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College Students' Perceptions of Popular Diets and Orthorexia Nervosa

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Abstract

Data suggest that individuals' purported dietary patterns influence others' perceptions of them. However, few studies have investigated how adherence to specific popular diets might influence these perceptions. This study investigated female undergraduates' (n = 463) perceptions of vignette characters described as adhering to specific dietary practices perceptions of a vignette character in a sample of 463 female undergraduates. Characters described as adhering to a Clean Eating diet were viewed most positively, followed by individuals on the Ketogenic diet or nondieters. Characters following an Intermittent Fasting diet, and those with Orthorexia Nervosa were viewed most negatively. These findings support the idea that individuals' adherence to specific popular diets might influence others' views of them. Correlates of Orthorexia Nervosa (ON) were also investigated; diet-related impairment and weight bias internalization were positively correlated with ON symptomatology. Attitudes towards the vignette character with ON were not significantly correlated with ON symptomatology. Future research should investigate potential links between impression management and dieting motivation and adherence.

College Students' Perceptions of Orthorexia Nervosa and Popular Diets

Most Americans have attempted to improve their diet at some point in the last 12 months, with one survey finding 94% reported dieting to lose weight in the past year (Puhl, Himmelstein, & Quinn, 2018). Thus, it is quite common for individuals to watch what they eat in the pursuit of better health. Indeed, a healthy diet can improve both physical and mental health. In contrast, a poor diet is a significant risk factor for disability and premature death (Devries et al., 2014). Diets high in nutritional quality can prevent diabetes, cancer, and obesity (Lock, Schneiderhan, & Zink, 2018). Additionally, healthy eating is linked to greater psychological well-being and quality of life, and lower risk of depression (Dreher, 2018; Godos, Castellano, & Marranzanno, 2019; Wayne et al., 2006).

However, determining what constitutes a healthy diet is increasingly difficult given the breadth and depth of information available to consumers. Indeed, many individuals report feeling confused about nutritional information (Spiteri-Cornish & Moraes, 2015). Numerous sources of this information exist, many of which contradict one another (Fitzgibbon et al., 2007). For example, in the 1970s, nutrition experts suggested saturated fat was a major contributor to heart disease, and consequently, consumers turned to low-fat diets (e.g. the Atkins diet) in an effort to eat healthier (Reedy, 2016). However, more recently, perceptions of dietary fat have shifted, with experts now viewing it as an important aspect of a healthy diet (Temple, 2018). Indeed, certain popular diets emphasize the importance of fat intake (e.g. Ketogenic diet; Walczyk & Wick, 2017). Given the shifting understanding of healthy eating, it is understandable that many feel frustrated when trying to interpret nutritional recommendations and establish a healthy diet (Crow, 2012).

This confusion might lead individuals to turn to sources offering seemingly straightforward solutions, such as fad diets, in their attempts to eat healthier. Surveys indicate that 39% of Americans report following a specific "fad" diet in the past year (IFIC, 2019). The popularity of these popular diets, including Intermittent Fasting, the Ketogenic diet, clean eating, Whole 30, and many more, seems to have eclipsed that of national nutritional recommendations in recent years (Brown et al., 2016). Unfortunately, adherence to these strict fad diets can have severe negative consequences for an individual's health, including fatigue, weight gain, and even organ failure (Mann et al., 2007; Khawandanah & Tewfik, 2016). In addition to these serious physical health consequences, fad diets can contribute to mental health concerns (Tomiyama et al., 2010; Polivy & Herman, 1985). For example, dieting has been shown to precipitate eating disorder onset (Heatherton & Polivy, 2013). Furthermore, emerging research suggests that a more recently identified eating concern, Orthorexia Nervosa (ON), a pathological obsession with healthy eating, might be related to adherence to a strict diet (Bratman & Knight, 2000).

College students appear more likely than individuals in other age groups to diet (Abraham et al., 1994; Striegel-Moore et al., 1990; Fayet, Petocz, & Samman, 2012). Moreover, college students are at a crucial point in their development; many are living independently for the first time, which greatly increases the autonomy they have regarding their dietary choices (Mann & Blotnicky, 2016). The current generation of college students also has constant access to social media, to which they often turn for information about diets and healthy eating (Subrahmanyam, Reich, Waechter, & Espinoza, 2008). This constant access to dietary advice on social media might make them particularly susceptible to the influence of those promoting strict fad diets.

Given the widespread popularity of fad diets, as well as the potential harm that comes from following them, it seems important to understand college students' perceptions of these eating patterns. Understanding young adults' perceptions of diets may help health professionals working with this age group. In addition to investigating young adults' perceptions of people following specific fad diets, this study investigated potential correlates of these views. Understanding characteristics associated with positive views of dieting might clarify why individuals turn to fad diets, and could ultimately inform efforts aimed at helping at risk individuals avoid potentially harmful dietary advice. Finally, this research examined the recently-emerged eating concern labeled Orthorexia Nervosa (ON). Specifically, this study investigated associations among adherence to fad diets, symptoms of ON, and health consciousness, body appreciation, depression, and anxiety (Barnes & Caltabiano, 2017; Luck-Sikorski et al., 2018; Barthels et al., 2016).

This document begins by reviewing the literature addressing conceptualizations of healthy eating. Next, information regarding some of the most popular fad diets is outlined. Then, the influence of social media on dieting is discussed, and data reviewing the importance of healthy eating for emerging adults are summarized. Next, the concept of ON and research on this construct are reviewed. This literature review provides the rationale for the research proposed at the end of this document, which investigated perceptions of dieting and ON in emerging adults.

What Is Healthy Eating?

Previous qualitative research has investigated the ways in which individuals from various groups define healthy eating (Bisogni et al., 2012). This literature reveals a range of definitions (Ronteltap, Sijstema, Dagevos, & de Winter, 2012), reflecting both individual differences, and

change over time (Bisogni et al., 2012). Shifts in nutrition science, as well as the emergence of new popular diets, appear to influence these trends (Kennedy et al., 2001; Shikany et al., 2007).

Specifically, a number of studies suggested that the definition of eating as "healthy" is related to the inclusion of specific foods in the diet. For example, researchers have found that consumers recognize the importance of fruit and vegetables to a healthy diet (Allicock et al., 2008; Austin, 2008; Povey et al., 1998). A study conducted with cancer survivors found that many of those interviewed perceived fruits and vegetables as the "key ingredient" to healthy eating (Allicock et al., 2008). Similarly, an analysis of the health beliefs of Latinx parents of toddlers found that these caregivers considered fruits and vegetables, "the most important food of the day" (Austin, 2008). Cross-cultural studies have found that many cultures endorse fruits and vegetables as a key to healthy eating (Banna et al., 2016). Overall, there seems to be general agreement that fruit and vegetable consumption are important components of a healthy diet.

Opinions of other food groups, however, vary both within and among various studies, and even among individuals within studies, highlighting confusion about what healthy eating entails. For example, meat and meat products are viewed differently by various groups. In one study conducted with a sample of Canadian women, participants noted that decreasing meat intake, particularly red meat, was considered an important way to improve one's diet (Chapman & Begman, 2003). Likewise, vegan and vegetarian individuals report that health is one of the major reasons they do not consume meat and animal products (Jabs, Devine, & Sobal, 1998). On the other hand, a number of studies have found that individuals identify meat as a necessary component of a "traditional" meal (Roos, Prättälä, & Koski, 2001; Keane & Willets, 1996). Indeed, in

some cases, individuals believe that maximizing intake of meat products leads to better health (Baker, 2019).

Similarly, opinions of dietary fat differ greatly between populations and individuals, and across time. From the 1950s to the 1990s, nutrition experts suggested that Americans' excess dietary fat consumption was the leading cause of increasing obesity rates (LaBerge, 2008). Years later, the notion that consumption of dietary fat leads to weight gain is widely disputed (Ludwig et al., 2018). In fact, a number of the currently popular fad diets recommend increasing fat intake to achieve optimal health (e.g. Ketogenic diet). Data from focus groups suggest lay individuals' current views of dietary fat vary widely (Bisogni et al., 2013). For example, one study of the dietary beliefs of women ages 65-88 found that they generally aimed to minimize their intake of dietary fat (Gustaffson, Ekblad, & Sidenvall, 2005). On the other hand, many individuals in United States now follow the Ketogenic diet (IFIC, 2019), which relies on fat as the primary source of caloric intake. Thus, it appears attitudes towards fat consumption have changed somewhat over time, and will likely continue to change as more research is conducted and diet trends further shift.

Another theme that emerges in the literature addressing conceptualizations of healthy eating is the importance of regular meals (Bisogni et al., 2013). Many individuals believe that eating at normal intervals throughout the day is crucial for healthy eating (Akamatsu et al., 2005; Savoca & Miller, 2001). However, for some, this belief has shifted in recent years as well, as noted by proponents of Intermittent Fasting. In addition, many endorse the importance of eating a wide variety of foods (McKie, 2000) and eating in moderation (Bryne, Cooper, & Fairburn, 2003).

Research also suggests that attitudes about healthy eating change considerably across the lifespan. Children have relaxed views of healthy eating and little knowledge about what it entails (Ross, 1995). As individuals enter adolescence, they learn more about nutrition, but often lack motivation or interest in engaging in healthier eating patterns (Croll, Neumark-Sztainer, & Story, 2001). In adulthood, ideas about healthy eating vary greatly, and tend to change following marriage or parenthood (Schee, 2009; Kremmer, Anderson, & Marshall, 1998; Bentley et al., 1999). Following marriage, many compromise their food preferences to accommodate the likes and dislikes of their partner (Kremmer et al., 1998). Commonly, one spouse aims to drive their partner to eat healthier, while the other steers their partner towards less healthy eating, leading to a "convergence" in eating patterns (Bove, Sobal, & Rauschenbach, 2003). After having children, parents often become more invested in healthy eating (Zehle et al., 2007). Many parents change their eating behaviors to model healthy eating for children and create a healthier environment, although some feed their children healthy food but retain their own (suboptimal) eating patterns (Zehle et al., 2007; Reimer et al., 2004). Clearly, development has a strong influence on eating patterns. Emerging adulthood (ages 18-25) appears to be one particularly crucial stage for the establishment of eating behavior (Mann & Blotnicky, 2016).

Although some research has investigated college-aged adults' perspectives on healthy eating, few studies have been completed in recent years. As stated earlier, internet (especially social media) use has greatly increased since these studies were conducted (Pew Research Center, 2019). The internet has significantly increased the accessibility of information about healthy eating and dieting (Allen et al., 2018). Moreover, this information is free and accessible 24/7. Given the amount and omnipresence of this information, the ways in which people conceptualize

healthy eating have likely changed markedly in recent years. In particular, it appears as though there is a shift towards following strict fad diets, rather than making small, healthy dietary changes, as is recommended in the medical community (Freeland-Graves & Nitzka, 2013). Therefore, it is important to enhance our understanding of how these fad diets are viewed, especially among young adults, a group that frequently interacts with social media.

Although most Americans attempt to follow a healthier diet as defined by their own understanding of this construct (Puhl et al., 2018), they might actually be following fad diets with potentially negative health effects. The following section reviews some of the most popular fad diets, as well as their correlates.

Popular Diets

"Clean" Eating

One dietary trend that has risen in popularity in recent years is "clean eating." In 2019, a yearly survey of American dietary habits conducted by the International Food Information Council found that clean eating was the most frequently endorsed dietary pattern (IFIC, 2019). Clean eating is generally defined as consuming foods that are local, organic, plant-based, home-cooked, or non-processed, and can include eliminating certain food groups (e.g. gluten, dairy, grains) (McCartney, 2016). There are considerable differences in individuals' definitions of clean eating, yet nearly all endorse positive feelings about this dietary approach (Ambwani et al., 2019). Clean eating is highly popularized on the internet, especially on sites and accounts offering "fitspiration" (Boepple & Thompson, 2014). One study found that over 25% of American women go to "clean eating" websites and blogs for recipes and dietary advice (Allen et al., 2018).

Clean eating websites can offer some healthy suggestions; however, they might also contribute to disordered eating patterns. A content analysis of clean eating sites found that the recipes available on those websites contained more protein and fiber than control recipes found on other food blogs (Dickinson, Watson, & Prichard, 2018). However, despite promises of greater health benefits, the clean eating blogs exceeded the World Health Organization (WHO) recommendations for sugar or fat intake (Dickinson et al., 2018). Despite claims of elevated health benefits, the dietary quality of many recipes included on many clean eating blogs is debatable; moreover, these sites might also expose adherents to psychological risks. For example, research shows that those who utilize clean eating blogs exhibit heightened dietary restraint, which is linked to disordered eating (Allen, Dickinson, & Prichard, 2018). Indeed, some researchers have suggested that ON is merely an extreme version of clean eating (Staudacher & Hauder, 2018). Much like other diet fads, clean eating is often promoted without any acknowledgement of its potential negative physical and psychological consequences (Allen et al., 2018). This possibility was supported in a study conducted by Ambwani and colleagues (2019). These researchers presented young women with vignettes of women adhering to clean eating patterns and experiencing health and social impairment as a result. Despite the vignettes' clear descriptions of impairment, the "clean eating" vignette was rated very favorably by participants, with a rating of over 4 out of 5 (Ambwani et al., 2019). In addition, many respondents suggested they were likely to adopt this eating pattern. These results suggest individuals are willing to pursue clean eating habits without fully considering their consequences. This faith in unvalidated dietary suggestions without medical advisement can be highly problematic in the case of clean eating and other fad

diets, such as Intermittent Fasting, another popular dietary approach discussed in the next section.

