

**Assessing Prevalence Rates and Clinical Impairment of Orthorexia Nervosa in a
U.S. Population**

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I have no conflicts of interest to disclose.

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Table of Contents

Acknowledgments	2
List of Tables and Figures	5
Abstract.....	6
Chapter 1	7
Diagnostic History of EDs.....	7
Clinical Impairment Associated With EDs	9
Orthorexia Nervosa	12
The Culture of Clean Eating and Emphasis on Health.....	16
Case Studies of Orthorexia.....	18
Rationale of Current Study	32
Research Questions	34
Chapter 2	37
Methodology and Research Design.....	37
Participants	37
Measures and Materials.....	39
Procedures	44
Procedural Analysis.....	45
Analytic Strategy	45
Chapter 3	47
Results	47
Descriptive Statistics	47
Inferential Statistics	50
Chapter 4	55
Discussion.....	55
Prevalence Rate of Orthorexia.....	55
Orthorexia and Clinical Impairment.....	57
Examination of Clinically Significant Profiles.....	58
Orthorexia as a Predictor of Clinical Impairment	61
Depression as a Moderator Between Orthorexia and Clinical Impairment	61
Anxiety as a Moderator Between Orthorexia and Clinical Impairment....	64
ED Pathology as a Moderator Between Orthorexia and Clinical Impairment	64
Limitations.....	65
Future Directions	66
Conclusion.....	66
References	69
Appendix A	80
Appendix B.....	81
Appendix C.....	82
Appendix D	83
Appendix E.....	84
Appendix F	85
Appendix G	86

Appendix H87
Appendix I88
Appendix J89

List of Tables and Figures

Table 1. Examples of Food Beliefs Inspired by Major Food Movements	15
Table 2. Demographic and Descriptive Statistics.....	38
Table 3. Descriptive Statistics of E-DOS, CIA, PHQ-9, and GAD-7	48
Table 4. Prevalence Rate of Orthorexia and Cutoff Categories in a U.S. Population.....	48
Table 5. Clinically Significant Participant Profiles	51
Table 6. Correlations Between Key Measures	52
Table 7. Regression Table for Model 1	52
Table 8. Regression Table for Model 2	53
Table 9. Regression Table for Model 3	53
Table 10. Regression Table for Model 4	54
Figure 1. Model Hypothesis	36
Figure 2. Education Demographics	38
Figure 3. Dietary Preferences	39
Figure 4. Model Hypothesis With Current Study Measures	46

Abstract

Orthorexia nervosa has been characterized as a pathological fixation toward consuming healthy foods. Recognized by U.S. physician Bratman in 1997, orthorexia has received global attention among professionals in the medical field and eating disorder (ED) community. Most literature on orthorexia has been done on international samples. Researchers have questioned if orthorexia warrants its own diagnostic entity as an ED, if the cluster of symptoms would be best explained by an existing condition such as avoidant/restrictive food intake disorder or a form of OCD. The culture of clean eating has also been a factor of consideration in the presentation of orthorexia. Instruments to assess orthorexia have been in development, along with working diagnostic criteria. The current study aimed to collect the prevalence rate of orthorexia in a U.S. population and to look at depression, anxiety, and ED pathology as moderating variables. Results revealed a prevalence rate of 7% of orthorexia using the E-DOS. Participants who received elevated scores on the E-DOS and CIA revealed a prevalence rate of 3%. These clinically significant profiles are presented in the results with more in-depth examination. Orthorexia was found to be a predictor of clinical impairment with depression as a moderator. Anxiety and ED pathology were not identified as moderating variables between orthorexia and clinical impairment. The E-DOS as a measure of orthorexia continues to show promising results of reliably detecting orthorexia with consistent prevalence rates. Orthorexia nervosa appears to be a cluster of ED-related symptoms accompanied by clinical impairment, warranting further investigation as a mental health concern.

