to BN (Anderson, Gratwick-Sarll, Bentley, Harrison, & Mond, 2016).

Relative to women, men appear to hold more stigmatizing views toward individuals with EDs and consider EDs to be less severe (Anderson et al., 2016; Boysen, Ebersole, Casner & Coston, 2014; Griffiths, Mond, Murray, & Touyz, 2014; Mond & Arrighi, 2011; McLean et al.,

2014; Wingfield, Kelly, Serdar, Shivy, & Mazzeo, 2011). Men also appear to be more likely than women to hold the belief that EDs only affect women (Harvey & Robinson, 2003). Recent findings indicate that conformity to certain masculine norms of behavior and thought (e.g., self-reliance, heterosexual self-presentation) is a stronger predictor of stigmatizing attitudes toward EDs than biological sex (Austen & Griffiths, 2018). Therefore, apparent gender differences in how participants perceive individuals with EDs may be driven by gender differences in internalized masculinity norms and negative views of "women's illnesses" (Harvey & Robinson, 2003).

Less is known about differences in stigma toward men versus women with EDs. Two vignette studies found that participants rated male targets as more likely to recover from an ED than female targets (Wingfield et al., 2011; Griffiths et al., 2014). In Griffiths and colleagues' (2014) study, participants also rated female targets as more likely to be watched or monitored by others, uncomfortable talking about their problems, and psychologically fragile. Another study, however, found no difference in college students' stigmatizing attitudes toward men versus women with EDs (Murakami et al., 2016).

To our knowledge, no prior study has specifically assessed stigmatizing attitudes or perceived psychopathology of subthreshold ED symptoms such as dietary restraint and emotional eating. While a handful of studies suggest that patients with AN frequently perceive calorie restriction and weight loss as a positive achievement that contributes to pride and a sense of identity (Serpell, Treasure, Teasdale, & Sullivan, 1999; Skarderud, 2007; Vitousek, Watson, & Wilson, 1998), empirical research investigating lay views about calorie restriction is lacking. Although thematic analyses of social media discourse around dieting, fitness, and healthy or "clean" eating suggest that engaging with this content may have a negative impact on users'

body image, there is no data on users' perceptions of the individuals who post this content (Alberga, Withnell, & von Ranson, 2018; Tiggemann & Zaccardo, 2015). Given the high value placed on thinness and the prevalence of dieting in western societies, it is unclear if the general public perceives restrained eating as positive, negative, or benign (Kruger, Galuska, Serdula, & Jones, 2004; Puhl, Himmelstein, & Quinn, 2018). Similarly, little is known about attitudes toward emotional eating, or overeating in response to emotional agitation in order to cope with negative affect.

Even less is known about attitudes toward avoidant/restrictive food intake disorder (ARFID). ARFID characterizes individuals who restrict their caloric intake and/or dietary variety for reasons that are not related to shape or weight concerns. The DSM-5 describes three patterns of restrictive eating that can lead to ARFID: severe picky or selective eating based on aversions to the sensory qualities of food; low appetite/low eating enjoyment; and fear of negative consequences related to eating (e.g., choking, vomiting; American Psychiatric Association (APA), 2013; Thomas et al., 2017). Of these presentations, picky eating has received the most research attention. ARFID diagnostic criteria are met when picky eating behavior causes significant weight loss, nutritional deficiency, dependence on oral or enteral nutritional supplements, and/or psychosocial impairment (APA, 2013). Although picky eaters have been found to report poorer self-esteem compared to peers, and describe social anxiety related to eating, stigma directed toward adult picky eaters, to our knowledge, has not been studied (Maiz & Balluerka, 2018; Wildes, Zucker, & Marcus, 2012).

Exploring the degree to which various mental health conditions are stigmatized may reveal potential barriers to help-seeking and guide the content of interventions aimed at increasing mental health literacy and decreasing stigma. For example, understanding the extent

to which society perceives restrained eating as negative and pathological versus valuable and healthy may inform whether education should focus on increasing empathy toward others who engage in restrained eating or increasing awareness of the risks of restrained eating. Furthermore, subthreshold eating symptoms may be risk factors for clinical EDs. If these subthreshold behaviors are stigmatized in and of themselves, this stigma might contribute to secrecy, shame, internalized stigma, and avoidance of treatment, which could potentially worsen ED symptoms and reduce quality of life. . Understanding which eating behaviors are more stigmatized may also help us understand what specific symptoms that make up an ED contribute to stigma.

