2019

The relation between disordered eating, stress, and anxiety in first-year college women

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The Relation Between Disordered Eating, Stress, and Anxiety in First-Year College Women

A Thesis Submitted

in Partial Fulfillment

of the Requirements for the Designation

University Honors

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May 2019

This Study by: Jenna Anderson

Entitled: The Relation Between Disordered Eating, Stress, and Anxiety in First-Year College Women

has been approved as meeting the thesis requirement for the Designation of University Honors

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Abstract

Eating disorders are serious mental illnesses which can impact any individual. Although they can negatively affect anyone, they disproportionately affect young women. The same is true for individuals with disordered eating. Disordered eating is more common than clinical eating disorders. The term disordered eating refers to subclinical eating disturbances. Past research has demonstrated a relation between disordered eating, stress, and anxiety. The current study expands upon this by examining these variables in first-year college-enrolled women. Participants were *n*=99 first-year college women who filled out the DASS-21, the EDE-Q, and a demographics questionnaire. Based on previous results, it was hypothesized that there would be a significant positive correlation between disordered eating and stress. It was also hypothesized that there would be a significant positive correlation between disordered eating and anxiety. Hypothesis one was supported, with a positive, significant correlation between disordered eating and stress, but hypothesis two was not supported. Additional analyses found that the DASS-21 stress subscale was significantly correlated with four out of the five subscales from the EDE-Q, whereas the DASS-21 anxiety subscale was only significantly correlated with one of five. Results from the current study indicate that interventions should be implemented on college campuses, including mindfulness and nutrition education programs, to target women with symptoms of stress and disordered eating.

The Relation Between Disordered Eating, Stress, and Anxiety in First-Year College Women

Eating disorders are serious psychological disorders that can impact anyone no matter their race, gender, age, ethnicity, sex, or socioeconomic status. Although this is true, eating disorders do disproportionately impact some groups of individuals more than others, such as young white women (King, 2013; Ball & Lee, 2000). According to the National Eating Disorders Association (NEDA) website, eating disorders are categorized by extreme emotions, attitudes, and behaviors surrounding weight and food (NEDA, 2018). Furthermore, these disorders cause clinically significant impairment and distress to a person's life. Therefore, concerns about weight and body image can become a serious, debilitating disorder (King, 2013). The term *disordered eating* refers to eating patterns and behaviors that may still be significant and distressing; however, individuals with disordered eating do not meet full criteria for a clinical eating disorder diagnosis. There are three primary eating disorders according to the *Diagnostic and Statistical Manual of Mental Disorders-5th edition* (*DSM-5*; American Psychiatric Association [APA], 2013). The three eating disorders discussed herein include Anorexia Nervosa, Bulimia Nervosa, and Binge-Eating Disorder. While these eating disorders require a clinical diagnosis by a healthcare professional, many more individuals suffer from subthreshold levels of disordered eating behaviors.

Anorexia Nervosa (AN) is an eating disorder most commonly characterized by extreme weight loss and distorted body image. People with this type of eating disorder typically severely restrict caloric intake. Specifically, the *DSM-5* (APA, 2013) criteria include the following:

> A. Restriction of energy intake relative to requirements, leading to a significantly low body weight in the context of age, sex, developmental trajectory, and physical health. Significantly low weight is defined as a weight that is less than minimally

normal or, for children and adolescents, less than minimally expected.

B. Intense fear of gaining weight or of becoming fat, or persistent behavior that interferes with weight gain, even though at a significantly low weight.

C. Disturbance in the way in which one's body weight or shape is experienced, undue influence of body weight or shape on self-evaluation, or persistent lack of recognition of the seriousness of the current low body weight.

Specify whether:

Restricting type: During the last three months, the individual has not engaged in recurrent episodes of binge eating or purging behavior (i.e. self-induced vomiting, or the misuse of laxatives, diuretics, or enemas). This subtype describes presentations in which weight loss is accomplished primarily through dieting, fasting and/or excessive exercise.

Binge-eating/purging type: During the last three months the individual has engaged in recurrent episodes of binge eating or purging behavior (i.e. self-induced vomiting, or the misuse of laxatives, diuretics, or enemas).

Specify current severity:

Mild: BMI more than 17

Moderate: BMI 16- 16.99

Severe: BMI 15-15.99

Extreme: BMI less than 15 (p. 338-339)

Thus, anorexia nervosa, commonly referred to simply as anorexia, is a disorder that involves a relentless pursuit of obtaining a desired level of thinness through starvation (King, 2013; Mash & Wolfe, 2016). Individuals with this type of eating disorder also frequently show a major

distortion in how they perceive their body shape and weight (Mash & Wolfe, 2016). According to the NEDA website, and other researchers, this eating disorder commonly has an onset during adolescence (King, 2013; Mash & Wolfe, 2016; NEDA, 2018). The overall prevalence rate of anorexia is thought to be 0.3%, and is much more common among girls and women than boys or men, with a female-to-male ratio of 10:1 (King, 2013; APA, 2013). The disorder commonly occurs following a period of dieting and some form of life stress, but also likely has genetic underpinnings (King, 2013). Additionally, it is very possible that anorexia can lead to physical changes in an individual's body. The growth of hair all over the body, thinning of bones and hair, severe constipation, low blood pressure, and the loss of menstruation are a few examples (King, 2013). Furthermore, anorexia is said to have the highest mortality rate of any psychological disorder (King, 2013). An important consideration is that you cannot tell if a person is struggling with anorexia by simply looking at them. Even if a person is not underweight, a serious eating disorder could still be present. Along that line, there are individuals who present with disordered eating, but do not meet all of the above criteria, and thus are considered sub-clinical.