Chapter 1

The act of partaking in food is a practice that offers individuals the opportunity to come together socially, express cultural identity, and to nourish the body. Food as an experience is a meaningful and vital part of human life. However, the experience of eating can also be a stressful experience for some. The uprising cultural emphasis on health has led providers in the eating disorder (ED) treatment community to believe some individuals have become vulnerable to developing a pathological fixation toward consuming perceived healthy foods (Bratman & Knight, 2000). The term *orthorexia nervosa* (ON) is referred to as a pathological fixation toward a rigid consumption of healthful foods (Bratman & Knight, 2000). Over the past 2 decades, a gradual rise in research on ON has created a global conversation, with studies trying to understand its construct and incidence (McComb & Mills, 2019). Publication of case reports of patients exhibiting orthorexic symptoms have produced an urgency to develop instruments to screen for this type of disordered eating and identify appropriate treatment interventions. ON has been proposed as a potential ED with working criteria (Dunn & Bratman, 2016; Moroze et al., 2015). The following literature review discusses the history of EDs, conveys the clinical impairment associated with ED pathology, and introduces this proposed ED known as ON nervosa.

Diagnostic History of EDs

A brief review of the diagnostic history of EDs is essential as the history depicts continuously evolving conceptualizations, nosological changes, and advancements in assessment, all of which are aspects of debate regarding ON. Among mental illnesses, EDs continue to present as some of the most difficult disorders to understand and treat

(Touyz & Hay, 2019; Walsh, 2019). Despite early historical evidence of the presence of EDs, their cause continues to be highly debated today (Habermas, 2005; Keel & Klump, 2003). Researchers continue to speculate on how much of a role genetics versus culture play in the development of an ED (Habermas, 2005; Keel & Klump, 2003). Family and genetic studies have shown EDs are heritable; however, the estimated influence of genes and nonshared environmental variables yield significant differences in estimation across the research (Gordon et al., 2018). Cultural variables including dieting have also been shown to increase the prevalence of disordered body image and eating behavior (Anderson-Fye, 2018). Dieting has been extensively studied as a risk factor in the development of EDs (Polivy & Herman, 1985).

Anorexia nervosa has the longest history among EDs, with case studies including viable diagnostic criteria dating back to mid-19th century (Gull, 1874) and reports of self-starvation dating back to the 12th century (Keel & Klump, 2003). Although binge ED recently became recognized as a disorder in the DSM-5, cases of binge eating strange foods were present during medieval times (Gordon et al., 2018). Bulimia nervosa began to receive clinical attention in North American clinics in the mid 1970s (Gordon et al., 2018) and became a diagnostic entity in 1980 (American Psychiatric Association [APA], 2013). Although the field has made advancements in the research, nosology, and treatment of EDs, it is clear the etiological understanding of them is still in development.

Systematic studies on EDs began to increase in the late 20th century (Gordon et al., 2018). The rise in research has led to significant changes in the conceptualization of EDs and treatment planning, particularly the transdiagnostic approach to ED treatment, which proposes EDs share the same psychopathology and may vacillate between

diagnostic states over their lifetime (Fairburn et al., 2003). The *Oxford Handbook of Eating Disorders* explores this diagnostic feature of EDs and defines it as a boundary problem. Due to the fact EDs tend to merge into other EDs over a lifespan, as Fairburn referred to as transdiagnostic disorders (Fairburn et al., 2003), professionals in the field question whether if the individual warrants a new diagnosis when behavioral symptoms change. Studies have shown patients with anorexia commonly develop symptoms of bulimia when the underweight criteria are no longer present (Gordon et al., 2018). Speculation regarding ON as a coping mechanism or variation of an ED necessitates investigation. One study found patients in recovery from anorexia and bulimia showed higher rates of orthorexic symptoms compared to a controlled group (Gazzarrini et al., 2015). Experts in the field of EDs have emphasized the importance of nutrition therapy in the process of ED recovery (Reiff & Reiff-Lampson, 1992), which appears to be a potential key factor in treatment for patients presenting with symptomology of ON (Bratman & Knight, 2000). To conclude on the diagnostic history of EDs, consideration of advancements in the conceptualization of EDs, such as Fairburn's transdiagnostic approach (Fairburn et al., 2003), is essential due to the fluid nature of ON that is to be presented.

Clinical Impairment Associated With EDs

To understand the potential clinical severity individuals presenting with ON experience, a review of the clinical impairment associated with EDs is warranted. According to Klump et al. (2009), EDs such as anorexia nervosa, bulimia nervosa, and variants of these disorders present serious functional impairment associated with symptomology. The symptomology of EDs has been found to be associated with

significant impairment in cognitive function, judgment, and emotional regulation. Due to the severity EDs place on individuals, social impairment is also characteristic. In addition to psychosocial impairment, EDs pose serious health consequences and risk of death (Klump et al., 2009).