Hypotheses of the Current Study

In the current study, we hypothesized that: (1) the target with ARFID would receive less stigmatizing attitudes and be viewed as less pathological than AN or BED, as picky and avoidant eating behaviors are more commonly observed in the general population (Zickgraf & Ellis, 2018; Hunot et al., 2016; Kauer, Pelchat, Rozin, & Zickgraf, 2015); (2) ED targets (AN, BED, and ARFID) would receive greater stigmatizing attitudes and be viewed as more pathological than the three subthreshold targets (restrained eating, emotional eating, and picky eating); and (3) the restrained eating target would receive less stigma and be viewed as less pathological than the picky eating and emotional eating targets, especially by female-identified participants, given that undergraduate women are more likely than male peers to have attempted dieting (Davy, Benes, & Driskell, 2006; Rozin, Bauer, & Catanese, 2003). In addition, as secondary/replication hypotheses, we predicted that: men would report greater stigmatizing attitudes overall than women, and the target with AN would receive greater stigmatizing attitudes and be viewed as more pathological compared to the BED target. In view of inconsistent findings from prior research (Griffiths et al., 2014; Murakami et al., 2016; Wingfield et al., 2011), we did not make

any specific hypotheses related to whether participants would report different attitudes toward male versus female targets.

Method

Participants

Participants were recruited via the research management website (Experimentrak) in the Department of Psychology at [University]. Procedures were approved by the university IRB. All participants were enrolled in an introductory psychology course and were offered course credit for participation. After excluding 498 participants who did not correctly respond to eight out of nine validity items (e.g., Please select "agree" for this item) and completed the survey in less than 15 minutes, the study sample consisted of 1147 college students (gender identity: 67.2% female, 32.2% male, 0.7% transgender or gender non-binary; mean age = 18.47 years, SD = 1.40). Participants who identified as transgender or gender non-binary (n = 8) were removed from final analyses as participant gender was dichotomized for primary analyses. The racial/ethnic background of this sample was: 72.2% White, 14.2% Black, 3.6% Hispanic, 1.7% Asian, and 8.3% other/multiple ethnicities. Their mean body mass index (BMI; kg/m^2), based on self-reported height and weight, was 24.27 (SD = 4.96).

Procedures

Participants were informed that the study was "examining attitudes about different groups of people." Participants were randomized and presented with a vignette of a clinical ED (i.e., AN, BED, or ARFID) or a subthreshold eating presentation (i.e., restrained eating, emotional eating, or picky eating). The gender of the target in the vignette was also randomized. The target vignettes are provided in Appendix A. The AN and BED vignettes were based on those used by Mond, Hay, Rodgers, Owen, and Beaumont (2004; 2006), and Murakami and colleagues (2016).

The vignettes were modified to include the target's gender, and vignettes for ARFID, picky eating, dietary restraint, and emotional eating were created in a similar format. The ARFID vignette included behaviors and symptoms that were described such that they would meet criteria for the DSM-5 disorder (APA, 2013). The ARFID vignette differed from the picky eating vignette in its description of: (1) family/pediatrician concerns about dietary adequacy, (2) avoidance of social events that involve eating, (3) inadequate intake due to being unable to find preferred foods, and (4) undesired weight loss (e.g., Zickgraf et al., 2019). The AN vignette differed from the restraint vignette in that it involved: (1) fear of weight gain (versus "avoidance" of weight gain), (2) fasting, (3) denial of being underweight, and (4) severe underweight status. The BED vignette differed from the emotional eating vignette in that it involved: (1) objectively large amounts of food, (2) feeling uncomfortably full, depressed, and guilty, (3) inability to stop/control binges, and (4) weekly occurrence of episodes. Participants were then asked to rate the vignettes on measures of stigma, bias, and blame. Participants also self-reported demographic factors.