Intermittent Fasting

A fad diet second only to clean eating in popularity is Intermittent Fasting (IFIF, 2019). Intermittent Fasting (IF) is an eating pattern in which adherents cycle between periods of fasting and periods of eating. Many methods of Intermittent Fasting exist, ranging from alternating 24 hours fasting and 24 hours eating; to fasting 16 hours a day and eating 8 hours a day (Jane et al., 2015). Intermittent fasting also might include restricting calories on specific days of the week (e.g. 60% restriction of calories two days per week; Mattson, Longo, & Harvey, 2017). A recent meta-analysis of the benefits of IF found that this approach is associated with a significant decrease in body mass, insulin resistance, and fasting glucose levels (Cho et al., 2019). IF has also yielded benefits such as weight loss, improved insulin sensitivity, and decreased inflammation for individuals with type 2 diabetes and obesity (Cho et al., 2019). In addition, there is ongoing research on the hypothesis that intermittent fasting may be useful in the prevention of cancer (de Cabo & Mattson, 2019). Furthermore, eating patterns such as IF which prevent nighttime eating may improve long-term human health (Patterson & Sears, 2017).

However, some researchers suggest that the benefits of IF are simply related to calorie restriction. For example, one review found that while IF outperformed no treatment, weight loss results did not differ from those associated with general calorie restriction (Harris et al., 2018). Interestingly, most research on IF has been conducted in mice or in humans with overweight who wanted to lose weight (Harvie & Howell, 2016). Thus, the purported benefits of this approach might not generalize to individuals looking for a way to eat healthier, but who do not need to lose

weight. Another important factor to consider is that intermittent fasting focuses on the times one eats each day, without considering the quality or quantity of food consumed (Zuo et al., 2016). Individuals adhering to intermittent fasting could consume foods of low nutritional quality, yet still lose weight. Although weight loss can contribute to overall health and wellbeing, eating a nutritionally adequate diet is essential for long-term physical health. Individuals adhering to IF also might find themselves overeating during their "eating window.".

There is some evidence that IF could be a useful intervention in the management of diabetes and cardiovascular disease, although most research on this topic has been conducted with rats (Mattson, Longo, & Harvie, 2017; Patterson et al., 2015). Generally, there is currently insufficient evidence directly suggesting that IF is associated with health benefits in humans; and more research is necessary (Horne, Muhlstein, & Anderson, 2015; Tinsley & Horne, 2017; Halpern & Mendes, 2021). Moreover, it is important to note that IF can be done in many ways. For example, while many studies investigate fasting for 16 hours of the day and eating for 8, some adherents to this approach promote a more extreme plan of fasting for 23 hours and eating for just 1 (Tinsely & LaBounty, 2015; Baum, 2019). The benefits and risks associated with adherence to an IF diet might vary depending on the approach utilized. Of particular concern is that some of the IF approaches endorse behavioral patterns similar to disordered eating.

Several authors have noted that IF is particularly problematic given its overlap with disordered eating behaviors (Hoddy et al., 2015; Laessle et al., 1996). Disordered eating scales, such as the Eating Disorder Examination Questionnaire, include items such as "Have you gone long periods of time (8 hours or more) without eating in order to influence your shape or weight?" (Fairburn & Beglin, 1994). Fasting for extended periods of time is considered a mal-

adaptive behavior in the eating disorder field, as it can serve either as a restrictive behavior, or as a purging behavior (e.g., following a binge). Interestingly, it does not appear as though IF triggers eating disorders (Hoddy et al., 2015). Nonetheless, IF is not recommended for individuals who have a history of an ED due to the possibility that it could cause relapse (Hoddy et al., 2015; Halpern & Mendes, 2021).

In addition, IF might have some immediate physical and psychological consequences. For example, studies show that fasting can disturb circadian rhythms (Bahammam et al., 2010). Furthermore, adherents might experience fatigue or hunger during fasting periods (Patterson et al., 2016). Nonetheless, given the rise in popularity of IF, many otherwise healthy individuals are using this approach in the pursuit of health (IFIF, 2019), despite ongoing debate about whether it is a healthy, adaptive pattern, or an unhealthy, disordered behavior.

Ketogenic Diet

Another recent dietary trend is the Ketogenic diet (Keto; Walczyk & Wick, 2017). The Keto diet has surged in popularity in recent years (IFIC, 2019). This diet was originally established as a highly regulated treatment method for patients with epilepsy (Wilder, 1921). It is characterized by high fat intake, low carbohydrate intake, and normal protein intake. Recently, the Ketogenic diet has been adopted by individuals looking to lose weight and achieve greater health (Walczyk et al., 2017; Fenasse & McEwan, 2019). Evidence suggests that the Ketogenic diet is effective in reducing hemoglobin A1c and promoting weight loss in individuals with diabetes mellitus type 2 (O'Neill & Ragii, 2019). One study even found that adherence to a Ketogenic diet enabled half of one sample of patients with diabetes to discontinue their use of insulin after 1 year (Bhanpuri et al., 2018). Indeed, it appears as though the Ketogenic diet can signifi-

cantly improve the health of some individuals, particularly those with pre-existing health conditions. It is important to note that most research offering support for the benefits of the Ketogenic diet was conducted with participants with type 2 diabetes, under medical advisement.

Although the Ketogenic diet does often lead to immediate weight loss (due to entering a state of ketoacidosis), these losses are commonly not sustained over time (Sremanakova, Sowerbutts, & Burden, 2018). Over time, the Ketogenic diet does not outperform traditionally recommended calorie restriction with respect to sustained weight loss (Johnston et al., 2006). Moreover, the Ketogenic approach is also associated with a number of potential side effects (Kang et al., 2004; Kwiterovich, 2004). Specifically, the high fat intake promoted in in the keto diet can lead to gastrointestinal distress in the short term. Long-term adherence to Ketogenic may contribute to reduced mineral bone density, anemia, pancreatitis, neuropathy of the optic nerve, and more (Choragiewicz et al., 2010). Similar to other approaches, such as clean eating, the Ketogenic diet may have serious consequences; yet consumers appear willing to follow it due to its purported health benefits and association with rapid weight loss.

The Ketogenic diet has a considerable following in the popular media (Walczyk et al., 2017), and is promoted by a number of online forums, social media influencers, and websites. A plethora of cookbooks and magazines offer tips regarding how to follow the diet, and have monetized its popularity (e.g. *Simply Keto*; Ryan, 2017). Though the Ketogenic diet is recommended for the management of certain medical complications (e.g. epilepsy; Rho, 2018), it lacks support for the general population and can have serious negative effects (Ludwig, Willett, Volek, & Neuhouser, 2018; Choragiewicz et al., 2010; Joshi, Ostfeld, & McMacken, 2019). However, because the Ketogenic diet has such widespread support online, many attempt this diet without the sup-

port of a physician or dietitian (Schwartz et al., 2015). In the words of medical researchers, current enthusiasm for Keto "outpaces evidence" (Joshi et al., 2019). The popularity of Keto highlights the degree to which online information and word of mouth are altering the ways in which individuals choose to eat.

All of the aforementioned diets have gained popularity in online circles, and many others have accrued a following as well (Joshi & Mohan, 2018). The wide range of dietary information available has led to general confusion regarding the optimal definition of healthy eating (Temple, 2018; Liu et al., 2017). In addition, many individuals have developed strong beliefs about the "right" way to eat. For example, research shows that many hold biases towards individuals who follow diets (MacInnis & Hodson, 2017). Individuals with strong dietary beliefs are often judgmental of those who adhere to eating patterns different from their own. With so many individuals following contradicting diets, and believing strongly in the validity of their own nutritional approach, there is considerable disagreement about the "right" way to eat.

MyPlate

At odds with many of these popularized dietary frameworks are the national recommendations for healthy eating. Disturbingly, many popular diets are not empirically supported for either nutritional or weight loss outcomes (Freeman, King, & Kennedy, 2001; Bryngelsson & Asp, 2005; Joshi & Mohan, 2018). National scientific consensus on recommendations for a healthy diet are updated every ten years by the United States Department of Agriculture (USDA, 2010). The current dietary guidelines for Americans are outlined in MyPlate, a program established by the United States Department of Agriculture (USDA, 2010). MyPlate is a user-friendly resource that offers dietary recommendations in an easily applicable format: the shape of a plate.

In accordance with the US Dietary Guidelines, MyPlate emphasizes consumption of fruits and vegetables, whole grains, lean proteins, and low-fat and fat-free dairy products. In addition, MyPlate recommends limiting intake of sodium, saturated fat, and added sugar.

The MyPlate recommendations were developed by a panel of nutrition professionals, based on scientific consensus. However, many Americans have not been exposed to MyPlate. One study found that only 20% of college students had seen or heard of these dietary recommendations (Brown et al., 2016). One reason for this disconnect might be the sources college students use to get nutrition-related information. For example, even as far back as 2015, approximately 60% of phone users downloaded health related applications, specifically for information about diet and exercise (Krebs & Duncan, 2015). This suggests individuals who are trying to eat healthier are getting information from sources other than the national recommendations, such as websites and apps that promote popular diets like clean eating, Intermittent Fasting, and the Ketogenic diet. Although the USDA does have a MyPlate guideline app (Simple Start), it is nowhere near as popular as alternatives (e.g., MyFitnessPal, Keto.app), and a recent systematic review of the most popular health apps did not include it in its analysis due to its lack of comparative popularity (Higgins et al., 2016).

These non-peer-reviewed apps and influencers' dietary suggestions often conflict with one another. Consumers are met with a cornucopia of dietary recommendations, many of which are not as beneficial as their sources suggest (Dickinson et al., 2018; Sremanakova et al., 2018). Moreover, many consumers are choosing among these approaches without adequate nutritional knowledge (Freeman et al., 2017; Hirasawa et al., 2013).

As a result of this disparate dietary advice, healthy eating likely means different things to different people. For example, foods considered healthy according to the Ketogenic diet (e.g., bacon) are considered distinctly unhealthy by those following the MyPlate or clean eating approaches (USDA, 2010). Despite these obvious differences among popular diet approaches, few studies have investigated attitudes towards current popular diets, or the factors related with views of these diets. Such research is necessary given the proliferation of conflicting dietary advice available online, and the need for Americans to follow healthier diets (Grotto & Zied, 2010; Goldberg & Sliwa, 2011). College students are particularly susceptible to fad diets, as an estimated 87% of them get their health information from the internet or social media (Prybutok & Ryan, 2015), and they are more likely than individuals in other age groups to report dieting (Enriquez, Duncan, & Schur, 2013; Seymour, Hoerr, & Huang, 1997).

College Students and Healthy Eating

College students are at a crucial developmental stage in which they are establishing health behaviors they are likely to continue throughout adulthood (Mann et al., 2016). Behaviors established during these years often follow individuals throughout their lifetime (Swanson, 2016). Many young adults gain weight during the transition to university life (Crombie et al., 2009). Though the exact amount of weight gained is often exaggerated by the media, the "freshman 15" appears to be a legitimate health concern for incoming students (Brown, 2008). The average actual weight gain of incoming students appears to fall between 3.5 lbs (Holm-Denoma et al., 2008) and 7.8 lbs (Lloyd-Richardson, Bailey, Fava, & Wing, 2006). Weight and fat gain in college students generally outpaces that of the general public, which is particularly concerning given the number of potential health risks associated with excess weight (Neumark-Sztainer &

Haines, 2004). Weight gain may also be problematic due to the high prevalence of body image concerns and disordered eating patterns present in college students (Fardouly, Diedrichs, Vartanian, & Halliwell, 2015; Abraham et al., 1994). Concerns about actual or potential weight gain might influence college students to evaluate their eating patterns.

College is a unique time for individuals to establish health behaviors, as it is typically when young adults experience a considerable increase in autonomy over what, when and how much to eat (Butler et al., 2004). Unfortunately, research suggests that college students often struggle to follow a healthy diet. Only one in three college students consumes a diet consistent with national dietary guidelines (Kolodinsky, Harvey-Berino, Berlin, Johnson, & Reyonlds, 2007). In particular, college students often fail to consume enough fruits and vegetables. One study found that, on average, college students consume fewer servings of fruits and vegetables each week than are recommended for each day, with less than one third of students consuming an adequate amount of fruits and vegetables (Li et al., 2012; Racette et al., 2005). Students also often eat high fat, high calorie foods (Racette et al., 2010) and consume excessive quantities of sugar-sweetened beverages such as soda (Block et al., 2013).