The APA (2013) posited EDs are accompanied by significant impairment in health and/or psychosocial functioning. The APA reported individuals with eating-related symptoms display similarities with individuals who suffer from substance use disorders, in regard to craving and patterns of compulsivity around use. The resemblance in these systems is theorized to include the involvement of the same neural systems, which process self-control and reward (APA, 2013). Diagnostic features outlined by the APA regarding restricting-type EDs include serious impairment in physical health, emotional functioning, and social functioning.

Physical Health Impairment

EDs with a restrictive presentation often result in serious nutritional deficiency, which typically affects most major organ systems and can produce a number of health complications. Common physiological disturbances include amenorrhea and abnormal vital signs. Although many of the physical health disturbances produced by malnutrition can be restored through nutritional therapy, some conditions such as loss of bone mineral density are irreversible. In grave conditions, EDs may also pose a serious threat of mortality due to severe malnourishment (APA, 2013).

Cognitive and Emotional Impairment

EDs typically result in cognitive deficits that affect executive functioning (decision making, judgment, flexibility; Klump et al., 2009). Additional features related

to cognition and EDs include rigid thinking and distorted thinking (typically surrounding diet or self; Klump et al., 2009). The state of being underweight or malnourished has been shown to be accompanied by depressed mood, social withdrawal, irritability, insomnia, and lack of desire for sex (APA, 2013). Additional affective components associated with malnourishment include obsessive-compulsive features that may be related to food or other aspects. Inflexible thinking and the desire to control one's environment typically leads to feelings of anxiety. Diminished self-esteem and feelings of ineffectiveness are also typically seen among EDs (APA, 2013).

Social Impairment

Due to physical and emotional impairments associated with malnourishment and other symptoms related to disordered eating, impairment in social functioning is often a result. Social impairment might include social withdrawal, concerns about eating in public, and/or limited social spontaneity (APA, 2013). The severe symptomology of EDs are likely to result in limited life activities such as social gatherings, educational opportunities, and hobbies (Klump et al., 2009). Lastly, impairment in occupational functioning is noted if the individual presents with severe ED symptomology and is unable to perform work-related responsibilities due to malnourishment or inpatient treatment (APA, 2013).

As evidenced by the diagnostic profile and associated clinical impairment EDs impose on individuals, their treatment must be taken with extreme seriousness and with an aggressive approach. Klump et al. (2009) parallels the severity of EDs to other psychiatric conditions such as schizophrenia, obsessive-compulsive disorder, bipolar disorder, and depression. These heritable and impairing disorders are considered to be

biologically based mental illnesses (BBMIs), serious mental illnesses (SMIs), and serious emotional disturbances (SEDs). Unfortunately, in some parts of the world, EDs are not presented as serious conditions and go untreated or ignored. In the United States, EDs have been increasingly understood as serious mental health disorders with severe health consequences; however, the slow movement in political and financial support for treatment has resulted in many individuals who lack access to services and the help they need. In the position of the Academy for Eating Disorders (AED), EDs are classified as BBMIs and SMIs; therefore, they warrant the same level of health care and coverage other serious psychiatric conditions receive (Klump et al., 2009). For the purpose of this study, clinical impairment is defined as psychopathology related to mood dysregulation, cognitive functioning, interpersonal functioning, and work performance. These features of psychopathology may also impact self-perception and social functioning, thus encompassing psychosocial impairment.

Orthorexia Nervosa

The core issues of EDs are often perceived to be all about the food, and some believe the anecdote to disordered eating is to “just eat”; however, EDs have been known to have much more serious underlying emotional issues that often become entangled with food. Understanding how the affective experience of individuals with EDs interacts with food consumption is crucial when considering ON. The term ON nervosa was coined by U.S. physician Bratman in 1997. The construction of the term is derived from Greek, the term *orthos* meaning “correct” or “right” and *orexis* meaning “hunger” or “appetite,” hence orthorexia nervosa (Mathieu, 2005). The term *healthy* in the context of diet has been found to be highly subjective. Common defining terms seen throughout the

literature include foods that are biologically pure, organic, clean, unprocessed, raw, all natural, or part of a specific diet such as veganism (Bratman, 1997; Moroze et al., 2015). In his book, *Health Food Junkies*, Bratman began to notice a pattern of obsessional fixation toward healthful foods in patients (Bratman & Knight, 2000). Since his first publication on ON, Bratman reported receiving a number of emails and messages from people expressing they were experiencing symptoms of ON (Mathieu, 2005). Since then, case studies from around the world have been published (Moroze et al., 2015; Park et al., 2011; Wilsher & Panagiotaki, 2018), and clinicians are asking for more (Missbach et al., 2017).