Measures

Stigmatizing Attitudes

Bias. The Universal Measure of Bias (UMB; Latner, O'Brian, Durso, Brinkman, & MacDonald, 2008) is a 20-item self-report questionnaire that assesses the relative strength of bias against different targets. The UMB includes a series of questions that measure participants' negative judgements toward the target, desire to distance themselves from the target, attraction to the target, and beliefs about whether the target should have access to equal rights. Participants are asked to respond to items on a 7-point rating scale from "1 = strongly agree" to "7 = strongly disagree," with higher scores indicating more bias. The UMB has demonstrated good convergent

validity and internal consistency, and has been used in similar research (Latner et al., 2008; Murakami et al., 2016). The Cronbach's alpha was .87 in the current study.

Blame and Distrust. The Universal Stigma Scale (USS; Ebneter, Latner, & O'Brien, 2011; Ebneter & Latner, 2013) was included to assess participants' stigmatizing attitudes toward the different eating presentation vignettes. The USS is an 11-item self-report measure that is scored on a 5-point rating scale ranging from "1 = strongly agree" to "5 = strongly disagree," with lower scores indicating greater stigma. Items were slightly modified for the present study: "problem" was replaced with "eating behavior" so that participants would not assume that all targets displayed problematic eating. The USS has two subscales: Blame/Personal Responsibility and Distrust/Impairment. The USS has demonstrated adequate internal consistency across prior studies using ED vignettes (Ebneter et al., 2011; Ebneter & Latner, 2013; Murakami et al., 2016). In the current study, Cronbach's alpha was .70 for the Blame subscale and.79 for the Distrust subscale.

Perceived Psychopathology. A three-item scale that has been used in previous vignette research of ED stigma to assess perceived psychopathology was also completed. Items are scored on a 4-point rating scale from "1 = strongly agree" to "4 = strongly disagree," with lower scores suggesting greater perceived psychopathology. The items included: "Name is probably depressed," "Name is a generally unhappy person," and "Name has psychological problems." Cronbach's alpha was .83 in the current sample.

Demographics

Participants self-reported several demographic variables (e.g., age, ethnicity, and gender identity) and height and weight. Regarding gender identity, participants were asked, "How would

you describe yourself?" and selected either "male," "female," "transgender," or "do not identify as male, female, or transgender."

Data Analysis

One-way analyses of variance (ANOVAs) were employed between groups on demographic variables to confirm adequate sample randomization. Dummy variables were assigned to each vignette condition in a 6 × 2 × 2 fashion: target condition (AN, BN, ARFID, restrained eating, emotional eating, and picky eating), target gender identity (male vs. female), and participant gender (men vs. women). A preliminary three-way multivariate analysis of variance (MANOVA) across eating presentation, target gender, and participant gender was employed to analyze differences amongst groups and stigma ratings. Dependent variables included: UMB Total, USS Blame, USS Distrust, and Perceived Psychopathology. Effect sizes were calculated using partial eta squared. Effect sizes were interpreted using Cohen's (1988) guidelines for small (η^2_p = .01), medium (η^2_p = .06), and large effect sizes (η^2_p = .14). All analyses were conducted using SPSS 24.

Results

Overall MANOVA Findings

No differences were found between randomized groups for participant self-report BMI, ethnicity, gender, or age. Five participants were removed from the primary analyses due to missing data. The three-way MANOVA showed no significant interactions or main effects for target gender. Thus, groups were collapsed on target gender. Given the impact of weight on stigma and bias in previous research, we also conducted an exploratory three-way MANOVA to investigate the influence of participant self-reported BMI. A dichotomous BMI variable was created to compare participants with obesity to those without obesity. The three-way MANOVA showed no significant main effects or interactions with BMI, thus we elected to remove BMI as an independent variable and proceed with a two-way MANOVA.

Upon checking assumptions for the two-way MANOVA, the Mahalanobis distance revealed four multivariate outliers. These were removed from further analyses, resulting in a final sample size of 1129. Furthermore, Box's M test of equality of covariance matrices was significant, suggesting heterogeneity of the variance-covariance matrix. Thus, Pillai's trace was used as a more robust test statistic.