Bulimia Nervosa (BN) is an eating disorder which is characterized by bingeing and compensatory behaviors that are meant to compensate for the aforementioned bingeing. Most individuals with bulimia have a preoccupation with food and have an intense fear of becoming overweight; however, these individuals do not experience excessive weight loss as is the case with anorexia (King, 2013; Mash & Wolfe, 2016). Instead, most individuals with bulimia are within 10 percent of their normal weight (Mash & Wolfe, 2016). *DSM-5* (APA, 2013) criteria include:

A. Recurrent episodes of binge eating. An episode of binge eating is characterized by both:

1. Eating in a discrete period of time (e.g. within any 2-hour period), an amount of food that is definitely larger than what most individuals would eat in a similar period of time under similar circumstances;

2. A sense of lack of control over eating during the episodes (e.g. a feeling that one cannot stop eating or control what or how much one is eating.

B. Recurrent inappropriate compensatory behaviors to prevent weight gain, such as self-induced vomiting; misuse of laxatives, diuretics, or other medications; fasting; or excessive exercise.

C. The binge eating and inappropriate compensatory behaviors both occur, on average, at least once a week for 3 months.

D. Self-evaluation is unduly influenced by body shape and weight.

E. The disturbance does not occur exclusively during episodes of anorexia nervosa.

Specify current severity:

Mild: An average of 1-3 episodes of inappropriate compensatory behaviors per week.

Moderate: An average of 4-7 episodes of inappropriate compensatory behaviors per week.

Severe: An average of 8-13 episodes of inappropriate compensatory behaviors per week.

Extreme: An average of 14 or more episodes of inappropriate compensatory behaviors per week. (p. 345)

Bulimia can be difficult to detect because individuals with this type of eating disorder are typically within a normal weight range (King, 2013). Additionally, individuals with bulimia often go unnoticed for extended periods of time because they attempt to conceal their binges

(Mash & Wolfe, 2016). For these reasons, individuals with bulimia often hide their disorder for a long time and suffer from prolonged feelings of shame or self-disgust (King, 2013). Bulimia nervosa also has physical side effects that are a direct result of the compensatory behaviors used following bingeing, such as self-induced vomiting and laxative abuse. These side effects range from a chronic sore throat to dehydration and gastrointestinal issues (King, 2013). The disorder also impacts dental health, as the acid in vomit can erode the enamel from an individual's teeth (King, 2013). Bulimia typically has a later onset than does anorexia, but has a higher prevalence rate (Mash & Wolfe, 2016). It usually begins in late adolescence or early adulthood, and, again, occurs more frequently among women, with a female-to-male ratio of 10:1 (King, 2013; Mash & Wolfe, 2016; APA, 2013). This eating disorder affects between 1 and 4 percent of young women (King, 2013). In contrast to those with anorexia, individuals suffering from bulimia tend to have low self-efficacy levels (King, 2013). This means that they tend to have very high standards for themselves, but they also have very low confidence in their ability to achieve their goals.

There are many possible explanations for the etiology of bulimia and anorexia. For many years researchers have believed that these two eating disorders are caused by media images and family pressures. Indeed, media images glorify extremely thin women and emphasis is placed on the thin ideal; however, most people are exposed to these images but only a very small portion of them develop a clinical eating disorder (King, 2013). Instead, many more women experience patterns of disordered eating. Biological underpinnings are also implicated in the etiology of eating disorders. Researchers know that genes influence psychological characteristics that are associated with bulimia and anorexia (King, 2013). These include perfectionism, drive for thinness, impulsivity, and obsessive-compulsive tendencies. Genes also influence behaviors related to the disorders such as restrained eating, binge eating, and self-induced vomiting (King,

2013). Not only that, but genes play a role in the regulation of serotonin, which is disrupted in both anorexia and bulimia. Finally, the physical symptoms associated with these two eating disorders may change neural networks, thus sustaining them in a vicious cycle (King, 2013).

Finally, Binge-Eating Disorder (BED) is an eating disorder characterized by recurrent consumption of large amounts of food, often to the point of discomfort. These episodes result from a loss of control over how much an individual eats. Following these binges, individuals frequently feel shame, distress, and guilt; however, they do not use compensatory behaviors as is the case with bulimia. The *DSM-5* (APA, 2013) criteria for this eating disorder is as follows:

A. Recurrent episodes of binge eating. An episode of binge eating is characterized by both:

1. Eating in a discrete period of time (e.g. within any 2-hour period), an amount of food that is definitely larger than what most individuals would eat in a similar period of time under similar circumstances;

2. A sense of lack of control over eating during the episodes (e.g. a feeling that one cannot stop eating or control what or how much one is eating).

B. Binge eating episodes are associated with three or more of the following:

1. Eating much more rapidly than normal.

2. Eating until feeling uncomfortably full.

3. Eating large amounts of food when not feeling physically hungry.

4. Eating alone because of feeling embarrassed by how much one is eating.

5. Feeling disgusted with oneself, depressed, or very guilty afterwards.

C. Marked distress regarding binge eating is present.

D. The binge eating occurs, on average, at least once a week for 3 months.

E. The binge eating is not associated with the recurrent use of inappropriate compensatory behavior as in bulimia nervosa and does not occur exclusively during the course of bulimia nervosa or anorexia nervosa.

Specify current severity:

Mild: 1-3 binge eating episodes per week.

Moderate: 4-7 binge eating episodes per week.

Severe: 8-13 binge eating episodes per week.