Perhaps in an effort to counteract these problematic eating behaviors, and/or to avoid feared weight gain, many college students diet at some point. There are stark gender disparities in the prevalence of reported dieting, however. Approximately 80-91% of female college students (Abraham et al., 1994; Striegel-Moore et al., 1990) endorse dieting, compared with only 17% of their male peers (McCreary, 2005). In addition, college students are at a heightened risk for eating disorders (Yager & O'Dea, 2008); 32.6% of college women and 25% of college men in the United States report disordered eating patterns (White et al., 2011). Thus, although there is a

general need for college students need to establish healthy eating patterns, it appears this group often finds themselves pursuing unhealthy dietary methods.

In order to determine which diet to follow, college students may turn to a wide range of sources for health information. One study found that approximately 78% of college students seek online sources for health and fitness information (Percheski & Hargittai, 2011). Searching for information online can benefit students, depending on the sources they utilize. Research shows that exposure to the USDA guidelines (i.e., MyPlate) is associated with healthier eating patterns in college-aged individuals (Kolodinsky et al., 2007). Similarly, nutrition knowledge is positively associated with better eating habits (Sogari et al., 2018). Therefore, students may benefit from turning to MyPlate and other empirically validated sources for health information. However, research shows that, despite the high rates of searching for dietary advice online, only 20% of college students have been exposed to the MyPlate framework (Brown et al., 2016). Thus, students are clearly seeking other sources for information about healthy eating. Students might be especially likely to encounter information sources that lack scientific support and promote fad diets, given the proliferation of these types of sites on social media. Consequently, it is crucial to understand where students get their information, and how they perceive various dieting behaviors.

Social Media and Dieting Trends

In 2019, 39% of Americans claimed to be on a specific diet (International Food Informational Council (IFIC, 2019). Technological advancements have drastically changed the ways in which individuals learn about healthy eating and dieting. A proliferation of blogs, social media sites, and advertisements addressing health and wellbeing are now broadly available to the public (Dickinson et al., 2018; Schneider et al., 2013). Many of these emphasize adherence to a certain

dietary framework to achieve optimal health (i.e., thisrawsomeveganlife.com, perfectketo.com, thecleaneatingcouple.com).

Individuals are increasingly turning to sources such as blogs and social media for information about dieting (Vaterlaus et al., 2015). Blogs and influencers post diet and fitness content, and offer recipes, workouts, and products for followers to utilize. Such resources are so widely available that they have earned the term "fitspiration" (Boepple & Thompson, 2016). "Fitspiration" sites idealize a muscular, athletic body type and emphasize healthy eating (Santarossa et al., 2016). One study found that women experience approximately 10 fitspiration exposures per week, while men experience about five (Griffiths & Stefanofski, 2016). Individuals are thus frequently exposed to advice on the best diet and exercise routines to follow to achieve ideal physical health.

On the one hand, searching for health information online is understandable, as scientific sources can be harder to access and more difficult to comprehend, while influencers are readily available on one's phone, for free. However, these non-peer reviewed, online sources are often problematic. For example, a content analysis of "healthy living" and "fitspiration" websites found that many developers of these sites reported histories of eating disorders or related behaviors (Boepple et al., 2014). Similarly, one study found that use of Instagram to search for health advice is associated with a heightened risk of orthorexic (ON) symptoms (Turner & Lefevre, 2017). Thus, dietary advice presented online as, "healthy" might instead promote pathological, orthorexic behavior. Orthorexia is a disordered eating pattern that has received increased attention in the media and scientific literature, perhaps in part due to the increased popularity of adherence to fad diets. This pattern is reviewed in detail in the following section.

Orthorexia Definition and History

Orthorexia nervosa (ON) is the term used to describe an eating disorder characterized by a pathological obsession with healthy eating (Bratman, 2000). Derived from the Greek root orthos, meaning "correct or right" and orexis, meaning "hunger or appetite," ON literally translates to correct appetite. Individuals with ON place an excessive emphasis on the health content or purity of the food they consume. This focus on food quality leads to an obsession with developing and maintaining a "perfect" diet. (Varga, Dukay-Szabó, Túry, & van Furth, 2013; Bratman et al., 2000).

Bratman (1997) first identified ON as a unique psychological phenomenon in a non-peer reviewed article describing his personal experience with this eating pattern. Even after the release of Bratman and Knight's (2000) seminal book on the disorder, there remained little empirical study of ON. In recent years, however, the popular media has developed an interest in ON (Radford, 2015; Vandereycken, 2011). Most recently, TIME Magazine published an article detailing the complicated and undefined nature of this proposed disorder (Ducharme, 2020). Likewise, the academic study of ON has exploded, with most research occurring in European countries (Dunn & Bratman, 2016; McCombs & Mills, 2019). However, there is still a paucity of academic research on the disorder, particularly in North America, although many practitioners have emphasized the need for a greater understanding of ON (Vandereycken, 2011). The current conceptualization of ON suggests that its symptoms include, following a restrictive diet, focusing excessively on food preparation, and eating in a ritualized way.

Individuals with ON develop a preoccupation with the purity of the food they consume, which tends to result in a highly restrictive diet (Bratman et al., 2000). In some cases, those with

ON would prefer to starve rather than eat foods considered “impure” and “unhealthy” (Donini et al., 2004). Such extreme beliefs about food often originate from adherence to a particular dietary framework. Bratman (2000) outlines a number of dietary practices followed by patients with ON, including the Macrobiotic diet, the organic diet, and the raw diet. Since the publication of Bratman’s book, dietary trends have shifted to emphasize a number of constantly evolving fad diets. However, no single diet seems to be responsible for the development of ON (Dunn et al., 2016). Rather, virtually any diet or eating pattern can be taken to an extreme, ultimately precipitating ON (Bratman, 2017). For example, popular diets often suggest eliminating certain foods, which can lead individuals to reduce the number of foods they deem acceptable for consumption (Varga et al., 2013). Decisions about which foods are acceptable can vary among individuals with ON, but overall, this condition is characterized by a highly restrictive diet which includes a small quantity of acceptable foods.

Many individuals with ON also spend an excessive amount of time cooking and preparing foods to ensure “purity” (Bratman et al., 2000). As with food selection, certain dietary theories have specific rules regarding the acceptable methods of food preparation. For example, some individuals with ON symptomatology follow a raw food diet, a pattern considered a form of “clean” eating. Raw foodism suggests that cooking food removes nutrients (Link & Jacobson, 2008). Followers of this diet, therefore, can become obsessed with only consuming foods that can be eaten raw, such as fruits and vegetables. On the other hand, some dietary theories suggest that one can achieve optimal nutrient quality only from steaming foods for a designated time period. Regardless of the underlying justification for the behavior, ON is often characterized by an obsession with food preparation methods.

In addition, persons with ON typically consume foods in a ritualized manner. Certain internalized rules about food consumption lead a person to only eat certain foods at specific time of day, or to avoid eating two foods at the same time (Koven & Abry, 2015). These rules often stem from the suggestions outlined in an individual's chosen diet. In addition to these behaviors, ON is often characterized by spending excessive amounts of time planning meals, weighing food, or researching healthy diets (Bratman et al., 2000; Olejniczak et al., 2017). Proposed diagnostic criteria indicate that those with ON commonly spend more than three hours a day contemplating food and planning food choices (Olejniczak et al., 2017; Moroze, Dunn, Craig, Yager, & Weintraub, 2015). Therefore, the types of foods consumed, their preparation, and their consumption, are all overemphasized in those with ON.

All of the aforementioned behaviors can be adaptive if they occur in moderation. Healthy eating and exercise behaviors are even seen as laudable pursuits. Indeed, many with ON flaunt their healthy eating behaviors (Bratman et al., 2000). However, ON is unique in that the behavior is taken to a pathological extreme. Pathological behavior is frequently defined by its "clinical significance" (Spitzer & Wakefield, 1999). In other words, the level of distress or impairment the person experiences as a result of the behavior plays an important role in determining whether it is considered pathological. Psychological disorders are understood to create interpersonal distress, as well as functional impairment, in various aspects of one's life, including medical, educational, or social contexts. Persons with ON experience serious impairment and distress as a result of their excessive focus on food (Bratman et al., 2016; Moroze et al., 2015). Thus, ON has serious medical, interpersonal, and psychological consequences, suggesting that it is a clinically significant concern.

Specifically, those with ON often experience serious negative health outcomes as a result of their disorder (Volpe et al., 2005). Nutritional deficiencies and weight loss similar to those seen in patients with anorexia nervosa (AN) can occur as a result of limited food intake (Bosu, Çamur, & Güler, 2007; Zamora et al., 2005). For example, a case study of a 28-year- old man presenting with orthorexic symptoms, noted that his behavior led to cardiac, digestive and metabolic issues, as well as other severe medical complications (Moroze et al., 2015). Diets followed by those with ON typically omit nutrients necessary for healthy functioning, contributing to serious medical complications. Occasionally, ON leads to food restriction so severe that it causes excessive weight loss impacting physical functioning (Moroze et al., 2015). Consequently, it is common for persons with ON to develop health problems, which is seemingly paradoxical, given their expressed pursuit of optimal health.

ON also can also lead to social impairment resulting from the obsession over healthy foods. Food is central to social interaction. Friends and family often get together to share meals, and food is a common way in which people connect with others. Individuals with ON miss out on social interactions due to fears of consuming foods that do not fit within their strict dietary guidelines. Consequently, ON can lead to intense social isolation (Chaki, Pal, & Bandyopadhyay, 2013). Many with ON find that they lose friends and jobs due to placing a higher priority on following their dietary rules than on maintaining healthy relationships (Bratman et al., 2000; Boci et al., 2007). Furthermore, it is common for people with ON to damage relationships as a result of their attempts to spread their dietary beliefs to others (Bratman et al., 2000). In some cases, parents with ON place strict dietary rules (e.g., clean eating) on their young children, impairing de-

velopment (Von Rosenstiel, Stam, & Schats, 2012; Cuzzolaro & Donini, 2016). Thus, ON has serious social implications for both the affected individual, and those close to him or her.

Persons with ON can also experience psychological distress as a result of the disorder. When dietary violations occur, a person with ON might feel intense guilt, disgust, and self-loathing, sometimes leading to engagement in self-punishing behaviors to account for the supposed mistake (Koven et al., 2015). In addition, ON symptoms are associated with depression, lower self-esteem, lower personal well-being, and an inability to relax (Barthels et al., 2007). Research on long term psychological correlates of ON is not yet available; nonetheless, extant information strongly suggests that the disorder is associated with psychological distress (Bratman et al., 2000; Barthels et al., 2007).

Unfortunately, along with severe impairment, individuals with ON might also be subject to increased stigma. Research investigating perceptions of ON has shown that ON is viewed as a result of personal choice more than other eating disorders (Simpson & Mazzeo, 2017). Thus, individuals struggling with ON are thought to be more responsible for their disorder. This could prohibit individuals with ON from receiving necessary treatment, as their condition is seen as a choice. The same study also indicated that ON-related symptoms are considered more desirable than those of other eating disorders. Researchers suggest that the desirability of ON could reflect the widespread popularity of dieting. Because dieting is considered to be a healthy, adaptive behavior, it is often viewed positively, particularly in individuals with overweight or obesity (Black, Sokol, & Vartanian, 2014; Beames, Black & Vartanian, 2016). Thus, an individual with ON may initially receive praise for his or her eating behaviors. Furthermore, even when exhibiting impairment as a result of following such a strict diet, persons with ON may not receive nec-

essary help, as others view them as responsible for their own disorder. Clearly, views of ON could have serious implications for the well-being of persons suffering from the disorder. Thus, it is important to understand how people perceive individuals with ON.

Another study of perceptions of individuals with ON found that they were viewed as negatively as people with anorexia (Nevin & Vartanian, 2017). The same study also found that the perception that a person was in control of their condition was associated with more negative views of him or her. Given that previous research suggests that those with ON are seen to choose their condition (Simpson et al., 2017), it is possible that persons with ON are ultimately subject to greater stigmatization. It is important to enhance understanding of perceptions of individuals with ON, as potential stigmatization might make those struggling with the disorder less likely to seek treatment, which could have serious mental and physical health consequences.

Nevin and Vartanian (2017) also found that individuals who both followed a clean eating diet, and experienced impairment related to this diet, were viewed as negatively as those with ON. These results contradict previous research suggesting that people view those on a diet more positively than those not following a diet (Black et al., 2014; Beames et al., 2016; Ambwani et al., 2019). Thus, perceptions of people following specific diets or "eating clean" remain unclear, and have not been compared to one another. Previous research has primarily compared following one specific diet to not following a diet. It is important to examine views of various popular diets, as views might vary and be differentially related to stigma.