Researchers have discussed the unreliable methods used to evaluate ON (Missbach et al., 2015). Moroze et al. (2015) reported the growing empirical research on ON thus far has been presented throughout diverse disciplines including behavioral health, ED literature, diet and nutrition, and sport and fitness literature (Moroze et al., 2015). Additionally, a great portion of the current literature is represented internationally (Moroze et al., 2015). Missbach et al. (2017) reported the literature on ON contains flawed methodology in many studies. To increase awareness in the scientific community and collect data for constructing a reliable measure, a topical collection on ON in *Eating and Weight Disorders* was released in 2017 to call for relevant case reports and high-quality research studies (Missbach & Barthels, 2017). Researchers have yet to identify a psychometrically sound screening instrument to assess ON and collect consistent prevalence rates. A reliable point of prevalence in addition to longitudinal studies are needed to assess if ON is a diet trend or a viable diagnostic entity that warrants further scientific research. Although the current literature on ON has shown population samples

are revealing elevated scores on measures designed to assess extreme healthful eating (McComb & Mills, 2019), case reports have shown ON may include varying levels of severity, thus indicating *ON* may be a societal diet trend, but a small percentage of individuals experiencing severe eating pathology face grave health conditions (Moroze et al., 2015; Park et al., 2011; Saddichha et al., 2012; Wilsher & Panagiotaki, 2018; Zamora et al., 2005).

It must be made clear that the proposed criteria for ON do not aim to pathologize healthy eating (Bratman & Knight, 2000), a practice of value and recommended for overall health (U.S. Department of Health and Human Services & U.S. Department of Agriculture, 2015). ON was initially conceptualized as an unhealthy fixation toward healthful eating with associated features of dietary restriction, emotional dysregulation, impairment in social functioning, malnourishment, and risk of mortality (Brytek-Matera, 2012). Koven and Abry (2015) presented a table (see Table 1) listing major food beliefs inspired by food movements, which depicts the magical thinking that can be attributed to food (Aarnio & Lindeman, 2004; Koven & Abry, 2015; Lindeman et al., 2000). These food beliefs demonstrate how culture can play a large role in the development of extreme dieting. The evolving construct of ON continues to emphasize the severity of symptomology (Dunn & Bratman, 2016) and the case reports presented later in this chapter will also demonstrate this pathology.

Table 1*Examples of Food Beliefs Inspired by Major Food Movements*

• Approximately 70% of our food should be high in water content since our bodies are 70% water (living water diet)
• Chewing food too quickly impedes stomach digestion of proteins and the absorption of amino acids (raw foodism)
• Eating yellow food focuses one's energy on productive activities and strengthens the spiritual center (chakra-focused eating)
• Eating unprocessed plant-based food increases one's spiritual frequency and helps one connect to the divine (veganism)
• Eating fruit on an empty stomach 30–60 minutes before a meal primes the stomach for nutrition absorption (trophology)
• Eating food associated with one's blood type prevents disease and enhances energy and well-being (blood type diet)
• To avoid bodily degeneration and illness, no more than 30% of the diet should consist of acidic foods (alkaline diet)
• Eating at the wrong time of day disturbs the autonomic nervous system, hindering one's ability to manage stress (warrior diet)

According to Barthels et al. (2017), the theoretical concept of ON compared to typical ED behaviors share pathological similarities, particularly when compared to anorexia nervosa. Barthels et al. outlined the similarities including cognitive fixation on nutrition, food selection based on distorted rationalization verses feeling of hunger, and overall rigidity in diet. However, a distinction between the two includes the intent behind the disordered eating. Individuals with anorexia are concerned with quantity of food (APA, 2013), and individuals with orthorexic tendencies are concerned with quality of food intake (Bratman & Knight, 2000). Researchers have suggested individuals suffering from anorexia may use orthorexic eating behaviors as a coping strategy through recovery by being selective with dietary choices (Barthels et al., 2017). To further address ON as a coping strategy, it is important to note a study from the *Journal of Eating and Weight Disorders* that conducted a search on Instagram using the keyword *orthorexia*. The search results revealed over 120,000 posts related to the topic with 425 posts hashtagging:

#edrecovery. This study that showed individuals posting healthful meals, including the keyword orthorexia, also indicated they were in recovery from an ED. Researchers speculated healthful eating may be used as a coping strategy as opposed to controlling food intake through caloric restriction, which may continue to serve as a form of food control or symptom relief (Santarossa et al., 2018). Another study found increased use of Instagram was correlated with symptoms of ON (Turner & Lefevre, 2017). On the surface, ON may present as a value for health, but the underlying pathology may be rooted in anxiety or fear.