Extreme: 14 or more binge eating episodes per week. (p. 350)

Although Binge-Eating Disorder is the most newly recognized eating disorder in the *DSM-5*, it is more prevalent than either anorexia nervosa or bulimia nervosa (King, 2013). It is also currently the most common eating disorder among individuals in the United States (NEDA, 2018). It is estimated that 2 to 5 percent of Americans will suffer from BED in their lifetime (King, 2013). Unlike individuals with BN or AN, most individuals with binge eating disorder are typically overweight or obese (King, 2013). In fact, approximately 8 percent of individuals who are obese are thought to have BED (King, 2013). In comparison to those who are obese without BED, those with the eating disorder are more preoccupied with their weight, shape, and physical appearance (King, 2013). It is common for these individuals to eat alone because of embarrassment or guilt, and they frequently feel ashamed and disgusted after overeating (King, 2013). The physical problems associated with this eating disorder are related to obesity complications in general, including diabetes, high blood pressure, and cardiovascular disease (King, 2013). BED is likely to have a genetic etiology as with AN and BN (King, 2013). In individuals with BED, the areas of the brain and endocrine system that respond to stress are overactive, which causes these individuals to be more likely to perceive events as stressful and

react to that stress by binge eating (King, 2013). Additionally, research has demonstrated that the American culture might have an influence on this eating disorder, suggesting that it increases a person's risk (King, 2013). For instance, research has shown that eating disorders such as BED are far more prevalent among females in industrialized, Western societies, most notably in the United States (Pomerantz, 2017). Even those who do not meet the clinically relevant criteria are still impacted by the American culture which promotes ease of access to processed food, food in large quantities, and chain restaurants producing food in a quick manner. As such, it is easy to see how an individual might develop disordered eating behaviors, without being clinically significant.

While all three of the primary eating disorders vary in their presentation, they share some commonalities. For example, individuals with eating disorders tend to be highly perfectionistic (King, 2013). They obsessively think about their weight and body image in a way that greatly impacts their daily life. These individuals are rigid in their thinking, and often see things in 'black and white' (Mash & Wolfe, 2016). For instance, they either feel in total control, or totally out of control. In combination, these three primary eating disorders are the third most common illness in adolescent females, demonstrating their large impact on this specific population (Mash & Wolfe, 2016). Furthermore, the single best predictor for developing an eating disorder is being female, and being an adolescent is the greatest period of risk for onset (Mash & Wolfe, 2016).

Although eating disorders are extremely impairing, few individuals will meet full diagnostic criteria. As was mentioned earlier, there are many more who struggle with sub-clinical levels of eating disturbances, known as disordered eating (King, 2013). Disordered eating is a broad term that describes eating patterns and behaviors that may still be significant and distressing, but that do not meet full diagnostic criteria for an eating disorder. Disordered

eating, therefore, consists of a range of irregular eating that does not warrant a diagnosis (Anderson, 2018). Because young women are disproportionately affected by these disorders, college women are particularly at-risk. Not only are age and gender factors of increased risk, but the transitional period into college is an important factor too. The transition to college, namely the first year of college, is a difficult time for many individuals (Quick & Byrd-Bredbenner, 2013). This developmental period is called emerging adulthood and is characterized by increasing independence (Arnett, 2000). It is often a stress- and anxiety-provoking experience; something that relates to an increase in disordered eating (Striegel-Moore, Silberstein, Frensch, & Rodin, 1989). The college campus culture also promotes disordered eating behaviors (Vohs, Heatherton, & Herrin, 2001). Common examples of disordered eating in college students might include skipping meals to fit into a new outfit, bingeing on food after a night of drinking, excessive exercise before a big event, frequent dieting, and rigid or inflexible eating. Past research has examined how stress and anxiety play a role in disordered eating. These studies have often been conducted separately, studying the relation between stress and disordered eating separate from the relation of anxiety and disordered eating. Additionally, other studies have separately examined these relations as they apply to college students, specifically. The current study extends this literature base to include stress, anxiety, and disordered eating in a sample of emerging adult college women.

A review by Ball and Lee (2000) found one factor which was especially related to disordered eating in each of the 23 studies that it examined. This factor was stress. The studies from the review found consistent relationships between stress measures and the degree of disordered eating (Ball & Lee, 2000). These results demonstrate the robustness of this relation between stress and disordered eating across multiple populations. The review also noted that

women overall reported considerably high levels of stress, therefore demonstrating the impact on women specifically. A different study, which examined the relation between anxiety and disordered eating, found similar results. In a study by Vardar and colleagues (2007), researchers sought to identify how young female athletes were affected by this relation. They determined that anxiety scores were higher in athletes with disordered eating behaviors than those without (Vardar et al., 2007). This relation was regardless of type of sport, meaning that athletes in both leanness and non-leanness sports reported similar scores of anxiety and disordered eating. These results demonstrate how females in general are at risk, even when factoring in differences.

There have also been studies directly related to disordered eating in the college population, which present similar results as those previously mentioned. In a longitudinal study by Vohs and colleagues (2001), researchers noted that college is rich in factors associated with disordered eating. Additionally, those factors seem to be most salient upon first arrival to college, when students are in the process of transitioning. These authors studied over 300 female students as they transitioned from high school to college. Overall, more negative body self-perceptions were reported in college than in high school by the women in this study. More women also categorized themselves as overweight and reported greater body dissatisfaction in college than in high school. These results were present regardless of not being considered overweight by national standards (Vohs et al., 2001). The reports by the women in this study show change in disordered eating thoughts and behavior over the course of their transition from high school to college. A study by Quick and Byrd-Bredbenner (2013) also highlighted the stresses of the transition to college and the associated health-related impacts, such as disordered eating. The authors identified some of the key factors as being related to sociocultural expectations, emotional stress, and dichotomous thinking (Quick & Byrd-Bredbenner, 2013). In

their sample of over 2,600 college students, nearly 40% reported various dieting behaviors, even though most participants were at a healthy weight. Also, women in the study appeared to be more negatively impacted by disordered eating than men. Females scored significantly higher on specific scales of eating concerns, restraint, and emotional eating. They also had significantly greater concerns about their shape and weight, were more likely to base their self-worth on physical appearance, and placed a greater value on overall appearance (Quick & Byrd-Bredbenner, 2013). Not only were women more negatively impacted by disordered eating, but they also reported more psychological characteristics, including scoring significantly higher on depression and anxiety scales (Quick & Byrd-Bredbenner, 2013). In combination, these studies demonstrate the impacts of disordered eating in the college population.