Diet and Impression Management

In American society, there is a general belief that one's personal health and well-being are within one's control. As such, individuals are expected to act in ways that enable them to main-

tain or achieve optimal health. Crawford (1980) outlined this concept in his paper detailing "healthism," which may be understood as the ideology which posits that the health of an individual is within their own control. He describes the ways in which the ideology of healthism suggests that disease can be solved through individual responsibility. Whether this responsibility means dietary change, increased exercise, or abstention from substances, the implication is that a person is in charge of their own disease risk.

The effects of healthism are easily observed in the lives of individuals with overweight and obesity. A majority of Americans believe that personal responsibility, rather than genetic or environmental factors, is the cause of obesity (Oliver & Lee, 2005). As such, weight is believed to be controllable, and weight loss a matter of personal willpower and dedication. These beliefs, in turn, contribute to the stigmatization of individuals with obesity (Puhl & Brownell, 2003). Individuals with obesity face a number of negative stereotypes, including, for example, the belief that obesity is due to laziness, sloppiness, and a lack of motivation, and self-discipline (Puhl & Brownell, 2011). Studies show that obesity stigmatization is inversely related to perceived effort to lose weight, such that individuals exhibit less prejudice towards those with obesity when they are described as attempting to lose weight (Beames et al., 2016). Thus, it appears that individuals with obesity are viewed more positively when they follow a diet and exercise plan, perhaps because they are seen as exercising agency in their own wellbeing.

The impact of healthism is also observed in the lives of communities of color. The prevalence of overweight and obesity is higher in racial-ethnic minority groups in the United States, with the exception of Asian Americans (Paeratakul et al., 2002). Many factors are thought to contribute to this disparity; including genetics, stress, discrimination, and food insecurity (Byrd et

al., 2018). Food insecurity, or a lack of access to healthful food due to cost or other factors (Coleman-Jensen et al., 2016), is higher in Black and Hispanic communities (Hernandez et al., 2017). Indeed, research suggests that foods that are richer in nutrients associated with lowered risk for chronic disease (i.e. fiber, vitamins A, C, D, E and B-12, iron, calcium, etc.) are more expensive than foods associated with an increased risk of chronic disease (i.e. trans and saturated fat, sugar; Denny et al., 2012). Thus, it is more challenging for food insecure and low SES individuals to maintain a healthy diet and prevent obesity. As noted earlier, public attitudes towards obesity reflect the notion that diet and exercise are the primary drivers of weight status (Brownell et al., 2010; Lush & Ellison, 2013). Thus, individuals of color who are overweight and obese may be viewed negatively for making food choices over which they have little control. Individuals are thus blamed for systemic, environmental inequities.

Healthism posits that an individual should behave in a specific manner in order to control their health. Diet is a particularly common variable that is manipulated in the pursuit of greater health and well-being. As such, there appears to be some possibility that individuals who follow diets may be viewed more positively than those who do not. Indeed, research on "consumption stereotypes" show that people often ascribe stereotypical attributes to others based upon what they eat. For example, people who eat small meals and "healthy" foods are perceived as more feminine, while people who eat large meals and "unhealthy" foods are seen as more masculine (Stein & Nemeroff, 1995).

Researchers have suggested that people may select foods not only for their taste and nutritive purposes, but also as a form of impression management (Sadalla & Burroughs, 1981; Herman et al., 2003). As stated earlier, evidence exists to suggest that certain dietary patterns are

seen as more feminine or masculine (Stein & Nemeroff, 1995). Similarly, many researchers have found that consumption of healthy food is associated with a wide range of more favorable personality characteristics. For example, Mooney and colleagues (1994) had half of their participants read a description of a woman on a "high fat" diet, and half of their participants read a description of a woman on a "low fat" diet. Results showed that both men and women rated the woman on a low fat diet as more attractive, intelligent, conscientious, and calm. Collectively, studies have shown that those who ate foods described as less fattening were rated as more physically attractive, more moral, and even more intelligent (Mooney & Amico, 2000; Fries & Croyle, 1993; Barker et al., 1999). Thus, it appears as though views towards a person may be influenced by the foods they choose to eat. As such, it may be important to further understand how views towards others are impacted by eating patterns, specifically by adherence to popular diets. A desire to portray a favorable image of oneself may motivate individuals to follow specific diets.

Summary and Purpose of Study

Good nutrition is extremely important to overall health. However, the definition of healthy eating is unclear, leading to confusion among individuals trying to engage in this behavior. In the digital age, dietary advice is widely available to consumers. Blogs, social media accounts, and websites offer endless access to dietary information and promote fad diets, like the Ketogenic diet, clean eating and, Intermittent Fasting. A great deal of this information contradicts the eating patterns supported by scientific evidence. Given the number of Americans who attempt to diet, it is important to understand how individuals view popular diets and the factors associated with these perspectives. Enhancing understanding of views towards diets will aid

health care providers working with individuals to improve their eating behaviors. Additionally, understanding factors associated with views towards various diets might help clarify why people choose to follow them, and help identify which individuals might be especially vulnerable to believing misleading nutritional information on social media and other online outlets.

Furthermore, this study aimed to increase understanding of ON by investigating factors associated with symptoms of this condition. There is some disagreement in the literature regarding potential overlap among ON, fad dieting, and disordered eating (Bratman, 2017). This study examined these issues by assessing associations among these constructs. In addition, the study aimed to understand some of the factors associated with perceptions of ON and specific fad diets.

All of these eating behaviors are especially relevant for college students. College students are in a crucial phase of life for the development of healthy eating patterns, and might be especially vulnerable to believing unvalidated sources of dietary information, given their frequent use of social media to obtain health information. Furthermore, the desire to portray oneself favorably on social media could influence one's decision to follow a particular diet. Understanding college students' perceptions of both various popular diets, and of ON symptomatology, might aid in prevention of the development of unhealthy eating patterns.

Limited empirical investigation has assessed college students' attitudes towards various popular diets and the potential impairment associated with adherence to them. Additional research on this topic is needed to facilitate recognition of behaviors that could impair overall functioning. Furthermore, this topic is especially relevant given the current popularity of dieting and the overwhelming amount of (often discrepant) information available to consumers. With 39% of Americans following specific diets at some point each year (IFIC, 2019), it is essential to

understand whether adherence to specific diets could be associated with a pathological obsession with healthy eating.

Thus, this research aimed to investigate attitudes towards popular diets, using an experimental design and quantitative analysis. Participants read vignettes describing specific eating patterns and answered a set of questionnaires. The aims of the study were as follows: 1) to investigate perceptions of three popular diets (i.e., Intermittent Fasting, clean eating, Keto), 2) to understand whether participants' individual characteristics (e.g. weight bias internalization, sources of health information, ON symptomatology, disordered eating) are associated with their perceptions of the vignette characters, and 3) to evaluate potential correlates (e.g. body appreciation, health consciousness) of ON. Results of this study will provide insight into the views of dietary patterns popular in the United States, and will further scientific understanding of ON.

Method

Power Analysis

A power analysis was conducted using G*Power software (Faul, Erdfelder, Buchner, Lang, 2009). Previous research on attitudes towards how people view those with ON and other eating disorders found an effect size of $\eta_p^2 = .04$ (Simpson et al., 2017). For the current study, a minimum sample size of 432 was required to achieve adequate power. In order to account for missing or incomplete data, the researcher aimed to recruit 500 participants.

Participants

Participants were recruited from Virginia Commonwealth University (VCU), a large, urban college in the southeastern United States. The study included only individuals who identify as women. Generally, dieting is seen as a feminine pursuit (Gough, 2007). Indeed, women are

significantly more likely to diet than men (Davy, Benes, & Driskell, 2006; Rolls, Fedoroff, & Guthrie, 1991). These gender disparities in dieting rates are especially noteworthy in young adults, with 80-91% of college women reporting dieting in the last year, compared with only 17% of their male peers (Abraham et al., 1994; Striegel-Moore et al., 1990; McCreary, 2005). As such, this study will only include women.

The study was reviewed by VCU's Institutional Review Board. After providing consent, participants completed the survey using SONA, the online research software. Students enrolled in an introductory psychology course received course credit for completing the survey. Data was collected anonymously.

Participants (n=501) completed the informed consent. Data from 34 participants were excluded because they had completed less than 50% of the survey; 4 additional participants were excluded for answering validation questions incorrectly. The final sample (n = 463) included the following racial/ethnic groups: 45% White (n = 210), 29% Black or African American (n = 135), 20% Asian (n = 94), 13% Latinx/Hispanic (n = 60) 3% American Indian/Alaska Native (n = 14). Participants were asked to mark every race/ethnicity that applied. Mean age of participants was 18.84 (SD = 1.58); 305 of the participants were first-year students, 78 were sophomores, 52 were juniors, 27 were seniors, and the rest did not report their year in school. Most (73%) of participants identified that they did not follow a specific diet (n = 338); 8.4% of participants reported following Intermittent Fasting (n = 39); 7.1% reported following a vegan or vegetarian diet; 5.6% of participants noted "other" (e.g., FODMAP diet, halal, gluten free; n = 26); 4.1% of participants follow a clean eating diet (n = 19), 1.3% of participants follow the Ketogenic diet (n = 6).

Measures

Demographic Information. The questionnaire asked participants their age, year in school, race/ethnicity, gender identity, height and weight. They were also asked if they currently follow any common dieting approaches (e.g., Keto, Whole 30, vegetarian, Intermittent Fasting; see Appendix A).

Vignettes. Participants were presented with a vignette depicting a fictional 19-year-old female following a specific diet. Vignettes are commonly used in psychological science when experimental manipulation is either unethical or impossible (Evans et al., 2015). The vignettes used in this study were developed according to guidelines established through systematic review (Evans et al., 2015). Specifically, this review indicated that vignettes between 50 to 500 words are appropriate tools for use in psychological studies (Evans et al., 2015). The vignettes included in this study were 147-170 words. Similar vignettes have been used in previous research investigating views of individuals with ON (Ambwani et al., 2019; Simpson et al., 2017; Vartanian et al., 2017) and eating disorders (Currin, Schmidt, & Waller, 2007; Ebneter & Latner, 2013; Mond & Arrighi, 2011). In addition, vignettes are used to investigate weight bias (Mussap, Manger, & Gold, 2016; Swami et al., 2008). In the current study, participants were randomly assigned to view one of the four vignettes included in Appendix B, and were asked to answer a series of questions (described below) after reading them.

The four eating patterns described in the vignettes were the Ketogenic diet, clean eating, Intermittent Fasting, and a clearly orthorexic pattern. The ON vignette was adapted from previous research looking at attitudes towards ON (Simpson & Mazzeo, 2017). The clean eating vignette was adapted from a previous study comparing clean eating to other diets (Ambwani et al.,

2019). The Ketogenic vignette was adapted to follow the same format as the ON and clean eating vignettes, using information from the description of the diet on the US News and World Report's annual evaluation of popular diets (US News, 2019). The Intermittent Fasting vignette was similarly adapted from a scientific article investigating Intermittent Fasting (Gabel et al., 2018). The control vignette was constructed to resemble the standard American diet. Information about the average diet of an American female was taken from studies examining the Center for Disease Control and Prevention National Health and Nutrition Examination Survey (Rosinger et al., 2017; Fryar et al., 2018; Lee-Kwan et al., 2017). The control vignette was constructed to represent the absence of a specific diet. Height, weight, and racial/ethnic membership were intentionally excluded from these vignettes, as we did not want to trigger conscious or unconscious weight and racial/ethnic biases (Kerlinger, 1986).

Validation Questions. Participants were asked two validation questions to ensure they attended to vignette content. These items were: "What diet is this person following?" and "Was the person in the vignette male or female?"

Response Questions. Participants were presented with a series of items intended to measure attitudes towards the dietary patterns presented in the vignettes. They were asked to indicate the degree to which they agree with a series of statements. Examples include, "This vignette depicts healthy eating" and "I would follow this dietary pattern."

The Adjective Checklist. Following each vignette, participants were asked to respond to several items assessing characteristics adapted from a measure previously used in the literature (Robinson, Bacon, & O'Reilly, 1993). The measure used is known as the Fat Phobia Scale. Although the current study is not investigating fat bias, the FPS offers a way to assess participants'

perspectives in a manner that reduces social desirability, as they do not ask direct opinions of a person with a given condition (e.g., "a person with obesity,") but rather, include a range of characteristics without explicitly naming the condition or category under evaluation (Myers & Smith, 2012; Bacon, Scheltema, & Robinson, 2001). In the current study, this measure is referred to as the Attitudes Scale. The scale is composed of 36 items following a semantic differential scale (Osgood, Suci, & Tannenbaum, 1957; see Appendix E). Semantic differential scales include two polar adjectives (e.g. Friendly and Unfriendly, Warm and Cold), and participants rate the individual described in the vignette on a scale of 1 to 5, depending on which adjective they feel most accurately describes the person. Lower scores indicate more negative perceptions. Previous studies have demonstrated that this measure yields internally consistent scores (Cronbach's $\alpha = .82$, Tantleff-Dunn et al., 2009). In the current study, alpha was .88. In prior research, construct validity was supported via data showing reductions in fat phobia following a body image intervention (Robinson et al., 1993).