The Culture of Clean Eating and Emphasis on Health

Culture as an influence in the development of EDs continues to be an ongoing discussion, especially because culture and general information regarding topics such as health have become amplified through media and its obtrusive accessibility. During the mid-19th century, a cultural emphasis was placed on weight and shape, primarily among women (Habermas, 2005), which has remained today. The “thin ideal” has been a longstanding cultural value some have internalized and is a known risk factor in the development of EDs (Allen & Schmidt, 2019). However, in addition to weight and shape, an emerging cultural emphasis has been placed on body health, catering to all demographics. Through advancements in the field of medicine, increased lifespan, and access to abundant information regarding disease, individuals have the opportunity to have a more proactive role in their health. It is uncertain if Hippocrates ever wrote, “Let food be thy medicine, and medicine be thy food,” but this catchphrase continues to prevail as teaching regarding diet.

According to the 2019 Food & Health Survey published by the International Food Information Council Foundation (IFICF), 38% of U.S. consumers reported they follow a specific diet pattern, with *clean eating* as the leading cited diet. The survey reported 24% of consumers responded they actively seek health benefits from foods that include weight management, energy, digestive health, and cardiovascular health. Half of American consumers responded they are interested in learning more about how to adopt plant-based diets (IFICF, 2019). In a special report by the IFICF, nearly half of Gen X consumers reported they make decisions regarding food and beverage purchases based on the possibility of disease prevention. The survey also revealed 57% endorsed extreme dietary changes over the past 10 years as a form of cancer prevention (IFICF, 2019).

Available information on how to eat to improve factors, such as gut health, disease prevention, mental health, and various additional elements, has become limitless. This does not include the thousands of diets such as clean eating, paleo, Whole30, keto, vegan, and/or raw foodism. YouTube, a major platform for mass information, has provided thousands of job opportunities for vloggers who create channels such as “What I Eat in a Day” where subscribers can follow self-proclaimed health gurus and take note of how to eat and discuss the implications of consuming gluten, wheat, dairy, and other food ingredients. Health benefits of food have begun to take rise next to weight management (IFICF, 2019). A medical study in 2015 by Capannolo et al. highlighted the trend of perceived food sensitivities regarding items such as gluten, when in fact gluten intolerance is a rare condition despite the widespread demand for gluten-free foods. The Capannolo et al. study found 86% of participants in their study reported having gluten

sensitivities; however, during a 2-year follow up, those following a gluten-free diet did not report a change in the symptoms believed to be gluten related.

The Nielsen Global Health and Wellness Report (2015), with the front page title, “We Are What We Eat,” reported surveys showed consumers are looking for “fresh, natural and minimally processed foods. Beneficial ingredients that help fight disease and promote good health” (p. 2). Data also revealed younger consumers are willing to pay higher prices for quality. Food companies have embraced the cultural demand for healthful foods, and consumers have paid more attention to health buzzwords such as *all natural, organic, good source of protein, vitamin X, and other nutrient*, when purchasing food items (Nielsen Health & Wellness Report, 2015). Overall, individuals are becoming more selective and avoidant of foods as immeasurable amounts of information about nutritional properties and opinions infiltrate the media.

Case Studies of Orthorexia

A study by Segura-Garcia et al. (2015) found 28% of individuals with anorexia or bulimia displayed symptoms of ON, and, after treatment, 58% of patients presented with orthorexic symptomology. Studies have also found patients in recovery from EDs, specifically anorexia, may exhibit orthorexic eating behaviors as a coping strategy through recovery (Barthels et al., 2017). The case studies presented here display varying degrees of clinical impairment seen among EDs. Although the sample of case reports are minimal, they demonstrate diversity in presentation and the severity of symptomology associated with ON.