Further studies have examined disordered eating in college students at more specific intervals such as the beginning and end of the first year or during periods of increased stress (Striegel-Moore et al., 1989; Costarelli, & Patsai, 2012). In Striegel-Moore et al.'s (1989) study, college men and women were assessed at the beginning and end of their first year of college to identify factors related to a worsening of disordered eating. Results from this study indicated that rates of bulimia nervosa remained the same over the course of time, but disordered eating was significantly greater by the end of the year. Students who had reported disordered eating at the beginning of the year reported significantly greater levels of disordered eating by the end of the year. Also notable, was the fact that many students who initially did not report any disordered eating at the beginning of the year, reported the introduction of disordered eating by the end of the year. These results demonstrate how symptomatic disordered eating can increase, but still remain at a subthreshold level. Analyses also determined that females were significantly more likely to report that they had ever been on a weight loss diet, had a history of binge eating, or had

ever used purging to control their weight (Striegel-Moore et al., 1989). Other analyses related to identifying factors that might relate to the worsening of disordered eating symptoms over the course of the first year. These included high perceived stress, an increased sense of ineffectiveness, and an increase in negative feelings about weight (Striegel-Moore et al., 1989). These are similar to results from the studies previously mentioned (Ball & Lee, 2000; Vohs et al., 2001; Quick & Byrd-Bredbenner, 2013).

In order to examine how the factors of stress, disordered eating, and college are interrelated, Costarelli and Patsai (2012) sought to explore the possible effect of academic examination stress on disordered eating in college women. In this study female college students were assessed during an examination period and again during a control period with no scheduled exams and relatively few academic responsibilities. Results from the study relate to past research literature (Striegel-Moore et al., 1989; Ball & Lee, 2000; Vohs et al., 2001; Vardar et al., 2007; Quick & Byrd-Bredbenner, 2013). Moreover, female university students reported significantly higher levels of disordered eating attitudes, higher levels of anxiety, and lower levels of self-esteem during the examination stress period compared to the control period (Costarelli & Patsai, 2012). More importantly, disordered eating was significantly positively correlated with anxiety during both the period of increased academic stress and the control period. This information is valuable because it demonstrates the impact of anxiety on disordered eating, regardless of level of stress. This also further validates past research on the relation between anxiety and disordered eating. In combination, all of these studies demonstrate how results related to disordered eating, stress, and anxiety have been consistent over the span of several decades. The current study sought to extend the results of these studies by examining stress, anxiety, and disordered eating in a sample of emerging adult college women.

Current Study

The current study uses the information from past research literature and builds upon it. From past literature it is known that disordered eating, whether clinical or subclinical, impacts women to a greater extent than men. It is also known that the transition to college can be an extremely stress- and anxiety-provoking time. The current study uses that information and applies it in combination to further examine the relation between each variable. Thus, the current study is needed in order to demonstrate the impact that stress and anxiety, coupled with disordered eating, can have on college-aged women and the possible future implications that it may hold.

Hypotheses

Hypothesis 1. For first-year college women there will be a significant positive Pearson's correlation between disordered eating and stress.

Hypothesis 2. For first-year college women there will be a significant positive Pearson's correlation between disordered eating and anxiety.

Methods

Participants

Participants in this study were first-year college women (n=99) from a medium-sized midwestern university, who were given a choice of compensation in the form of one research credit, as required by Introductory Psychology courses at the university, or an $8 gift card to either *Subway or Starbucks*. An a priori power analysis was conducted; to achieve adequate power with a medium effect size (r = .4), 79 participants were required (Faul, Erdfelder, Lang, & Buchner, 2007). Thus, a final sample size of 99 participants provides sufficient power for the current study. Data were collected and cleaned, with a total of 99 participants remaining after 46

participants were removed for exclusionary criteria, such as being male. All participants in the final sample were cisgender females (n=98, 98.9%), leaving one individual who did not enter information regarding sex and gender. This person was retained in the sample to be gender inclusive. The sample was primarily Caucasian/White (88.9%), with 3.03% identifying as African American or Black, 4.04% identifying as Asian American or Asian, 2.02% identifying as multiracial, and two individuals who did not answer (2.01%). Most participants were 18 years old (83.8%) or 19-year olds (13.1%), and some did not answer the question (3.1%). These demographic factors were expected, as the sample was first-year college women at a predominantly white university.

Procedure

The current study was one part of a larger study; only relevant procedures and materials will be discussed herein. Participants in this study were recruited in two ways. The first was through an online participant management pool. Secondly, they were recruited from first-year classes such as Introduction to Psychology, Introductory College Reading and Writing, and Student Academic Success. Recruitment in this manner took place in person with a two-minute speech giving information regarding the study. Students were then asked to write down their name and email address if they wished to be contacted for participation. Those who chose to do so were contacted via email with possible participation dates and times.