The two-way 6 (eating presentation) × 2 (participant gender) MANOVA revealed a significant multivariate interaction, $V^{(s)}$ =.036 $F(20, 4468.00) = 2.01$, $p = .005$, partial $\eta^2 = .009$. There were also significant main effects for eating presentation group, $V^{(s)} = .336$ $F(20, 4468.00) = 20.47$, $p < .001$, partial $\eta^2 = .084$, and for participant gender, $V^{(s)} = .058$ $F(4, 114.00) = 17.24$, $p < .001$ with partial $\eta^2 = .058$. A post hoc power analysis indicated that the sample size of 1129 participants was large enough to detect small effects with power of .97 (G*Power 3.1.9.6; Faul,

Erdfelder, Lang, & Buchner, 2007). See Table 1 for means and results of the 6 × 2 interaction effects.

Table 1. Means, standard errors, and ANOVA results for the UMB, USS Blame subscale, USS Distrust subscale, and Perceived Psychopathology by participant gender and eating group

Measure	Men (n = 364)	Women (n = 765)	Total (n = 1129)	Participant Gender F (partial η^2)	Eating Group F (partial η^2)	Participant Gender x Eating Group F (partial η^2)
UMB (overall)	3.57 (*.040*)^{A}	3.41 (*.028*)^{B}	3.46 (*.78*†)	10.99** (*.010*)	9.54*** (*.041*)	2.70* (*.012*)
ARFID	3.61 (*.093*)	3.45 (*.069*)	3.53 (*.058*)^{b}			
Picky Eating	3.66 (*.10*)	3.43 (*.068*)	3.55 (*.060*)^{b}			
Binge-Eating Disorder	**3.78 (*.096*)**	**3.30 (*.067*)**	3.54 (*.059*)^{b}			
Emotional Eating	3.55 (*.110*)	3.42 (*.065*)	3.48 (*.064*)^{b}			
Anorexia Nervosa	3.74 (*.094*)	3.67 (*.069*)	3.71 (*.058*)^{b}			
Restrained Eating	3.10 (*.096*)	3.22 (*.068*)	3.16 (*.05*[illegible])^{a}			
USS Blame (overall)	3.19 (*.039*)^{A}	3.53 (.027)^{B}	3.[illegible] (*.77*†)	53.24*** (*.045*)	10.23*** (*.044*)	0.84 (*.004*)
ARFID	3.35 (*.090*)	3.64 (.067)	3.[illegible] (*.056*)^{bc}			
Picky Eating	3.15 (*.096*)	3.40 (.0[illegible])	3.27 (*.058*)^{ab}			
Binge-Eating Disorder	3.15 (*.093*)	3.64 (.0[illegible])	3.40 (*.056*)^{b}			
Emotional Eating	3.10 (*.106*)	3.3[illegible] (*.063*)	3.21 (*.062*)^{ab}			
Anorexia Nervosa	3.40 (*.091*)	3.[illegible]4 (*.067*)	3.62 (*.056*)^{c}			
Restrained Eating	2.96 (*.093*)	3.[illegible]2 (*.065*)	3.14 (*.057*)^{a}			
USS Distrust (overall)	3.75 (*.037*)^{A}	3.78 (*.025*)^{A}	3.77 (*.71*†)	0.77 (*.001*)	11.72*** (*.050*)	2.54* (*.011*)
ARFID	3.79 (.0[illegible])	3.80 (*.063*)	3.79 (*.053*)^{bc}			
Picky Eating	3.83 (.09[illegible])	3.88 (*.062*)	3.86 (*.055*)^{bc}			
Binge-Eating Disorder	**3.55 (*.088*)**	**3.79 (*.061*)**	3.67 (*.053*)^{ab}			
Emotional Eating	3.[illegible]5 (*.100*)	3.80 (*.059*)	3.81 (*.058*)^{bc}			
Anorexia Nervosa	**3.36 (*.086*)**	**3.56 (*.063*)**	3.46 (*.053*)^{a}			
Restrained Eating	**4.12 (*.088*)**	**3.88 (*.062*)**	4.00 (*.054*)^{c}			
Perceived Psychopathology (overall)	2.31 (*.031*)^{A}	2.23 (*.021*)^{B}	2.26 (*.69*†)	4.77* (*.004*)	75.64.*** (*.253*)	3.59** (*.016*)
ARFID	2.15 (*.071*)	2.24 (*.053*)	2.20 (*.044*)^{b}			
Picky Eating	2.55 (*.077*)	2.68 (*.052*)	2.61 (*.046*)^{c}			
Binge-Eating Disorder	1.91 (*.073*)	1.84 (*.051*)	1.87 (*.045*)^{a}			
Emotional Eating	2.23 (*.084*)	2.13 (*.050*)	2.18 (*.049*)^{b}			
Anorexia Nervosa	2.03 (*.072*)	1.80 (*.053*)	1.91 (*.045*)^{a}			
Restrained Eating	**3.02 (*.073*)**	**2.71 (*.052*)**	2.86 (*.045*)^{d}			