Orthorexia. Participants were asked to complete the Dusseldorf Orthorexia Scale - English version (E-DOS; Chard et al., 2019). The E-DOS is a 10-item scale assessing Orthorexic pathology on a 4-point scale (ranging from 1 = this does not apply to me, to 4 = this applies to me). Example items include "I can only enjoy foods considered healthy," "I feel upset after eating unhealthy foods," and "I have certain nutrition rules I adhere to." Higher scores indicate greater ON symptomatology. The English version of the E-DOS was validated with a college student population (Chard et al., 2019). This measure appears to distinguish adequately between ON and other eating disorders, as evidenced by its discriminant validity with the Eating Disorder Inventory (EDI). Compared with other instruments of ON pathology, the E-DOS reduces the

likelihood of identifying potential false positives. For example, research utilizing the ORTO-15 has found very high rates of pathology, while the E-DOS is thought to identify this symptom pattern more accurately (e.g. 8% compared to 71% of college students; Dunn, Gibbs, Whitney, & Saratosa, 2017; Chard et al., 2019). The E-DOS also yields internally consistent scores (Cronbach's $\alpha = .88$; Chard et al., 2019). A systematic review of tools available for measuring ON suggested that the E-DOS is a recommended tool for assessment of ON (Valente et al., 2019). In the current study, alpha was .87.

Disordered Eating and Impairment. Disordered eating was measured using the Eating Disorder Examination Questionnaire with Instruction (EDE-Q-I; Fairburn & Beglin, 1994). The EDE-Q-I is a 36-item measure assessing eating pathology that includes instructions explaining the definition of binge eating and providing examples of this behavior (EDE, Cooper & Fairburn, 1993; Goldfein, Delvin, & Kamenetz, 2005). The use of instructions has been found to improve the EDE-Q-I's validity for measuring binge eating (Goldfein, Delvin, and Kamenetz, 2005). The EDE-Q asks participants to answer questions about symptoms over the past 28 days on a scale ranging from 0 (no days/not at all) to 6 (every day/markedly). Items include, "Have you gone for long periods of time (8 hours or more) without eating?" "Have you been afraid of losing control over eating?"; and "Have you had a strong desire to lose weight?". The EDE-Q-I is comprised of four domains: dietary restraint, eating concern, shape concern, and weight concern. The internal consistency of the overall score is high (Cronbach's $\alpha = .90$); each of the domains also yield internally consistent scores (dietary restraint = .70, eating concerns = .73, shape concern = .83, weight concern = .90). Test-retest reliability estimates range from .81-.90 over two weeks for each subscale (Luce & Crowther, 1997). In the current study, alpha was .87. Following the EDE-

Q-I, the Clinical Impairment Assessment (CIA) was administered (Bohn & Fairburn, 2008; Bohn et al., 2008). The CIA measures impairment resulting from eating behaviors. It is a 16-item measure designed to be administered immediately following the EDE-Q. The CIA asks how often over the past 28 days a person's eating habits have "made it difficult to concentrate," "made you feel guilty" or "made you upset" on a 4-point scale (1 = not at all, 4 = a lot). The CIA had a Cronbach's alpha of .96.

Sources of Information. Participants were asked what sources they use to obtain information about healthy eating behavior. Ten sources of health information were presented, and individuals rated how likely they were to use each of them on a 5-point scale (1 = Very Unlikely to 5 = Very Likely).

Health Consciousness. Health consciousness was measured with the Health Consciousness Scale (HCS; Gould, 1988). The HCS is a 9-item self-report measure including items such as, "I reflect about my health a lot" and "I'm usually aware of my health" on a 7-point scale (1 = Strongly Disagree, 7 = Strongly Agree). This scale measures health awareness and has been validated for use in a US population. The HCS demonstrates good internal consistency (Cronbach's $\alpha = .84$; Espinoza & Kadic-Maglajilic, 2018). In the current study, alpha was .91. The HCS has shown to be a valid indicator of health consciousness and is related to health behaviors (Iversen & Kraft, 2006; Gould, 1988; Hanspal & Devasagayam, 2017).

Weight Bias Internalization. Weight bias internalization was measured using the Weight Bias Internalization Scale - Modified (WBIS-M; Pearl & Puhl, 2014). The WBIS-M measures the degree to which individuals internalize and accept weight-related commentary, stereotypes, and attitudes. Participants responded using a 7-point scale (e.g. "I hate myself for my weight"; 1

= strongly disagree, 7 = strongly agree). Higher scores indicate greater internalization of weight related stigma. This measure has been validated with individuals of varying weights. In the current study, Cronbach's alpha was .86.

Body Appreciation Scale. Positive body image was measured using the Body Appreciation Scale - 2 (BAS-2; Tylka & Wood-Barcalow, 2015). The Body Appreciation Scale is a 10-item measure that includes items such as, "I respect my body" and, "I feel love for my body." Participants indicate whether the statement is true for them on a 4-point scale (ranging from 1 = Never, to 5 = Always). The BAS-2 has been shown to be internally consistent and stable across time (Tylka et al., 2015). The scale has been validated for men and women in college settings (Tylka, 2013), and is one of the most widely used scales in the research of positive body image (Menzel & Levine, 2011). In the current study, alpha was .97.

Depression and Anxiety. Depression and anxiety were measured using the Depression, Anxiety, and Stress Scale (DASS; Henry & Crawford, 2005). This 21-item measure includes items such as, "I felt that I had nothing to look forward to" and "I felt close to panic." Participants rate the degree to which each statement applies to them over the past week on a 4-point scale (0 = Never, 4 = Almost Always). The scale consists of three subscales (depression, anxiety, and stress) and an overall score of psychological distress. Each of the subscales demonstrates good internal consistency (Cronbach's α = .88 for depression, .82 for anxiety, .90 for stress), as does the overall scale (Cronbach's α = .93). In the current study, alpha was .95 for the overall scale. Research suggests this tool is acceptable for use in a nonclinical sample and that it can be applied to various racial groups (Norton, 2007; Henry et al., 2005). The scale has been shown to correlate significantly with measures of mixed anxiety and depression (Osman et al., 2012).

Procedure

This study was approved by the university's IRB prior to beginning data collection. Participants 18 years and older were recruited from the psychology-department sponsored participant pool. The study's purpose was described as an investigation of factors associated with perceptions of women. The actual title and purpose of the study were initially be withheld from participants to reduce the probability of socially desirable responses. After obtaining informed consent online via Qualtrics (Qualtrics, Provo, UT), all participants provided demographic information. Next, random assignment to a vignette occurred using a randomizer through Qualtrics. Participants were assigned to read one of four vignettes (ON, IF, clean eating, Keto). Participants read the vignette, answered the validation questions, and then completed the other measures described in the following section. Following completion of all questionnaires, participants were debriefed about the nature of the research and provided with a list of mental health resources should they have any concerns about their eating behaviors.

Proposed Data Analyses

Prior to conducting data analysis, data were cleaned in SPSS (Version 27.0), and assumptions of normality were checked. All tests were run with an alpha $\leq .05$. Thus, there is a 5% probability that the results obtained are due to chance, or a 5% chance of a Type I error. Setting a smaller, stricter alpha would increase the likelihood of making a Type II error, so a .05 alpha level was chosen to balance the probability of each of these errors.

Aim I. The first aim of the study was to investigate perceptions of popular diets. It was hypothesized that there would be a main effect of dietary pattern such that: (a) the vignette character with ON would be perceived more negatively than vignette characters following fad

diets, (b) the vignette characters following fad diets would be perceived more positively than the vignette character not on a diet, and (c) the character following the "clean" eating diet would be perceived more positively than Keto or Intermittent Fasting.

The first hypothesis was tested using a one-way ANOVA. The vignette type was entered as the independent variable and the Attitudes Scale was entered as the dependent variable.

Aim II. The second aim of the study was to investigate associations among ON symptomology, health consciousness, time spent viewing health information, body appreciation, and views of the vignette characters. It was hypothesized that:

1) ON symptomatology, health consciousness, and time spent viewing health information online would be positively associated with positive views of the ON vignette.

2) Low body appreciation and high frequency of seeking health information online would be positively associated with views towards fad diets.

The first hypothesis was investigated by running Pearson product-moment correlations between scores on the attitude scale for the Orthorexia vignette and the other variables. Following the correlational analysis, any variables identified as significant were planned to be entered into a simultaneous multiple regression analysis with scores on the Attitudes Scale from those who were exposed to the ON vignette as the dependent variable. Running a regression analysis would aid in understanding which variables are the strongest predictors for positive views of ON. The second hypothesis was tested by running a Pearson product-moment correlation with BAS and health consciousness and aggregated scores on the Attitudes Scale for the fad diet vignettes. Two-tailed tests will be used to test significance of correlations.

Aim III. The third aim of the study was to understand the correlates of ON. It was hypothesized that:

1) Higher ON symptomatology (E-DOS) would be associated with higher weight bias internalization, higher health consciousness, and greater depression and anxiety.

2) Individuals with a clinically significant E-DOS score would report significant impairment (as measured by the EDEQ - CIA score).

The first hypothesis was tested by calculating the Pearson product-moment correlations between WBIS-M, HCS, and DASS 21 and the E-DOS. The second hypothesis was conducted by calculating the Pearson product-moment correlation between the EDEQ CIA score and E-DOS scores.

Results

Descriptive Statistics

Descriptive statistics for each measure are presented in Table 1. A review of each scale's skewness and kurtosis indicated that each measurement was approximately normally distributed, with skewness scores of less than or equal to 1. Thus, all scales were included in the following analyses. Scales met assumptions for planned analyses. Data from 34 participants were excluded because they had completed less than 50% of the survey; 4 additional participants were excluded for answering validation questions incorrectly.

	FPS	E-DOS	CIA	BAS	HC	DASS
Mean	119.00	18.62	1.75	3.41	5.25	1.86
Standard Deviation	16.11	6.45	.74	.99	1.05	.62

Table 1. Descriptive statistics for relevant scales included in analyses.

Note: FPS = Fat Phobia Scale; EDOS = English Dusseldorf Orthorexia Scale; CIA = Critical Impairment Assessment; BAS = Body Appreciation Survey; HC = Health Consciousness; DASS = Depression, Anxiety, and Stress Survey.

Personality Characteristics of the Vignette Character

A one-way, between groups (1x5) ANOVA was conducted to explore the impact of the vignette character's dietary pattern on the overall perception of favorable personality characteristics. There was a significant main effect of the vignette character's dietary patterns on respondents' overall perceptions of her, F (4, 457) = 18.72, $p < .001$, partial η 2 = .14. Post-hoc analyses using Tukey's HSD revealed that the clean eating vignette characters were perceived significantly more positively than all other characters (ps ≤ .006). Characters following the Ketogenic diet and controls were viewed more positively than the ON vignette characters and the Intermittent Fasting vignette characters (ps ≤ .004), with no difference between Keto and controls. Finally, there was no significant difference in perceptions of characters in the ON vignette and the Intermittent Fasting vignettes ($p > .05$). Taken together, these results suggest that characters on a clean eating diet are viewed most positively, followed by those on the Ketogenic diet or no diet, followed by those on the Intermittent Fasting diet or those struggling with Orthorexia Nervosa. For a breakdown of individual adjectives, see Table 2.