Once participants signed up for a time and date, they were given a location to participate in the study. Participants met a research assistant in a large room, containing four additional private rooms. Prior to beginning the study, each participant signed a consent form after they were read a short paragraph further explaining the study and the debriefing process that would follow. They were then given a copy of the consent form to keep and asked if they had any

questions. Following this, each participant went into one of the private rooms to complete a survey packet. Each packet held several measures/questionnaires, three of which pertain to this study. After the completion of all items, participants were given a sheet with their depression screener score and a list of mental health resources on the university campus and in the community. If the participant scored in either the low or mild risk range, they were debriefed by an undergraduate research assistant. This debriefing included a thank you for participation along with the resource list. However, if the participant scored in either the moderate or significant risk range, they were debriefed by a clinical psychology graduate student research assistant. This debriefing process included all the same things as would be done by an undergraduate research assistant, but with an additional step. Graduate research assistants asked these participants if they would like to be walked to the campus counseling center or have help making a call to set up an appointment, giving them the option to decline both offers. After the debriefing process was completed, participants were granted their choice of compensation for participation.

Measures

The following measures, and the others included in the larger part of the study, were all presented in a randomized order to control for ordering effects. The measures included for the purposes of the current study were three of seven.

Depression Anxiety and Stress Scales (DASS-21). The *Depression Anxiety and Stress Scales (DASS-21)* is a twenty-one item questionnaire which uses a Likert-type scale (0=*did not apply to me at all*; 3=*applied to me very much or most of the time*) and measures levels of depression, anxiety, and stress (Lovibond & Lovibond, 1995). An example item on the DASS-21 is “I found it hard to unwind.” Each item is based on experiences within the past week. This self-report measure was used in the current study to determine scores of anxiety and stress. The stress

subscale of the DASS-21 has been shown to have excellent internal consistency reliability (alpha = .90; Lovibond & Lovibond, 1995). Likewise, the anxiety subscale of the DASS-21 has been shown to have excellent internal consistency reliability (alpha = .94; Lovibond & Lovibond, 1995). In the current study, DASS-21 stress and anxiety internal consistency reliability scores were nearly excellent and poor, respectively (alphas = .89 and .58 respectively).

Eating Disorder Examination Questionnaire (EDE-Q). The *Eating Disorder Examination Questionnaire (EDE-Q)* is a measure consisting of twenty-two questions using a Likert-type scale (0=*no days*, 5=*23-27 days*; 0=*not at all*, 3=*markedly*), followed by several yes/no questions, and questions requiring a numerical value (Fairburn & Beglin, 2008). An example item on the EDE-Q is "On how many of the past 28 days have you been deliberately trying to limit the amount of food you eat to influence your shape or weight (whether or not you have succeeded)?". Each item on this measure is based upon personal experiences within the past four weeks, or 28 days. This measure helped the current study signify disordered eating behaviors in participants. The EDE-Q measure has been shown to have excellent internal consistency reliability (alpha=.91; Rose et al., 2013). In the current study, the EDE-Q internal consistency reliability score was acceptable (alpha = .73).

Demographics Questionnaire. A demographics questionnaire created by the authors was given to each participant to determine age, biological sex, gender, and race/ethnicity. There were also questions pertaining to honesty, and those related to part of the larger study.

Results

After the data were collected, the dataset was cleaned and prepared for analysis. The two hypotheses were first examined. The first hypothesis in this study was that for first-year college women there would be a significant positive Pearson's correlation between disordered eating (as

measured by the EDE-Q) and stress (as measured by the DASS-21 stress subscale). This correlation was significant, which supports the hypothesis ($r(92) = .33$, $p = .001$). The second hypothesis was that for first-year college women there would be a significant positive Pearson's correlation between disordered eating (as measured by the EDE-Q) and anxiety (as measured by the DASS-21 anxiety subscale). This correlation was non-significant, which refutes the hypothesis ($r(92) = .08$, $p = .473$).

Other exploratory analyses were then conducted to evaluate the relation between subscales of the EDE-Q and DASS-21, in order to determine if specific types of disordered eating were correlated with stress and anxiety to a greater extent than others. The subscales of the EDE-Q include restraint, eating concern, shape concern, weight concern, and bingeing/purging behaviors. Sum scores and average scores were calculated for the subscales of both the DASS-21 and EDE-Q, and multiple correlations were conducted, some of which produced significant results.

All correlation results are presented in Table 1. As expected, DASS-21 depression was significantly positively correlated with both stress and anxiety DASS-21 scores ($r(97) = .35$, $p < .001$; $r(97) = .94$, $p < .001$). Past literature has demonstrated that depression and anxiety are often comorbid, therefore past results help to validate the results from this study (Gorman, 1996; Hirschfeld, 2001; Cummings, Caporino, & Kendall, 2014). Examining the subscales of the DASS-21 specifically, it is notable that the stress subscale was significantly correlated with all DASS-21 and EDE-Q subscales, except for anxiety and shape concern. Conversely, the anxiety subscale of the DASS-21 was not significantly correlated with most other subscales; only with depression and weight concern. The total EDE-Q sum, or total disordered eating, was significantly correlated with all subscales, except for the DASS-21 anxiety subscale. The EDE-Q

subscale significantly correlated with the most items was weight concern, which was correlated with every other subscale.

Discussion

Previous research examining the relations between disordered eating, stress, anxiety, and the college transition has been conducted (Ball & Lee, 2000; Costarelli & Patsai, 2012; Quick & Byrd-Bredbenner, 2013; Root, 1991; Russon et al., 2019; Schwitzer & Rodriguez, 2002; Striegel-Moore et al., 1989; Vardar et al., 2007), and the current study aimed to reexamine these intercorrelations in one study. The results of the current study indicate that, as hypothesized, as rates of stress increase, so too do the rates of disordered eating in first year college women. However, the same cannot be said for anxiety and disordered eating in college women, which were not correlated in this sample. This null finding was contrary to the hypothesis.