Note. Higher scores on the UMB indicate greater bias (1 = "strongly agree" to 7 = "strongly disagree"). Lower scores on the USS indicate greater stigma (1 = "strongly agree" to 5 = "strongly disagree"). Lower scores on the Perceived Psychopathology scale indicate greater perceived psychopathology (1 = "strongly agree" to 4 = "strongly disagree"). Significant differences between men and women are indicated by uppercase superscripts A and B horizontally. Significant differences between eating groups are indicated by lowercase superscripts a, b, c, and d vertically. Means sharing the same superscript are statistically equivalent. Bolded means and standard errors mark significant interaction effects. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$. †= Standard deviations.

Main Effects for Eating Group

One-way ANOVAs yielded main effects for eating group on the UMB, USS Blame responsibility subscale, USS Distrust subscale, and perceived psychopathology scale. Means and ANOVA tests can be seen in Table 1.

Bias. Regarding the UMB, post-hoc comparisons indicated that participants exhibited significantly more bias toward AN compared to all other eating presentations. Comparisons between the other five groups fell short of significance.

Blame. Regarding the USS Blame scale, participants endorsed significantly greater blame (i.e., lower score) toward restrained eating compared to all other presentations. Blame was significantly lower for AN in comparison to all other presentations. The BED target received less blame than restrained eating and more than AN, but was not significantly different from the other targets.

Distrust. Regarding the USS Distrust scale, the AN target received significantly greater distrust scores relative to all presentations. BED received a significantly greater distrust score compared to restrained eating, but was not significantly different from the other presentations. Restrained eating received significantly lower ratings of distrust compared to all other eating presentations.

Perceived psychopathology. Participants rated AN and BED as significantly more pathological than the other four presentations. ARFID and emotional eating were seen as significantly more pathological than picky eating and restrained eating, and picky eating was rated as significantly more pathological than restrained eating.

Main Effects for Participant Gender

Significant main effects for participant gender on the UMB, USS Blame subscale, and the perceived psychopathology scale were also observed (see Table 3). Overall, men endorsed more bias and blame across all eating presentations compared to women, while women rated the vignettes as more pathological relative to men. No significant differences between men and women were observed for the USS Distrust subscale.

Participant Gender and Eating Group Interactions

There were significant interaction effects between participant gender and eating group on the UMB (η^2_p = .012), the USS Distrust subscale (η^2_p = .011), and perceived psychopathology (η^2_p = .016), but not on the USS Blame scale (η^2_p = .004). Interactions indicated that: men exhibited more bias (UMB) and distrust (USS) toward the BED eating presentation than women; men endorsed higher USS Distrust toward the AN target and less toward the restrained eating target than women; and women reported higher perceived psychopathology toward the restraint target than men (see bolded means in Table 1).

Discussion

Supporting our first hypothesis, ARFID received less bias and distrust than AN, and was perceived as less pathological than both AN and BED. This distinction may be driven by participants viewing the target's ARFID symptoms as less problematic or serious than the symptoms described in the AN and BED targets; however, it may also be the case that participants recognized the symptoms of AN and BED as disordered eating and were less familiar with ARFID as an ED diagnosis.

Our second hypothesis was partially supported. On the one hand, AN, BED, and ARFID were perceived as more pathological than restraint, emotional eating, and picky eating, respectively. On the other hand, participants reported similar levels of bias toward ARFID and its subthreshold manifestation of picky eating, as well as toward BED and its subthreshold manifestation of emotional eating. Furthermore, the picky, emotional, and restrained eating targets received more blame than the AN target, and restraint received more blame than the ARFID and BED targets. These findings suggest that participants recognize AN as a psychological disorder for which sufferers should not be assigned personal responsibility, but view individuals with BED, ARFID, and subthreshold ED symptoms as being relatively more responsible for their eating behavior.