Adjectives	Control	Clean Eating	ON	IF	Keto
Total	120.32	128.37	112.44	112.33	120.77
Lazy - Industrious*	2.97	4.01	3.92	3.44	3.76
Sloppy - Neat*	3.18	4.12	3.95	3.54	3.82

Friendly - Unfriendly*	2.00	2.23	2.75	2.55	2.25
Nonassertive - Assertive*	2.86	3.71	3.52	3.42	3.31
No willpower - Has willpower*	3.13	4.48	4.03	4.17	4.20
Depressed - Happy*	3.79	3.37	2.39	2.37	3.10
Smart - Stupid*	2.40	2.02	2.60	2.82	2.64
Unambitious - Ambitious*	3.31	4.17	3.78	3.85	3.98
Easy to talk to - Hard to talk to*	2.16	2.48	3.12	2.80	2.76
Unattractive - Attractive*	3.37	3.61	3.16	3.28	3.28
Poor Self-Control - Good self-control*	3.01	4.42	3.69	4.13	4.27
Ineffective - Effective*	3.28	4.10	3.23	3.26	3.52
Popular - Unpopular*	2.62	2.64	3.13	2.73	2.54
Slow - Fast*	2.91	3.42	3.23	2.94	3.31
Careless - Careful*	2.71	4.18	3.84	3.19	3.89
Having endurance - Having no endurance*	3.03	2.20	2.74	2.84	2.47
Inactive - Active*	2.94	3.91	3.36	3.13	3.49
Tries to please people - Does not try to please people*	3.14	2.82	2.53	2.33	2.47
Humourous - Humourless*	2.32	2.76	3.21	2.94	2.84
Strong - Weak*	2.66	2.07	2.73	2.65	2.27
Individualistic - Conforming*	2.72	2.93	3.13	3.28	2.98

Independent - Dependent*	2.40	2.13	2.31	2.79	2.48
Good-natured - Irritable*	2.23	2.24	2.83	2.78	2.47
Selfish - Selfish	3.36	3.23	3.09	3.17	3.19
Passive - Aggressive*	2.39	2.79	2.82	2.72	2.76
Indirect - Direct*	3.08	3.54	3.29	3.18	3.36
Likes food - Dislikes food*	1.55	2.20	3.05	2.75	2.46
Dirty - Clean*	3.34	3.92	3.88	3.55	3.69
Easy-going - Uptight*	1.80	3.08	3.75	3.19	3.05
Shapeless - Shapely	3.06	3.36	3.22	3.12	3.07
Overeats - Undereats*	2.54	3.40	3.97	3.99	3.33
Moody - Even-tempered*	3.28	3.22	2.52	2.35	2.96
Insecure - Secure*	3.44	2.91	1.97	1.96	2.54
Low self-esteem - High self-esteem*	3.25	2.99	2.08	2.08	2.58
Does not attend to one's appearance - Attends to one's appearance*	3.05	4.01	3.88	3.81	3.86

Table 2. Mean scores per adjective by vignette type.

*: indicates significant difference, $p < .05$.

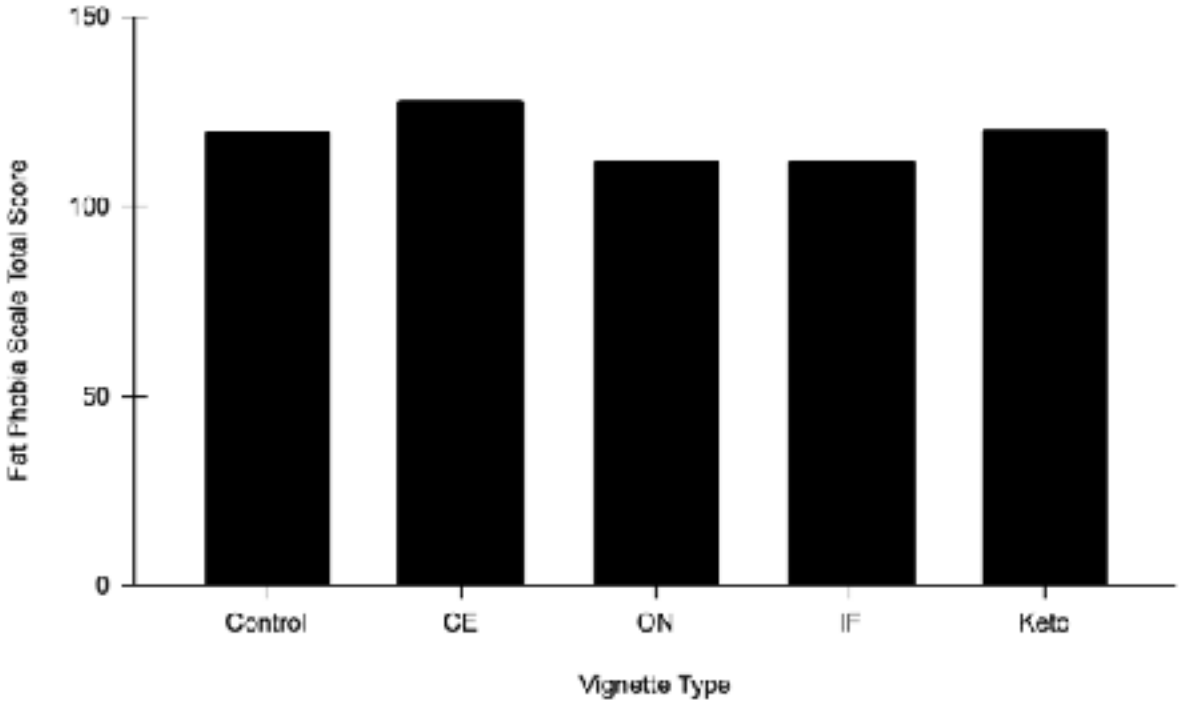

Table 3. Average total scores on FPS for each vignette type.

Next, an independent samples t-test was conducted to examine whether vignette characters following any of the fad diets (i.e., clean eating, Keto, or Intermittent Fasting) were viewed more positively than the control, no-diet vignette characters. Results showed no significant difference in attitudes towards vignette characters who were described as following a fad diet compared with those who were not, $p = .91$. Heterogeneity between views towards those on different specific diets may account for the lack of a significant difference between these two groups.

A Pearson product-moment correlation examined the relations between ON symptomatology (E-DOS), the Health Consciousness Scale (HC), and time spent viewing health information online, with views of the ON vignette character. Views of the vignette character did not significantly correlate with ON symptomatology ($r = .001$), health consciousness ($r = -.14$), or time spent viewing health information ($r = -.10$), $ps > .05$. These results suggest that ON symptomatology, health consciousness, and time spent viewing health information online were not linked to views of a person with ON.

Correlates of ON

Next, Pearson product-moment correlations were calculated to examine relations of study variables with ON. The Health Consciousness Scale (HC), the EDE-Q Critical Impairment Assessment, the Depression, Anxiety, and Stress Scale (DASS), and Weight Bias Internalization - Modified Scale (WBIS-M) were correlated with scores on the English Dusseldorf Orthorexia Scale (E-DOS). Health consciousness ($r = .36$, $p < .001$), critical impairment ($r = .41$, $p < .001$), and weight bias internalization ($r = .30$, $p < .001$) were all significantly, positively associated with ON. Interestingly, DASS scores were not significantly associated with EDOS scores, $r = .08$, $p = .09$. Overall, these correlation results suggest that those with greater levels of ON pathol-

ogy might be more health conscious, more likely both to internalize weight bias, and to experience impairment resulting from their eating habits.

Discussion

The pursuit of optimal health is widely valued in modern society. Indeed, good health behaviors are often perceived as virtuous. Many individuals pursue a healthier lifestyle through diet, and a significant proportion attempt to follow fad diets to improve overall health and lose weight. The current study assessed whether women's adherence to a diet influences others' perception of them. Results suggest that the diet an individual follows does impact how others view them. Specifically, those on a clean eating diet were viewed most favorably, followed by those on no diet or on the Ketogenic diet, followed by individuals with ON or those on an Intermittent Fasting Diet.

Multiple studies suggest clean eating is a dieting trend that is rapidly gaining popularity (Ambwani et al., 2019; IFIC, 2019). In the current study, the vignette character who followed a clean eating diet was viewed most favorably. This finding aligns with previous research suggesting that undergraduate students view clean eating as a healthy and positive dieting strategy (Ambwani et al., 2019). Ambwani and colleagues (2020) found that a majority of US adolescents and young adults appear to view clean eating positively, and many endorse a willingness to follow this dietary approach themselves. The results of the current study align with those findings. Ambwani and colleagues (2020) also noted that positive views towards clean eating are likely related to cultural moralization around the concept of "clean" and "dirty" foods. In the current study, the clean eating vignette characters were perceived as having "high self-control," and "high willpower," and were more likely to be viewed as "industrious" and "clean." These adjec-

tives further suggest that there may be a moral component to the way in which those on a clean eating diet are viewed. Future research should investigate whether being viewed as a moral person plays a role, explicitly or implicitly, in the decision to follow a clean eating diet. Indeed, there appears to be a possibility that individuals follow a clean eating diet as a form of virtue-signaling and to gain social approval (Puska et al., 2018; Kareklas et al., 2014).

The characters described as struggling with ON and those following the Intermittent Fasting Diet were rated least positively. The negative attitudes towards the character with ON could reflect a stigmatization towards individuals struggling with eating disorders. Previous research has shown that individuals with eating disorders are often viewed more negatively than those without eating disorders, and some studies even suggest that those with Orthorexia may face an even stronger bias than those with other eating disorders (Simpson et al., 2017). Interestingly, Intermittent Fasting was viewed as negatively as ON. This finding also could have resulted from the overlap between Intermittent Fasting and disordered eating habits. Many of the assessment tools most commonly used to screen for eating disorders (e.g., the Eating Disorder Examination Questionnaire; Fairburn & Cooper, 1993) include items assessing fasting behavior [e.g., “On how many of the past 28 days have you gone long periods of time (8 waking hours or more) without eating anything at all in order to influence your shape or weight?]. Although fasting can be viewed as a disordered eating habit, there is also myriad research in support of the health benefits of Intermittent Fasting, particularly for people with overweight and obesity (Harris et al., 2018; Cho et al., 2019; Meng et al., 2020). The overlap between Intermittent Fasting, a dieting strategy with which some individuals find success, and disordered eating might account for the negative views of the character depicted as following an Intermittent Fasting diet. Depending on

the individual's understanding of fasting, it can be seen as a pathological behavior or a healthy weight control strategy. Interestingly, proposed correlates (i.e., the rater's own ON symptomatology, health consciousness, and time spent viewing health information online) were not significantly related to views of ON. This might suggest that personal dietary behavior is not associated with views towards the habits of others. However, this result may also have been impacted by the small sample size of participants who were exposed to the ON vignette. Overall, it appears as though opinions about fasting and ON are somewhat negative, though potential causes of this negative appraisal remain unclear.

It is well documented that diets frequently precede the onset of eating disorders (Neumark-Sztainer et al., 2006; Patton et al., 1999). Indeed, many suggest that ON occurs after the decision to follow a specific diet devolves into disordered eating habits (Bratman et al., 2000; McComb & Mills, 2019). A qualitative study conducted with individuals who self-identified as having histories of ON also yielded evidence of this pathway from fad diet to eating disorder (Greville-Harris et al., 2019). Participants in this study noted that they originally started eating healthy to improve their overall health. However, their initial decision to follow a diet took on new meaning after they began receiving positive social reinforcement for their behavior, which led them to take that behavior further, ultimately resulting in an eating disorder (Greville-Harris et al., 2019). Findings of the current study support the idea that individuals who follow a clean eating diet might experience positive social effects, as those on a clean eating diet are viewed more positively than others. Favorable views of clean eating from others may be associated with positive feedback from friends, family, and acquaintances (e.g., that the individual is "good" for following their diet). Thus, perceptions about the supposed morality of an individual's dieting

behavior may reinforce their decision to follow a diet, and leading to even stricter adherence to it. In individuals with a predisposition for eating disorders, this feedback loop might ultimately result in ON.

This study is one of the first to use the E-DOS to study ON. Previous research on ON has heavily relied upon the ORTO-15, which has been shown to have potential psychometric deficiencies. Specifically, researchers assert that the ORTO-15 identifies individuals who are on diets without discerning whether those diets are causing impairment (Roncero et al., 2017). Thus, use of the ORTO-15 results in alarmingly high ON prevalence rates, potentially arising from a high false positive rate (Alvarenga et al., 2012).

Furthermore, use of the ORTO-15 has the potential to pathologize normal healthy eating behavior. Pathological behavior is frequently defined by its "clinical significance" of the behavior (Spitzer & Wakefield, 1999). In other words, the level of distress or impairment a person experiences as a result of the behavior plays an important role in determining whether it is considered pathological. In this study, higher E-DOS scores were associated with greater degrees of impairment caused by eating behaviors. This link between E-DOS scores and impairment supports the clinical significance of ON, as measured by this instrument. Thus, it appears as though the EDOS may be more successful in assessing for Orthorexic eating pathology than the ORTO-15. These results support the use of the E-DOS in future research and assessment of ON.

Interestingly, this study found that greater Weight Bias Internalization is associated with higher orthorexic pathology. Although ON was originally considered to be a pursuit of healthy eating in the absence of concern about weight, recent studies have challenged the validity of this notion (Bartel et al., 2020; Valente et al., 2020). Qualitative studies conducted with individuals

with ON have shown that concern over appearance and weight plays a critical role in the experience of ON (Valente et al., 2020; Cheshire et al., 2020; Greville-Harris et al., 2019). The desire to have a "fit" and healthy body often serves as the initial motivation to eat healthier (Valente et al., 2020). Indeed, health and weight are inextricably linked in American society. Thus, it may be misleading to suggest that ON can only occur in the absence of concern about weight. Though previous research has suggested that motivation to eat healthier in those with ON exists without an intention to lose weight, motivation for weight loss might co-occur with motivations for improved health. Further research is needed to understand whether ON is a unique eating disorder, and what role weight concern plays in its onset and maintenance.