Further analyses also indicated that DASS-21 stress was significantly correlated with four out of the five subscales from the EDE-Q (i.e., restraint, eating concern, weight concern, and binge/purge behaviors), whereas DASS-21 anxiety was only significantly correlated with one of five (i.e., weight concern). These results are consistent with past research on stress (Ball & Lee, 2000), suggesting that women are at a high risk for disordered eating when they report high levels of stress. However, the lack of a correlation between disordered eating and anxiety in the current study was unexpected based on previous findings (Vardar et al., 2007; Costarelli & Patsai, 2012). Specifically, in Vardar et al.'s (2007) study of female athletes, anxiety scores were higher in those with elevated disordered eating, demonstrating a relation between these two topics. Likewise, in the study by Costarelli and Patsai (2012), anxiety was significantly correlated with disordered eating, regardless of stress level. In the current study, the anxiety

subscale of the DASS-21 had poor internal consistency reliability. This could be the cause of the null findings, as they are out of step with past data.

Despite the fact that one of the two hypotheses was not supported, some of the exploratory analyses conducted in the current study replicate previous data. Specifically, it is well known that there is a consistent and significant correlation between depression and anxiety (Gorman, 1996; Hirschfeld, 2001; Cummings, Caporino & Kendall, 2014); something that was replicated herein. Results from each of these studies indicate a significant overlap in depression and anxiety symptoms, if not full clinical diagnoses. Additionally, the studies all highlight the importance of determining the impact that comorbidity has on individuals and treatment effectiveness. This is another topic that the current study sought to examine as well, but with other factors (e.g., disordered eating, stress, anxiety, and the transition to college).

Any significant finding in our data, as mentioned previously, was a correlation. Thus, a causal direction between variables cannot be determined. Although this is true, some prominent researchers have generated hypotheses regarding specific causal direction based on other methodologies. Many of these hypotheses are multifactorial in nature. Research by Root (1991) found that rates of disordered eating are significantly high in females with a past history of sexual abuse and/or rape, and suggests that it might be the cause. Additional hypotheses presented by the author include sociocultural norms, dysfunctional family life, and low self-esteem. Other studies have also presented similar and additional hypotheses regarding causal direction such as stress or anxiety causing disordered eating, disordered eating causing stress or anxiety, personality trait, or body image dissatisfaction (Russon et al., 2019; Ball & Lee, 2000; Vardar et al., 2007; Costarelli & Patsai, 2012).

Implications

These findings have implications for college campus administrators as they plan for mental health and well-being resources for their students. Overall, these results suggest that college leaders should be focused on reducing stress and identifying eating problems in students as they transition to college. For instance, college administrators should provide adequate funding to campus counseling and health centers. Additionally, they should hire an adequate number of mental health professionals who are able to provide effective and empirically-supported treatments to students with disordered eating. There are many treatment options that could be used, three of which include: dissonance-based programs, mindfulness programs, and nutrition education programs.

In an effectiveness trial study conducted by Stice, Rohde, Shaw & Gau (2011), researchers determined that dissonance-based programs are one way to successfully reduce disordered eating thoughts and behaviors. According to these authors, participants in the dissonance-based treatment group showed significantly greater decreases in body dissatisfaction and eating disorder symptoms, reduced risk for eating disorder onset, and improved psychosocial functioning when compared to a control group that received an informational brochure (Stice et al., 2011). Decreases in thin-ideal internalization and self-reported dieting were also present, but to a lesser degree. The results from this study demonstrate the effectiveness of such a program, and other schools should seek to adopt a similar strategy.

Additional programs that could be implemented on college campuses to help combat disordered eating in young women are mindfulness and nutrition education. Several studies related to these interventions have been conducted, producing valuable information (Katterman, Kleinman, Hood, Nackers & Corsica, 2014; Baer, Fischer & Huss, 2005; Quick & Byrd-

Bredbenner, 2013). Mindfulness and acceptance-based approaches for the treatment of clinical problems are becoming more popular and accruing substantial empirical support (Baer et al., 2005). Helpful mindfulness techniques include awareness, acceptance, and meditation. Mindfulness programs have produced similar or greater results than current programs for disordered eating such as interpersonal therapy or dialectical behavior therapy (Katterman et al., 2014). More importantly, these mindfulness program studies have resulted in reductions of disordered eating (Baer et al., 2005; Katterman et al., 2014). Other studies suggest that nutrition education would be a useful intervention on college campuses. Quick and Byrd-Bredbenner (2013) argue that effective nutrition education programs address disturbed eating behaviors and provide guidance on how to seek professional help. They also state that the most effective interventions are targeted and tailored to specific audiences. These treatments should especially be considered during periods of increased stress, such as during final examinations, because rates of disordered eating increase as stress does (Costarelli & Patsai, 2012; Ball & Lee, 2000). When implemented correctly, education programs regarding these topics can create and maintain healthy patterns of behaviors and help to reduce the presence of comorbidity.

It is not the sole responsibility of college administrators and mental health professionals to recognize these behaviors and do something about it. Primary care providers in the community should also be aware of these results, as they interact with individuals that may present with any number of these concerns. For example, primary care providers should screen for disordered eating risk if they have a patient who reports being stressed or anxious in order to determine if early intervention can take place, such as the programs that were previously mentioned (Quick & Byrd-Bredbenner, 2013; Russon et al., 2019; Stice et al., 2011; Katterman et al., 2014; Baer et al., 2005). Primary care providers should refer individuals presenting with these issues to the

correct resources in order to reduce rates of disordered eating in college students, and more specifically, first-year college women.

Limitations & Future Directions

The population for the current study was specifically chosen. As previously mentioned, women are at a significantly greater risk for disordered eating, stress, and anxiety. Women in emerging adulthood are especially at an increased risk. First-year college women are thus a valuable population to study in relation to these three variables due to their gender and age. However, because of this, the sample was homogenous. Participants were primarily white and 18 years old, with few participants outside of these demographic categories. Some of these demographics were specifically chosen, including sex/gender and year in school, whereas others were a result of the population that was sampled (i.e., first-year students at a predominantly white university). Although the data are important and interesting for this specific group, it means that the results cannot be generalized to men or non-binary people, non-traditional (i.e., older) college students, students in other parts of the country, or students from other racial/ethnic groups. These are examples of possible limitations to this study. Future studies should examine these relations in various other populations.