Moroze et al. (2015) reported treating a 28-year-old male with a 3-year history of severe nutritional deficiency. Mr. A, the deidentified patient, was assessed in the Rocky

Mountain West, an academic medical center that has a specialized unit for the treatment of severely underweight patients. Upon admission, Mr. A. presented with significant malnutrition and many of the serious medical conditions outlined in the DSM-5 that accompany severe anorexia (APA, 2013). The patient reported a history of inpatient treatment for an ED not otherwise specified and denied a family history of psychiatric illness. Mr. A stated he held a bachelor's degree in engineering. During the mental status examination, the patient was oriented to person, place, and time, however, was disorganized and tangential in his thought processing. Active psychosis was ruled out. Mr. A displayed magical thinking regarding food and its healing power. He reported a history of diet changes in an attempt to resolve constipation. He stated he stopped buying certain items such as protein shakes and began making his own recipes from whole nutrients such as pure amino acid powders. He talked about following a homeopathic provider for guidance on dietary selections. Mr. A reported a number of somatic complaints such as difficulty swallowing; however, no medical abnormalities were found. Near the end of Mr. A's treatment, he was treated with olanzapine, and his thought processing was noted as more linear and logical. His clinicians also noted his "delusion-like" thoughts regarding food were absent. The patient was discharged to another ED treatment center for further weight stabilization (Moroze et al., 2015).

Park et al. (2011) reported a case study of a 30-year-old male who was admitted to a hospital in Seoul, Korea, with presenting concerns of general weakness and drowsy mental status. The patient reported his daily diet consisted of "3-4 spoons of brown rice and fresh vegetable without salt for 3 months" (Park et al., 2011, p. 33). The patient reported his dietary practices were part of his treatment for a tic disorder. The treating

physicians indicated the patient presented with serious medical conditions due to malnutrition. The case report indicated the patient's past medical history was unremarkable excluding the tic disorder. The patient reported his weight dropped by 14 kg within the past 3 months. Medical imaging showed extensive tissue softening in the neck and chest wall. The patient presented in a bed-ridden state. Based on the patient's presentation, the treating physicians made a diagnosis of "orthorexia nervosa with hyponatremia, rhabdomyolysis, pneumomediastinum, pneumothorax, and soft tissue emphysema" (Park et al., 2011, p. 33). The patient was treated with intravenous fluid supplementation based on treatment guidelines for refeeding syndrome. The patient's vitals over time improved, and, on the 38th day, he was released on recommendation of rehabilitation for physical therapy and psychological services (Park et al., 2011).

Zamora et al. (2005) from Spain reported a case of a 28-year-old woman presenting with severe malnutrition, hypoproteinemia, vitamin deficiency, and a BMI of 10.7. The patient's history consisted of restrictive eating from the age of 14. She stated, at this age, a nutritionist prescribed the elimination of fats to help reduce acne. By the age of 16, the patient reported following a "lacto-ovo-vegetarian" diet. At 22 years old, she decided to further limit her diet by restricting egg and milk ingredients. She reported she eventually isolated from family and friends and strictly ate uncooked vegetables. It was reported the patient believed proteins and nutrients had to be carefully planned with each meal, otherwise the incorrect combination could result in toxicity. Zamora et al. reported the patient did not present with anorexic features such as a desire for thinness nor a distorted body image.

A case study from India by Saddichha et al. (2012) reported a case of a 33-year-old female presenting with an 8-year diet consisting of exclusively fresh fruit, raw vegetables, and uncooked eggs. The patient did not present with a desire to be thin, rather a desire to eat healthful foods. The patient reported cooked foods were absent of nutrition. She reportedly became isolated from friends and family while maintaining this rigid diet. She presented with a BMI of 14.5, warranting urgent medical care. Professionals on the case noted the patient had a history of a psychotic break; however, the symptoms of ON appeared to be present 7 years prior (Saddichha et al., 2012).

Wilsher and Panagiotaki (2018) presented a case report of an 18-year-old male who demonstrated symptoms consistent with the proposed criteria of ON. Clinicians reported a longitudinal case study of a young male presenting with compulsive and/or preoccupations regarding strict and rigid dietary practices. In addition, he demonstrated interpersonal distress and impairment in several life domains due to his beliefs and obsessional fixation toward a perceived healthy diet. He was identified during a research study on drivers and barriers to consumption of fruits and vegetables. Jess, a pseudonym for the identified male, reported his diet consisted of roughly six portions of fruits and vegetables daily. He also reported his diet consisted of mostly “chicken, fish, pulses, nuts, and healthy carbohydrates.” Upon interview, Jess stated he worked full time as a fitness instructor, and his partner was a nutritionist. At the time of this interview, researchers did not observe any concerns surrounding mental health and dieting. During a 12-month follow up, it was revealed Jess became stricter regarding his diet and would spend a significant amount of time planning for meals the next day. His diet became reduced to chicken with vegetables or salad and fruit or yogurt as a snack. His partner expressed

concern regarding Jess's fixation toward his diet and explained it started to cause conflicts when dining out with friends or relatives. Jess did not consume any food items outside of his dietary list, and it was reported he became anxious adhering to the regimen. Jess's partner expressed this conflict also created relational stress between her and Jess and among his other social relationships (Wilsher & Panagiotaki, 2018).