Implications

Researchers hypothesize that individuals may alter their food intake in order to present a favorable image of oneself to others (Renner et al., 2012; Herman et al., 2003). Interestingly, the current study found that the specific diet an individual follows appears to play a role in how they are perceived. Thus, individuals may be motivated to go on a particular diet in order to alter the way in which others view them. This phenomenon may be of even greater importance in current times, given the widespread use of social media (Nguyen, 2021; Pew Research, 2019). Indeed, many individuals post pictures of meals or discuss their experiences of a diet on social media. Thus, dietary behavior may become a critical component in presenting a favorable online image of oneself to others. This effect can be easily observed in the many social media influencers who use their platforms to promote clean eating. These influencers might follow a particular diet in order to be viewed more positively. Although receiving positive feedback for following a healthy diet may be gratifying for some, it can be problematic in those predisposed to develop an eating

disorder. Furthermore, the moralization of diet may further promote the narrative that an individual is entirely in charge of their own health outcomes. Such a narrative may contribute to biases towards individuals with higher weights, those who cannot access healthy foods, and those who consume culturally appropriate foods not valued as "clean."

Interestingly, those on a clean eating diet were viewed most favorably in this study, over those on both the Ketogenic diet and the Intermittent Fasting diet. Clean eating is the most popular and widely followed diet at this time (IFIC, 2019). These results suggest that perceptions of people on diets may shift as the popularity of a given diet shifts. In other words, a person is viewed positively if they follow the diet that is popular at the given time. For example, a great deal of research on diet-related stereotyping was conducted in the 90s and early 2000s, during which dietary fat was viewed as unhealthy. These studies repeatedly found that individuals who followed low-fat diets were viewed more favorably (Mooney & Amico, 2000; Fries & Croyle, 1993; Barker et al., 1999). Therefore, it appears possible that people may choose how to eat in order to portray a favorable impression to others, specifically by following the diet that is most popular at the time. This finding has implications for the promotion of healthy eating and nutrition. Although the needs of the human body likely do not drastically change each year, popular diet trends often do. The knowledge that an individual may alter their diet to fit the popular trend at the given time can help public health experts understand the importance of clear nutrition communication that popularizes sustainable healthy eating behavior.

Future Research

ON is not yet acknowledged as a formal diagnosis in the ICD or DSM diagnostic systems. One topic of debate around formally recognizing ON is the potential for the pathologizing

of normal behavior, such as healthy eating. The results of this study shed further light on the complicated process of determining what is healthy and what is pathological. Indeed, the individual following Intermittent Fasting, a relatively popular diet, was viewed as negatively as the person described as struggling with ON. However, the individuals described as following the Ketogenic diet or a clean eating diet were viewed more positively than those with ON. Thus, there could be some possibility that the degree to which a person's eating behavior is seen as acceptable depends somewhat upon the given popularity of the diet that they are following. This could have serious implications for the diagnosis of ON, as one practitioner could see a person's behavior as pathological, while another could see it as normal adherence to a popular diet. Thus, future research should further investigate the point at which healthy eating becomes problematic. Indeed, the researcher who originally coined the term "Orthorexia" has himself suggested that "It is not the [dietary] theory itself: it is the response to the theory that constitutes Orthorexia" (Bratman, 2017; pp. 383). In order to formally acknowledge ON as a diagnosis, it must be differentiated from normal adherence to a given diet in the pursuit of greater health. Future research should attempt to refine assessment of ON to better differentiate between adherence to a healthy diet and eating pathology.

Future research should also investigate the degree to which impression management plays a role in the decision to follow a diet. The current study found that individuals on a diet were ranked more favorably than those not on a diet. However, this study did not assess whether the positive views associated with being on a diet drive an individual's decision to follow a specific diet. Future research should aim to further understand the extent to which a desire to appear a certain way to others may impact young adults' decisions to follow fad diets. For example, in-

vestigators could use tools such as The Eating Motivation Survey (EMS), which includes a subscale labeled "Social Image," to assesses the importance of social image in food choice (Renner et al., 2012). This line of inquiry could have implications for the promotion of healthy diet and nutrition, as a better understanding of motivations for healthy eating could help public health experts better adapt outreach efforts to the needs of the community.

Strengths and Limitations

This study offers insight into how adherence to specific popular diets may influence perceptions of others. It also offers support for the use of the EDOS in research and assessment of ON. However, this study should be viewed in light of its limitations. It was conducted using a convenience sample of female university students. Thus, the findings are not generalizable to other populations. However, a considerable amount of research on ON has utilized primarily White populations. This study contained a more racially diverse sample of individuals, and can therefore makes an important contribution to the field. However, future research in this area should include samples with greater age, gender, and racial/ethnic diversity.

Another limitation to this study is the use of vignettes. The participants were asked to evaluate the diet of others. This format did not allow for an examination of participants' own dietary patterns and decisions. Therefore, this study cannot provide insight into whether a positive view towards other people on a diet translates to an increased desire to follow a diet. Furthermore, data were collected during the COVID-19 pandemic. The social context of the pandemic may have influenced the results. For example, the Stress in America survey found that 61% of Americans reported unexpected weight changes over the course of the pandemic (APA, 2021), which may have influenced responses related to weight and dietary behavior. In addition, Gen Z

individuals, the majority of this study's participants, are the most likely to report worsening mental health as a result of the pandemic, potentially confounding factors in this study (APA, 2019). Finally, a limitation of this study is the ever-changing landscape of popular diets. Although this study was conducted using vignettes of the most popular diets at the time, it is likely that new diets will emerge in coming years. The general finding that a diet a person is on might impact how others perceive them could apply to diets beyond those used in this study. However, some more extreme diets were not used in this study, and these findings cannot be assumed to generalize to other diets.

The current study investigated attitudes towards individuals following a diet. Results suggest that perceptions of others may be influenced by the way they eat. Furthermore, the current study added to the extant literature on ON by providing evidence supporting the notion that weight and body image concerns may play a role in Orthorexic pathology. This study also offers support for the use of the E-DOS in research on ON. Future studies should investigate whether social reinforcement may play a role in the decision to follow a diet.

Appendix A

Demographic Questions

1) What is your age? (in years)

2) What is your current classification?
___Freshman
___Sophomore
___Junior
___Senior
___Other

3) Race/ethnicity: (Check all that apply)
___ White/European American
___ Black/African-American
___ Hispanic/Latino
___ Asian/Asian-American
___ Other

4) Sex:
___Male
___Female
___Prefer not to answer

5) Gender Identity:
___Man
___Woman
___Trans Man
___Trans Woman
___Gender non-conforming
___Other
___Prefer not to answer

6) Current height (in inches): ____

7) Current weight (in pounds): ____

8) What is your current household income level?
__Less than $20,000
__$20,000 to $34,999
__$35,000 to $49,999
__$50,000 to $74,999

__$75,000 to $99,999
__Over $100,000

9) Which, if any, of the following diets do you follow?
___The Ketogenic Diet
___Clean Eating
___Intermittent Fasting
___Vegan/Vegetarian/Plant-based diet
___Whole 30
___I do not follow a diet
___Other
Please explain:_____

Appendix B

Vignettes

Clean Eating Vignette

Rachel is a 19-year-old student in her second year of college. Upon starting college, Rachel started a new diet that she heard about from her friends. This new diet, commonly known as a "clean eating diet," consists of eating assorted vegetables, fruits, whole grains, low-fat dairy products, and a variety of protein products (such as seafood, lean meats, eggs, and nuts), while limiting consumption of foods that are fried or have added sugars. Rachel does not have any intolerances or allergies that require following this type of diet. Rachel does not go out to eat with her friends unless they are going to a restaurant that has options that fit within her new dietary pattern, and she has cut out some foods altogether. However, Rachel follows the diet because she believes that following this diet is a way to become more pure and healthy.

Ketogenic Diet

Rachel is a 19-year-old college student in her second year of college. Upon starting college, Rachel started a new diet that she heard about from her friends. This diet, commonly known as the "Keto diet," consists of limiting the intake of carbohydrates to enter a state of "ketosis." Rachel eats mostly animal products, such as meat, bacon, and eggs; and plant fats, such as olive oil, canola oil, and avocado. She avoids carbohydrates, root vegetables, alcohol, and sugar, including some fruits. Rachel spends a considerable amount of time tracking her food intake to ensure that she is limiting her consumption of carbohydrates enough to stay in ketosis. She cannot eat certain foods when her friends go out to eat, such as pizza and burgers. However, Rachel fol-

lows the diet because she believes that remaining in ketosis is healthy for the body and helps a person maintain a healthy weight.

Intermittent Fasting Diet

Rachel is a 19-year-old college student in her second year of college. Upon starting college, Rachel started a new diet that she heard about from her friends. The diet, commonly known as "Intermittent Fasting," consists of fasting for 16 hours of the day and eating for only 8 hours. Rachel stops eating at 8 PM, and only consumes coffee, black tea, diet soda, and water upon waking up in the morning. Around 12, she eats a big meal. She then proceeds to eat normally until 8 PM, where she stops eating until the next day. Rachel no longer goes to breakfast with her friends because she feels a need to adhere to her eating schedule. She often feels tired and hungry in the morning before she is allowed to eat, and she has a hard time staying focused. However, she follows the diet because she insists that there are a number of benefits associated with fasting for a few hours each day.

Orthorexia Nervosa

Rachel is a 19-year-old student in her second year of college. Upon starting college, she became very conscious of the foods she ate and preoccupied with eating a "healthy diet." Rachel started avoiding foods she believed were "impure" and "unhealthy," including foods containing any fat, preservatives, food additives, and animal products. Rachel carefully plans out all of her meals and spends 3 or more hours each day preparing, reading about, or purchasing specific types of foods bases on their quality and composition. She spends an excessive amount of money on foods she believes are "healthy" and "pure." Rachel frequently worries about the effect of eating "impure" or "unhealthy" foods on her physical and emotional health. If she makes a mistake and

consumes “unhealthy” or “impure” foods, she experiences feelings of disgust and guilt. Rachel has difficulty finding restaurants that serve food she eats, and rarely eats out. As a result of her eating habits, Rachel has become socially isolated and her grades at school have started to slip. However, Rachel still follows her diet because she feels it is healthy.

Control Vignette

Rachel is a 19-year-old student in her second year of college. Upon starting college, Rachel started eating a standard American diet. She doesn’t avoid eating any particular foods. She eats whenever she feels like eating. Rachel enjoys going out to eat with her friends and trying new restaurants near her college. Her diet does not matter much to her, and she does not spend much thinking about what she eats. Rachel drinks roughly one soda each day, eats fast food every three days, and typically consumes refined grain products rather than whole grain. She typically eats one serving of fruit and 2 servings of vegetables each day. She is not worried about the impact her diet could have on her health. She feels that her diet is healthy enough as it is, and as a result she does not purposefully change anything about her diet.

Validation Questions

1) Is the person in the vignette male or female?
2) What kind of diet is this person following?
    A. Ketogenic Diet
    B. Intermittent Fasting Diet
    C. Clean Eating Diet
    D. Healthy Eating Diet

E. No diet

Appendix C

Vignette Questions

Rate the degree to which you agree with the following statements.

1 = Strongly Disagree, 2 = Disagree, 3 =Neither Agree or Disagree, 4 = Agree, 5 = Strongly Agree

1) This vignette depicts healthy eating.

2) I would follow this dietary pattern.

3) This diet takes healthy eating too far.

4) This person's diet is causing impairment.

Appendix D

Fat Phobia Scale

Listed below are 36 pairs of adjectives sometimes used to describe people. For each adjective pair, please circle the number closest to the adjective that you feel best describes your feelings and beliefs about the person in the previous vignette.

1. Lazy	1	2	3	4	5	Industrious
2. Sloppy	1	2	3	4	5	Neat
3. Friendly	1	2	3	4	5	Unfriendly
4. Nonassertive	1	2	3	4	5	Assertive
5. No will power	1	2	3	4	5	Has will power
6. Warm	1	2	3	4	5	Cold
7. Depressed	1	2	3	4	5	Happy
8. Smart	1	2	3	4	5	Stupid
9. Unambitious	1	2	3	4	5	Ambitious
10. Easy to talk to	1	2	3	4	5	Hard to talk to
11. Unattractive	1	2	3	4	5	Attractive
12. Poor self-control	1	2	3	4	5	Good self-control
13. Ineffective	1	2	3	4	5	Effective
14. Popular	1	2	3	4	5	Unpopular
15. Slow	1	2	3	4	5	Fast
16. Careless	1	2	3	4	5	Careful
17 Having endurance	1	2	3	4	5	Having no endurance
18. Inactive	1	2	3	4	5	Active

19. Tries to please people	1	2	3	4	5	Does not try to please people
20. Humorous	1	2	3	4	5	Humorless
21. Strong	1	2	3	4	5	Weak
22. Individualistic	1	2	3	4	5	Conforming
23. Independent	1	2	3	4	5	Dependent
24. Good-natured	1	2	3	4	5	Irritable
25. Selfish	1	2	3	4	5	Selfless
26. Passive	1	2	3	4	5	Aggressive
27. Indirect	1	2	3	4	5	Direct
28. Likes food	1	2	3	4	5	Dislikes food
29. Dirty	1	2	3	4	5	Clean
30. Easy going	1	2	3	4	5	Uptight
31. Shapeless	1	2	3	4	5	Shapely
32. Overeats	1	2	3	4	5	Undereats
33. Moody	1	2	3	4	5	Even-tempered
34. Insecure	1	2	3	4	5	Secure
35. Low self-esteem	1	2	3	4	5	High self-esteem
36. Does not attend to	1	2	3	4	5	Attends to own appearance

Appendix E

E-DOS

Please rate the degree to which you agree with each of the following statements.