In addition, the internal consistency reliability of the anxiety subscale of the DASS-21 was poor, which limits the conclusions that can be drawn from any correlation including this subscale. To alleviate this problem, future studies should include the use of other or additional measures, as the poor alpha in this scale was unexpected. Moreover, a different measure of anxiety, such as the *State-Trait Anxiety Inventory* (*STAI;* Spielberger, Gorsuch, & Lushene, 1968), could be used to determine whether disordered eating and anxiety are or are not significantly correlated. This would help in determining whether the correlation between anxiety

and disordered eating is robust. The STAI might be useful in a study like this because it has had good to excellent reliability in other studies related to disordered eating (Costarelli & Patsai, 2012; Vardar et al., 2007). Another limitation to this study was the short amount of time in which the target behaviors were measured, and the reliance on retrospective self-reports. In particular, the measures used in this study were only based on experiences within the past week (i.e., DASS-21) or past four weeks (i.e., EDE-Q). This limits the time frame that individuals relate to feelings of stress, anxiety, or disordered eating. Furthermore, other studies have examined these relations at different points in time (Costarelli & Patsai, 2012; Striegel-Moore et al., 1989), but none more than a one-year period. Studies in the future could examine the relation between disordered eating, stress, and anxiety as an individual progresses through college in order to determine if the correlations increase, decrease, remain constant, or become insignificant. In terms of the use of retrospective self-report, given their limitations, daily diaries of mood and eating behaviors might be more accurate and telling.

Conclusion

Results from the current study indicate that an increase in stress correlates with an increase in disordered eating, though the causal direction remains unknown. However, the current data did not replicate the often-cited correlation between stress and anxiety. Therefore, overall, the current study's results are similar to, and contrast from, past research. Data from the current study provides additional evidence that interventions on college campuses should be focused on stress reduction and targeting disordered eating patterns. Specific evidence-based interventions should be considered, such as mindfulness and nutrition education, to assist this vulnerable population.

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Appendix A

Depression Anxiety and Stress Scales

Please read each statement and circle the number (0, 1, 2 or 3) which indicates how much the statement applied to you over the past week. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

0 = Did not apply to me at all

1 = Applied to me to some degree, or some of the time

2 = Applied to me to a considerable degree or a good part of time

3 = Applied to me very much or most of the time

1. I found it hard to wind down

   0 1 2 3

2. I was aware of dryness of my mouth

   0 1 2 3

3. I couldn't seem to experience any positive feeling at all

   0 1 2 3

4. I experienced breathing difficulty (e.g. excessively rapid breathing, breathlessness in the absence of physical exertion)

   0 1 2 3

5. I found it difficult to work up the initiative to do things

   0 1 2 3

6. I tended to over-react to situations

   0 1 2 3

7. I experienced trembling (e.g. in the hands)

   0 1 2 3

8. I felt that I was using a lot of nervous energy

   0 1 2 3

9. I was worried about situations in which I might panic and make a fool of myself

   0 1 2 3

10. I felt that I had nothing to look forward to

    0 1 2 3

11. I found myself getting agitated

    0 1 2 3

12. I found it difficult to relax

    0 1 2 3

13. I felt downhearted and blue

    0 1 2 3

14. I was intolerant of anything that kept me from getting on with what I was doing

    0 1 2 3

15. I felt I was close to panic

    0 1 2 3

16. I was unable to become enthusiastic about anything

    0 1 2 3

17. I felt I wasn’t worth much as a person

    0 1 2 3

18. I felt that I was rather touchy

0 1 2 3

19. I was aware of the action of my heart in the absence of physical exertion (e.g. sense of heart rate increase, heart missing a beat)

0 1 2 3

20. I felt scared without any good reason

0 1 2 3

21. I felt that life was meaningless

0 1 2 3

Appendix B

Eating Disorder Examination Questionnaire (EDE-Q)

Instructions: The following questions are concerned with the past four weeks (28 days) only. Please read each question carefully. Please answer all the questions. Thank you.

Questions 1 to 12: Please circle the appropriate number on the right. Remember that the questions only refer to the past four weeks (28 days) only.

On how many of the past 28 days...

1. Have you been deliberately trying to limit the amount of food you eat to influence your shape or weight (whether or not you have succeeded)?

   NO DAYS 1-5 DAYS 6-12 DAYS 13-15 DAYS 16-22 DAYS 23-27 DAYS

2. Have you gone for long periods of time (8 waking hours or more) without eating anything at all in order to influence your shape or weight?

   NO DAYS 1-5 DAYS 6-12 DAYS 13-15 DAYS 16-22 DAYS 23-27 DAYS

3. Have you tried to exclude from your diet any foods that you like in order to influence your shape or weight (whether or not you have succeeded)?

   NO DAYS 1-5 DAYS 6-12 DAYS 13-15 DAYS 16-22 DAYS 23-27 DAYS

4. Have you tried to follow definite rules regarding your eating (for example, a calorie limit) in order to influence your shape or weight (whether or not you have succeeded)?

   NO DAYS 1-5 DAYS 6-12 DAYS 13-15 DAYS 16-22 DAYS 23-27 DAYS

5. Have you had a definite desire to have an empty stomach with the aim of influencing your shape or weight?

   NO DAYS 1-5 DAYS 6-12 DAYS 13-15 DAYS 16-22 DAYS 23-27 DAYS

6. Have you had a definite desire to have a totally flat stomach?

   NO DAYS 1-5 DAYS 6-12 DAYS 13-15 DAYS 16-22 DAYS 23-27 DAYS

7. Has thinking about food, eating or calories made it very difficult to concentrate on things you are interested in (for example, working, following a conversation, or reading)?