In conclusion of these case reports, a general finding among two of the reports includes observation of similar medical symptoms seen between patients presenting with anorexia and those with orthorexic tendencies, consisting of severe medical conditions due to malnourishment. All three patients reported a specific diet they perceived to be healthy. The dietary practices among these patients caused significant clinical impairment across domains of health, interpersonal stress, and social impairment. An additional observation from this small sample of reports is the range in severity of impairment, ranging from significant psychosocial impairment to risk of death, an important implication for proposing diagnostic criteria.

Prevalence Rate Studies

McComb and Mills (2019) completed a thorough review of the existing research conducted on ON, which ranges from 2004–2018. This date range includes 35 studies with published prevalence rates. As discussed, the assessment of ON in the literature has become complex, due to the multiple instruments, language versions, and diverse samples that have been produced. Prevalence rates range from less than 1%–90% from countries including Turkey, Portugal, Australia, Spain, Germany, Italy, Poland, Sweden, Greece, United Kingdom, Hungary, and the United States, respectively. Studies have found a trend in samples of dieticians (Karakus et al., 2017) and athletes (Malmberg et al., 2017;

Rudolph, 2018) who show higher rates of ON. A study of a U.S. sample using the ORTO-15 revealed the prevalence of ON is less than 1% (Dunn et al., 2017); however, a more recent study using the E-DOS found higher presence of ON in a U.S. sample (8%; Chard et al., 2019) compared to a German sample (6%; Barthels et al., 2015).

A recent study in Australia (Reynolds, 2018), conducted a prevalence rate study using the ORTO-15 and found 21% of participants scored in the ON range (with a cutoff of 35). However, this study used criteria A and B from Dunn and Bratman (2016) to screen through these elevated ORTO-15 scores and assessed for the significant health issues and psychosocial impairment. The prevalence then decreased to 6% of participants scoring in the orthorexic range accompanied by health issues and psychosocial impairment (Reynolds, 2018). Although the prevalence decreased by 15%, a 6% prevalence rate remains significant considering the low prevalence of EDs (APA, 2013). The prevalence rate of anorexia nervosa (AN) has been found to be approximately 0.4% among young females, and less is known about the prevalence of AN among males; however, it is cited to be less common among males (APA, 2013). Bulimia nervosa (BN) has been found to be 1%–1.5% among young females, and similar to AN, less is known about the prevalence among males; however, BN is likely to be more common among females (APA, 2013). Binge-eating disorder (BED) has been found to be 1.6% and 0.8% respectively, among both males and females (APA, 2013). Therefore, these data points could suggest ON may be a more prevalent ED compared to AN, BN, and/or BED on a moderate level of severity. Additionally, more severe cases of ON presenting with grave physical impairments are likely to be rare.

Proposals of Diagnostic Criteria for Orthorexia

Researchers proposed diagnostic criteria in 2015 based on Bratman's operational definition of ON (Bratman & Knight, 2000). The following criteria by Moroze et al. (2015) has been frequently cited:

- A. Obsessional preoccupation with eating "healthy foods," focusing on concerns regarding the quality and composition of meals. (Two or more of the following.)
1. Consuming a nutritionally unbalanced diet owing to preoccupying beliefs about food "purity."
 2. Preoccupation and worries about eating impure or unhealthy foods and of the effect of food quality and composition on physical or emotional health or both.
 3. Rigid avoidance of foods believed by the patient to be "unhealthy," which may include foods containing any fat, preservatives, food additives, animal products, or other ingredients considered by the subject to be unhealthy.
 4. For individuals who are not food professionals, excessive amounts of time (e.g., 3 or more hours per day) spent reading about, acquiring, and preparing specific types of foods based on their perceived quality and composition.
 5. Guilty feelings and worries after transgressions in which "unhealthy" or "impure" foods are consumed.
 6. Intolerance to other's food beliefs.