1 = This does not apply to me, 4 = This applies to me

1) Eating healthy food is more important to me than indulgence/enjoying the food
2) I have certain nutrition rules that I adhere to
3) I can only enjoy eating foods considered healthy
4) I try to avoid getting invited over to friends for dinner if I know that they do not pay attention to nutrition
5) I like that I pay more attention to healthy nutrition than other people
6) If I eat something I consider unhealthy, I feel really bad
7) I have the feeling of being excluded by my friends and colleagues due to strict nutrition
8) My thoughts constantly revolve around healthy nutrition and I organize my day around it
9) I find it difficult to go against my personal dietary rules
10) I feel upset after eating unhealthy foods

Appendix F

Health Consciousness Scale

1) I reflect about my health a lot.
2) I'm very self-conscious about my health.
3) I'm generally attentive to my inner feelings about health.
4) I'm constantly examining my health.
5) I'm alert to changes in my health.
6) I'm usually aware of my health.
7) I'm aware of the state of my health as I go through the day.
8) I notice how I feel physically as I go through the day.
9) I'm very involved with my health.

Appendix G

Eating Disorder Examination Questionnaire with Instruction (EDE-Q-I)

Some questions (marked with an asterisk) ask about (1) eating what most people who regard as an unusually large amount of food and (2) feeling a sense of having lost control while eating.

1. An unusually large amount of food is something that *most* people would feel is more than a large meal.

2. A sense of having lost control while eating might be experienced as feeling drive or compelled to eat; not being able to stop eating once you have started; not being able to keep yourself from eating large amounts of certain kinds of foods in the first place; or giving up on even trying to control your eating because you know that, no matter what, you are going to overeat.

Here are some examples:

After work one evening, Diana ate two pieces of chicken, a 16-ounce package of frozen vegetables, three cups of rice, three fourths of a coffee cake, and a piece of fruit. This is an unusually large amount of food. While she ate Diana felt completely out of control, ate more quickly than usual, and ate until she felt uncomfortable full. Afterwards, Diana was very upset about how much she had eaten, and said she felt depressed, guilty, and hated herself for giving in to the urge to binge.

Several times a week JoAnne ate lunch at McDonald's with two coworkers. Her usual order was a Big Mac, a fish fillet sandwich, two large orders of fries, and a large chocolate shake. This is an unusually large amount of food. Although she ate somewhat more than her friends did and knew she was eating a lot of high-fat good, she did not feel out of control while eating or feel upset afterwards about how much she had eaten.

For lunch one day, Joseph had a ham and cheese sandwich with a mayonnaise on a roll, a small bag of potato chips, a candy bar, and a diet coke. Although this was a large meal, it was not

unusually large. However, Joseph felt out of control because he had planned to have turkey on whole wheat with lettuce and tomato plus a piece of fruit for dessert, but change his mind at the last minute while ordering his sandwich.

Carol ate two donuts someone brought to the office one morning. She had started a diet that day and planned to skip breakfast. Carol initially refused the donuts, but after everyone else had gone to a meet she snuck into the break room and very quickly ate the donuts so no one would see her eating. She felt very guilt and ashamed afterwards and hated feeling so out of control of her eating, resolving to start dieting again the next day. Although Carol felt bad about eating the donuts, this was not an unusually large amount of food.

Dina and JoAnne at an unusually large amount of food, but Joseph and Carol did not. Dina, Joseph, and Carol felt a loss of control while eating, but JoAnne did not. Of the four, Dina is the only one who actually had a binge episode, which includes both (1) eating an unusually large amount of food and (2) feeling a sense of having lost control while eating.

Instructions

The following questions are concerned with the PAST FOUR WEEKS ONLY (28 days). Please read each question carefully and circle the appropriate number on the right. Please answer all the questions.

ON HOW MANY DAYS OUT OF THE PAST 28 DAYS…..	No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	Every day
1. Have you been deliberating trying to limit the amount of food you eat to influence you shape or weight?	0	1	2	3	4	5	6

2. Have you gone for long periods of time (8 hours or more) without eating anything in order to influence your shape or weight?	0	1	2	3	4	5	6
3. Have you tried to avoid eating any foods which you like in order to influence your shape or weight?	0	1	2	3	4	5	6
4. Have you tried to follow definite rules regarding your eating in order to influence your shape or weight; for example, a calorie limit, a set amount of food, or rules about what or when you should eat?	0	1	2	3	4	5	6

5. Have you wanted your stomach to be empty?	0	1	2	3	4	5	6
6. Has thinking about food or its calorie content made it much more difficult to concentrate on things you are interesting in; for example, read, watch TV, or follow a conversation?	0	1	2	3	4	5	6
7. Have you been afraid of losing control over eating?	0	1	2	3	4	5	6
8. Have you had episodes of binge eating?	0	1	2	3	4	5	6
9. Have you eaten in secret? (Do not count binges.)	0	1	2	3	4	5	6
10. Have you definitely							

wanted you stomach to be flat?	0	1	2	3	4	5	6
11. Has thinking about shape or weight made it more difficult to concentrate on things you are interested in; for example read, watch TV, or follow a conversation?	0	1	2	3	4	5	6
12. Have you had a definite fear that you might gain weight or become fat?	0	1	2	3	4	5	6
13. Have you felt fat?	0	1	2	3	4	5	6
14. Have you had a strong desire to lose weight?	0	1	2	3	4	5	6

OVER THE PAST FOUR WEEKS (28 DAYS)

15. On what proportion of time that you have eaten have you felt guilty because the effect on your shape or weight? (Do not count binges.) (Circle the number which applies.)

0 – None of the times
1 – A few of the times
2 – Less than half the times
3 – Half of the times
4 – More than half the times
5 – Most of the times
6 – Every time

16. Over the past four weeks (28 days), have there been any times when you have felt you have eaten what other people would regard as an unusually large amount of food given the circumstances?

0 – No
1 – Yes

17. How many episodes have you had over the past four weeks?

18. During how many of these episodes of overeating did you have a sense of having lost control over your eating?

19. Have you had other episodes of eating in which you have had a sense of having lost control and eaten too much, but have <u>not</u> eaten an unusually large amount of food given the circumstances?

0 – No
1 – Yes

20. How many such episodes have you had over the past four weeks?

21. Over the past four weeks have you made yourself sick (vomit) as a means of controlling your shape or weight?

0 – No
1 – Yes

22. How many times have you done this over the past four weeks?

23. Have you taken laxatives as a means of controlling your shape or weight?

0 – No
1 – Yes

24. How many times have you done this over the past four weeks?

25. Have you take diuretics (water tablets) as a means of controlling your shape or weight?

0 – No
1 – Yes

26. How many times have you done this over the past four weeks?

27. Have you exercised hard as a means of controlling your shape or weight?

0 – No
1 – Yes

28. How many times have you done this over the past four weeks?

OVER THE PAST FOUR WEEKS (28 DAYS) (Please circle the number which best describes your behavior.)	Not at all		Slight ly		Moderately		Markedly
29. Has your weight influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5	6

30. Has your shape influ-enced how you think about (judge) yourself as a per-son?	0	1	2	3	4	5	6
31. How much would it upset you if you had to weight yourself once a week for the next four weeks?	0	1	2	3	4	5	6
32. How dissatis-fied have you felt about your weight?	0	1	2	3	4	5	6

33. How dissatis-fied have you felt about your shape?	0	1	2	3	4	5	6
34. How con-cerned have you been about other people seeing you eat?	0	1	2	3	4	5	6

35. How uncom-fortable have you felt see-ing your body; for example, in the mirror, in shop window reflec-tions, while undress-ing or taking a bath or shower?	0	1	2	3	4	5	6

36. How uncom-fortable have you felt about others seeing your body; for example, in com-munal changing rooms, when swim-ming or wearing tight clothes?	0	1	2	3	4	5	6

Critical Impairment Assessment - CIA

Over the past 28 days, to what extent have your eating habits…
0 = Not at all, 1 = A little, 2 = Quite a bit, 4 = A lot

1) made it difficult to concentrate?

2) made you feel critical of yourself?
3) stopped you going out with others?
4) affected your work (or school) performance?
5) made you forgetful?
6) affected your ability to make everyday decisions?
7) interfered with meals with family or friends?
8) made you upset?
9) made you feel ashamed of yourself?
10) made it difficult to eat out with others?
11) made you feel guilty?
12) interfered with you doing things you used to enjoy?
13) made you absent-minded?
14) made you feel a failure?
15) interfered with your relationships with others?
16) made you worry?

Appendix H

Sources of Health Information

1) Please rate the likelihood that you will turn to each of the following sources for information about healthy eating.

1 = Very Unlikely, 5 = Very Likely

A. Doctors or physicians
B. Dietitians or nutritionists
C. Friends
D. Family
E. Social Media (e.g. Facebook, Instagram, Twitter, Pinterest, etc.)
F. Healthy living blogs
G. Health websites (e.g. Medline, WebMD, Mayo Clinic)
H. Books or magazines
I. Federal resources (e.g. MyPlate, USDA guidelines)
J. Other
    Please describe:_____

Which source do you use the most?

How do you access it?

2) On average, how much time do you spend reading about or looking up information on healthy eating each week? (in hours) ___

3) On average, how many hours per week do you spend thinking about your diet? (in hours) ___

Appendix I

Modified Weight Bias Internalization Scale (WBIS-M) Items

Please rate the degree to which you agree with each of the following statements.
1 = strongly disagree; 7 = strongly agree

1. Because of my weight, I feel that I am just as competent as anyone.
2. I am less attractive than most other people because of my weight.
3. I feel anxious about my weight because of what people might think of me.
4. I wish I could drastically change my weight.
5. Whenever I think a lot about my weight, I feel depressed.
6. I hate myself for my weight.
7. My weight is a major way that I judge my value as a person.
8. I don't feel that I deserve to have a really fulfilling social life, because of my weight.
9. I am OK being the weight that I am.
10. Because of my weight, I don't feel like my true self.
11. Because of my weight, I don't understand how anyone attractive would want to date me.

Appendix J

BAS-2

Please indicate whether the question is true about you never, seldom, sometimes, often or always.

1 = Never
2 = Seldom
3 = Sometimes
4 = Often
5 = Always

1. I respect my body. _____
2. I feel good about my body. _____
3. I feel that my body has at least some good qualities. _____
4. I take a positive attitude towards my body. _____
5. I am attentive to my body's needs. _____
6. I feel love for my body. _____
7. I appreciate the different and unique characteristics of my body. _____
8. My behavior reveals my positive attitude toward my body; for example, I hold my head high and smile. _____
9. I am comfortable in my body. _____
10. I feel like I am beautiful even if I am different from media images of attractive people (e.g., models, actresses/actors). _____

Appendix K

DASS-21

Please read each statement and circle a 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 - NEVER
1: Applied to me to some degree, or some of the time - SOMETIMES
2: Applied to me to a considerable degree, or a good part of time - OFTEN
3: Applied to me very much, or most of the time

1) I found it hard to wind down
2) I was aware of dryness in my mouth
3) I couldn't seem to experience any positive feelings at all
4) I experienced breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion)
5) I found it difficult to work up the initiative to do things
6) I tended to over-react to situations
7) I experienced trembling (eg, in the hands)
8) I felt that I was using a lot of nervous energy
9) I was worried about situations in which I might panic and make a fool of myself
10) I felt that I had nothing to look forward to
11) I found myself agitated
12) I found it difficult to relax
13) I felt down-hearted and blue
14) I was intolerant of anything that kept me from getting on with what I was doing
15) I felt I was close to panic
16) I was unable to become enthusiastic about anything
17) I felt I wasn't worth much as a person
18) I felt that I was rather touchy
19) I was aware of the action of my heart in the absence of physical exertion (eg, sense of heart increase, heart missing a beat)
20) I felt scared without any good reason
21) I felt that life was meaningless

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