NO DAYS 1-5 DAYS 6-12 DAYS 13-15 DAYS 16-22 DAYS 23-27 DAYS

8. Has thinking about shape or weight made it very difficult to concentrate on things you are interested in (for example, working, following a conversation, or reading)?

NO DAYS 1-5 DAYS 6-12 DAYS 13-15 DAYS 16-22 DAYS 23-27 DAYS

9. Have you had a definite fear of losing control over eating?

NO DAYS 1-5 DAYS 6-12 DAYS 13-15 DAYS 16-22 DAYS 23-27 DAYS

10. Have you had a definite fear that you might gain weight?

NO DAYS 1-5 DAYS 6-12 DAYS 13-15 DAYS 16-22 DAYS 23-27 DAYS

11. Have you felt fat?

NO DAYS 1-5 DAYS 6-12 DAYS 13-15 DAYS 16-22 DAYS 23-27 DAYS

12. Have you had a strong desire to lose weight?

NO DAYS 1-5 DAYS 6-12 DAYS 13-15 DAYS 16-22 DAYS 23-27 DAYS

Questions 13-18: Please fill in the appropriate number underneath each question. Remember that the questions only refer to the past four weeks (28 days).

Over the past 28 days...

13. How many times have you eaten what other people would regards as an unusually large amount of food (given the circumstances)?

14. On how many of these times did you have a sense of having lost control over your eating (at the time you were eating)?

15. On how many **DAYS** have such episodes of overeating occurred (i.e. you have eaten an unusually large amount of food and have had a sense of loss of control at the time)?

16. How many times have you made yourself sick (vomit) as a means of controlling your shape or weight?

17. How many times have you taken laxatives as a means of controlling your shape or weight?

18. How many times have you exercised in a "driven" or "compulsive" way as a means of controlling your weight, shape or amount of fat, or to burn off calories?

Questions 19 to 21: Please circle the appropriate number. Please note that for these questions the term "binge eating" means eating what others would regard as an unusually large amount of food for the circumstances, accompanied by a sense of having lost control over eating.

19. Over the past 28 days, on how many days have you eaten in secret (i.e., furtively)? Do not count episodes of binge eating.

NO DAYS 1-5 DAYS 6-12 DAYS 13-15 DAYS 16-22 DAYS 23-27 DAYS

20. On what proportion of the times that you have eaten have you felt guilty (felt that you've done wrong) because of its effect on your shape or weight? Do not count episodes of binge eating.

NO DAYS 1-5 DAYS 6-12 DAYS 13-15 DAYS 16-22 DAYS 23-27 DAYS

21. Over the past 28 days, how concerned have you been about other people seeing you eat? Do not count episodes of binge eating.

NO DAYS 1-5 DAYS 6-12 DAYS 13-15 DAYS 16-22 DAYS 23-27 DAYS

Questions 22 to 28: Please circle the appropriate number on the right. Remember that the questions only refer to the past four weeks (28 days).

Over the past 28 days…

22. Has your weight influenced how you think about (judge) yourself as a person?

NOT AT ALL SLIGHTLY MODERATE MARKEDLY

23. Has your shape influenced how you think about (judge) yourself as a person?

NOT AT ALL SLIGHTLY MODERATE MARKEDLY

24. How much would it have upset you if you had been asked to weigh yourself once a week (no more, or less, often) for the next four weeks?

NOT AT ALL SLIGHTLY MODERATE MARKEDLY

25. How dissatisfied have you been with your weight?

NOT AT ALL SLIGHTLY MODERATE MARKEDLY

26. How dissatisfied have you been with your shape?

NOT AT ALL SLIGHTLY MODERATE MARKEDLY

27. How uncomfortable have you felt seeing your body (for example, seeing your shape in the mirror, in a shop window reflection, while undressing or taking a bath or shower)?

NOT AT ALL SLIGHTLY MODERATE MARKEDLY

28. How uncomfortable have you felt about others seeing your shape or figure (for example, in communal changing rooms, when swimming, or wearing tight clothes)?

NOT AT ALL SLIGHTLY MODERATE MARKEDLY

If female:

Over the past three to four months have you missed any menstrual periods?: YES NO

If so, how many?:

Have you been taking the “pill”?: YES NO

Appendix C

Demographics Questionnaire

Were you honest when completing this survey? YES NO

Age in years?: _____

What is your biological sex?

Male

Female

Intersex

What is your gender?

Male

Female

Transgender Male

Transgender Female

Non-binary/gender-fluid/gender queer

Not Listed: _____

Race/Ethnicity (all that apply):

Caucasian/White

African American or Black

Latino/Latina/Hispanic

Asian American or Asian

Native Hawaiian or Pacific Islander

Native American or American Indian

Biracial or Multiracial

Not Listed: _____

Table 1

Correlations between subscales of the DASS-21 and EDE-Q

Pearson Correlation									
Variable	1	2	3	4	5	6	7	8	9
1. Stress	-								
2. Anxiety	.196	-							
3. Depression	.351**	.940**	-						
4. Restraint	.345**	-.001	.064	-					
5. Eating Concern	.417**	.072	.192	.738**	-				
6. Shape Concern	.187	.094	.191	.470**	.422**	-			
7. Weight Concern	.387**	.206*	.311**	.621**	.662**	.689**	-		
8. Binge/Purge	.218*	.003	.117	.477**	.489**	.362**	.464**	-	
9. Total EDE-Q	.330**	.075	.208*	.734**	.725**	.787**	.806**	.802**	-

Note: * $p < .05$, ** $p < .01$, $n = 94\text{-}99$