In support of our third hypothesis, the restraint target was viewed as the least pathological and received the lowest ratings of bias and distrust, but not blame. In other words, restraint (a subthreshold manifestation of AN) appears to be viewed more positively than picky eating (a subthreshold manifestation of ARFID) and emotional eating (a subthreshold manifestation of BED). Given high rates of body dissatisfaction (Fallon, Harris, & Johnson, 2014), messages encouraging weight loss (Ethan, Basch, Hiyer, Berdnik, & Huynh, 2016), and dieting (Santos,

Sniehotta, Marques, Carraca, & Teixeira, 2017), dietary restraint may be perceived by many as a healthy and admirable behavior. Contrary to hypothesis three, however, women viewed restraint as *more* pathological and distrustful than men, perhaps because women are more likely to have experienced some of the potentially negative consequences of dieting such as increased preoccupation with food, weight, and body shape.

Results also supported the secondary/replication hypotheses. Men reported more stigmatizing views toward the BED and AN vignettes than women (Boysen, Ebersole, Casner, & Coston, 2014; Griffiths et al., 2014; Mond & Arrighi, 2011). As noted earlier, this finding may be related to an association between conformity to masculine norms and stigmatizing views toward individuals with EDs (Austen & Griffiths, 2018). Future research should consider exploring whether men with EDs who adhere more to masculine gender norms are at heightened risk for internalized stigma and self-blame. Consistent with prior research (Murakami et al., 2016; Wingfield et al., 2011), we failed to find significant differences in stigmatizing attitudes toward male versus female vignettes. This finding runs counter to the notion that men with EDs experience heightened discrimination and stigma, perhaps for having a stereotypically "feminine" disorder (Carlat, Camargo, & Herzog, 1997; Robinson, Mountford, & Sperlinger, 2013). Given evidence that men are less likely than women to seek treatment for an ED (Striegel-Moore, Leslie, Petrill, Garvin, & Rosenheck, 2000), it may be the case that fear of stigma from others and/or internalized stigma, rather than received (e.g., objectively observable) stigma, is more responsible for this avoidance of treatment (Essayli, Murakami, & Latner, 2019).

Limitations

The present study shares several limitations with prior research on attitudes toward disordered eating. First, this study relied on explicit, self-report questionnaires to assess stigma.

It may be the case that some of our participants held stigmatizing attitudes toward the target, but felt uncomfortable explicitly endorsing this bias on a face valid questionnaire. To our knowledge, no study to date has explored implicit bias toward targets with EDs or risky eating patterns, and should be explored in future research.

Second, findings from vignette studies are likely influenced by the selection of vignettes and specific wording used to describe each vignette. The vignettes selected for the present study did not capture the full range of ED presentations (e.g., binge/purge subtype of AN, fear presentation of ARFID). Vignettes representing alternate presentations may lead to differential conclusions. Furthermore, we intentionally chose disorders (i.e., AN and BED) that are closely associated with specific behaviors (i.e., restriction and binge eating), and excluded BN, which is characterized by purging, binge eating, and (often) restriction. Future research should address stigmatization of BN and of purging behaviors in comparison to stigmatization of other disordered eating behaviors. Additionally, given that the ARFID and subthreshold eating behavior vignettes have not been tested in prior research, findings related to these vignettes should be interpreted with caution.

Although our study's subthreshold vignettes were intended to include behaviors and emotions that raise concern for psychopathology, we do not know the degree to which participants perceived these subthreshold vignettes as pathological, normative, or risky. The restraint vignette in particular may have included a mixture of potentially adaptive (e.g., appropriate self-monitoring of eating and weight) and more risky behaviors.

We also elected not to include weight information in these vignettes, and it is possible that some of our results confounded eating behaviors with weight bias. While research suggests that obesity may be less stigmatized than EDs (Murakami et al., 2016), studies has clearly shown

that individuals with obesity are highly stigmatized, and weight bias translates into inequities across various social institutions (Puhl & Heuer, 2009). Given the societal importance of understanding obesity stigma, it will be important to address the role of vignette BMI in future stigma studies. In addition, we did not specifically match vignettes to participants according to their gender, and did not explore if responses differed based on whether participants read a vignette with a discrepant or concordant gender. Future research should consider exploring this question.

Third, our undergraduate sample was predominantly White college students, and our results may not generalize to other populations. The higher prevalence of disordered eating in college-aged young adults might reduce stigma and bias compared to older people because they are more likely to have recent personal or first-hand experiences of disordered eating (Eisenberg, Nicklett, Roeder, & Kirz, 2011; Lipson & Sonneville, 2017).

Conclusions

This study represents an initial attempt to explore differences in college students' perceptions of various EDs and subthreshold eating behaviors and extends the ED mental health literacy literature across a broader range of presentations. Overall, EDs did stand apart from their respective subthreshold eating behaviors, although the differences in perception varied and were most pronounced for AN versus restraint. Although restraint is a high-risk behavior for developing AN, there is a high degree of symptom overlap and cross-over among ED diagnoses (Eddy et al., 2008). This is true of both diagnosable EDs and subthreshold eating behaviors. For example, the binge-purge subtype of AN is characterized by both binge-like eating and low weight, and studies conducted in multiple non-clinical samples have reported a small but consistent positive correlation between measures of picky eating and measures of body shape

and weight concerns (e.g., Ellis et al., 2018; Zickgraf & Ellis, 2018). Therefore, the stigma associated with any disordered eating behavior, whether subthreshold or meeting diagnostic criteria, is not limited to people with or at risk for a single ED diagnosis. Our findings also highlight the importance of investigating different forms of stigma, as targets that received greater levels of psychopathology, bias, and distrust (such as AN), often received lower levels of blame. Given the public health interest in preventing the development of disordered eating and intervening in individuals at elevated risk, future researchers should explore how the severity of eating behaviors influences participants' perceptions and attributions of targets, and at what level of severity participants recognize behaviors such as restrained eating, emotional eating, and picky eating as disordered.

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Appendix A: Target Vignettes

Restraint:

[Amanda/Matthew] is a 21-year-old second-year university student. Since s/he was young, s/he has paid attention to what s/he was eating to avoid becoming overweight. Upon starting college, [Amanda/Matthew] decided to put more energy into changing her/his eating behaviors in order to keep his/her body at a certain weight and shape. [Amanda/Matthew] began avoiding foods that were high in fat and/or calories, rarely ate foods late at night, kept track of the amount of calories (s)he was eating, and tried his/her hardest to eat less than a certain number of calories every day. Even though [Amanda/Matthew] often feels a little hungry after finishing a meal, (s)he keeps her/himself from eating more to avoid gaining weight. When [Amanda/Matthew] notices that (s)he has gained some weight, (s)he will eat less until (s)he returns back to his/her ideal weight. When his/her friends invite him/her to eat at restaurants, s/he can usually find something on the menu to eat that is healthy and not too high in fat or calories. [Amanda/Matthew] is happy with his/her weight, which s/he has been able to keep relatively stable throughout college.

Anorexia Nervosa:

[Amanda/Matthew] is a 21-year-old second-year university student. Since s/he was young, s/he has paid close attention to what s/he was eating and has been afraid of becoming overweight. Upon starting college, [Amanda/Matthew] was unhappy with the size and shape of [her/his] body so (s)he decided to join a fitness program at the gym and started running daily. Through this effort, (s)he gradually began to lose weight. At the same time [Amanda/Matthew] started to "diet", avoiding all fatty foods, not eating between meals, and trying to eat set portions of "healthy foods" each day. On some days (s)he doesn't eat anything at all. Through this

combination of dieting and exercise, [Amanda/Matthew] has been able to further reduce her/his weight to the point that (s)he is now severely underweight. Despite [her/his] increasingly thin and gaunt appearance, [Amanda/Matthew] denies that (s)he is underweight. (S)he is terrified of becoming "fat" and refuses to make any effort to put weight back on.

Emotional Eating:

[Amanda/Matthew] is a 21-year-old second-year university student. Since s/he was young, s/he would sometimes reward him/herself with food and eat when s/he was sad, unhappy, or bored. Upon starting college, [Amanda/Matthew] began turning to food more often to help him/her cope with stress and negative emotions. For example, after finishing a medium-sized meal, [Amanda/Matthew] will sometimes go back for a second plate of food or eat snack foods that are high in sugar, fat, and/or calories. When [Amanda/Matthew] is stressed, s/he feels like s/he has less control over his/her eating than s/he would like, and will often eat even though s/he is not hungry. While these eating episodes help [Amanda/Matthew] feel better after having a stressful day, (s)he also feels a little guilty afterwards. Although [Amanda/Matthew] sometimes eats to cope with stress, she also tries to manage stress in other ways, such as spending time with friends and family, listening to music, and reading books (s)he enjoys.

Binge-Eating Disorder:

[Amanda/Matthew] is a 21-year-old second-year university student. Since s/he was young, s/he has been unhappy with the size and shape of [her/his] body and has tried a number of diet and healthy eating plans. Upon starting college, [Amanda/Matthew] began turning to food more often to help him/her cope with stress and negative emotions. For example, when [Amanda/Matthew]

starts to eat a medium-sized meal, s/he finds that s/he is unable to stop eating, and will often go back for two or three more plates of food plus several different snack foods that are high in sugar, fat, and/or calories. Afterwards, [Amanda/Matthew] feels uncomfortably full, depressed, and very guilty. Although [Amanda/Matthew] hates the shape of [her/his] body, it is hard for him/her to stop these eating episodes, which happen at least once a week. [Amanda/Matthew] has never told anyone about how (s)he feels or the way(s)he loses control of [her/his] eating.

Picky Eating:

[Amanda/Matthew] is a 21-year-old second-year university student. Since s/he was young, s/he has eaten a less varied diet than his/her friends and siblings. When s/he does try a new food, s/he almost never likes it enough to keep eating it. If foods that s/he usually likes are prepared differently, or even look different, from what s/he is used to, s/he feels uncomfortable and often will avoid eating them. [Amanda/Matthew] has always had a hard time eating in restaurants or at friends' houses because the food looks, smells, or tastes "weird" to him/her. When s/he was growing up, his/her parents and his/her pediatrician sometimes commented that his/her diet didn't contain enough "healthy foods." However, [Amanda/Matthew] has never experienced any health problems because of his/her diet. Upon starting college, [Amanda/Matthew] was able to find only a few foods s/he likes at the dining hall, but s/he is able to eat the same foods almost every day. When his/her friends invite him/her to eat at restaurants, s/he usually eats a snack before going in case there is nothing there that s/he likes, but s/he goes anyway because s/he likes spending time with his/her friends.

Avoidant/Restrictive Food Intake Disorder (ARFID): Picky Eating

[Amanda/Matthew] is a 21-year-old second-year university student. Since s/he was young, s/he has eaten a less varied diet than his/her friends and siblings. When s/he does try a new food, s/he almost never likes it enough to keep eating it. If foods that s/he usually likes are prepared differently, or even look different, from what s/he is used to, s/he feels uncomfortable and often will avoid eating them. [Amanda/Matthew] has always had a hard time eating in restaurants or at friends' houses because the food looks, smells, or tastes "weird" to him/her. When s/he was growing up, his/her parents and pediatrician were very concerned that there were no "healthy foods" in his/her diet. Upon starting college, [Amanda/Matthew] has struggled to find food s/he feels able to eat, and sometimes chooses to eat nothing at all. S/he usually avoids going to the dining hall or going out with friends because s/he is embarrassed by his/her limited diet and comments people make about it. One day, [Amanda/Matthew] decided to weigh him/herself and became very worried when s/he saw how much weight s/he had recently lost.

Author Statement

Authors JME, JHE, HZ, JR, RH, and MW designed the study and wrote the protocol. Authors JME, JHE, RH, and JZ conducted literature searches and provided summaries of previous research studies. Authors JME and JR conducted the statistical analysis. Author JME wrote the first draft of the manuscript and Authors JHE, HZ, RC, and MW contributed to the editing of the final document. All authors contributed to and have approved the final manuscript.

Highlights

- Men reported more stigmatizing views toward BED and AN than women
- BED and AN were viewed as more pathological than ARFID picky eating, restrained eating, and emotional eating
- Restrained eating was viewed as less pathological than BED, AN, ARFID, picky eating, and emotional eating