7. Spending excessive amounts of money relative to one's income on foods because of their perceived quality and composition.

B. The obsessional preoccupation becomes impairing by either of the following:

1. Impairment of physical health owing to nutritional imbalances, e.g., developing malnutrition because of an unbalanced diet.

2. Severe distress or impairment of social, academic, or vocational functioning owing to obsessional thoughts and behaviors focusing on patient's beliefs about "healthy" eating.

C. The disturbance is not merely an exacerbation of the symptoms of another disorder such as obsessive-compulsive disorder or of schizophrenia or another psychotic disorder.

D. The behavior is not better accounted for by the exclusive observation of organized orthodox religious food observance or when concerns with specialized food requirements are in relation to professionally diagnosed food allergies or medical conditions requiring a specific diet (p. 401).

Moroze et al. (2015) called for validation studies to assess the proposed criteria. More current proposed diagnostic criteria have been proposed by Dunn and Bratman (2016) after an extensive review of the current literature. The following proposed criteria are as follows:

A. Obsessive focus on "healthy" eating, as defined by a dietary theory or set of beliefs whose specific details may vary; marked by exaggerated emotional distress in relationship to food choices perceived as unhealthy;

weight loss may ensue as a result of dietary choices, but this is not the primary goal. As evidenced by the following:

1. Compulsive behavior and/or mental preoccupation regarding affirmative and restrictive dietary practices believed by the individual to promote optimum health.
2. Violation of self-imposed dietary rules causes exaggerated fear of disease, sense of personal impurity and/or negative physical sensations, accompanied by anxiety and shame.
3. Dietary restrictions escalate over time and may come to include elimination of entire food groups and involve progressively more frequent and/or severe “cleanses” (partial fasts) regarded as purifying or detoxifying. This escalation commonly leads to weight loss, but the desire to lose weight is absent, hidden or subordinated to ideation about healthy eating.

B. The compulsive behavior and mental preoccupation becomes clinically impairing by any of the following:

1. Malnutrition, severe weight loss or other medical complications from restricted diet.
2. Intrapersonal distress or impairment of social, academic or vocational functioning secondary to beliefs or behaviors about healthy diet.
3. Positive body image, self-worth, identity and/or satisfaction excessively dependent on compliance with self-defined “healthy” eating behavior (Dunn & Bratman, 2016, p. 16).

Overlap exists between the Moroze et al. (2015) proposed criteria and Dunn and Bratman's (2016) criteria. Both proposals encompass the pathological fixation for perceived healthy foods characterized by rigid and distorted beliefs surrounding the nutritional properties of food. In addition, the diagnostic feature of malnourishment is present in both proposals. Dunn and Bratman included a new criterion regarding the compulsive nature of orthorexic eating behavior: self-worth regarding diet and body positivity. These criteria are contrary to the diagnostic features associated with major EDs that typically present with low self-esteem and poor body image.

Currently, an individual presenting with symptoms of ON would be diagnosed with avoidant/restrictive food intake disorder (ARFID; Moroze et al., 2015). Researchers who have proposed ON's diagnostic features have reported ARFID provides the closest diagnostic criteria to that of ON. However, a recent study found symptoms of ON were more consistent with symptoms of anorexia and bulimia than those of ARFID (Zichgraf et al., 2019). Prominent criteria for anorexia include a severe lack of caloric intake, an intense fear of gaining weight, and distorted perceptions and beliefs regarding weight and shape (APA, 2013). Compared to the proposed criteria of ON, similar diagnostic features are present such as lack of nutrition, rigidity of diet, and mental preoccupation with food (Dunn & Bratman, 2016). However, there are variations within these features, including lack of nutrition encompassing both caloric intake and nutrients in ON (Dunn & Bratman, 2016). Additionally, although both AN and ON encompass an intense fear, ON is theorized to include intense fear surrounding impure foods as opposed to caloric intake (Dunn & Bratman, 2016).

Cooccurring Symptoms of Orthorexia

Roughly 14 studies on ON between 2004–2018 (McComb & Mills, 2019) have looked at cooccurring symptoms and risk factors of developing ON and potential correlations between individuals who scored in the orthorexic range using measures such as the ORTO-15 and its variants, evaluating factors such as gender, BMI, personality (Oberle et al., 2017), obsessive-compulsive traits, perfectionism, body satisfaction (Brytek-Matera, 2012), attachment style (Barnes & Caltabiano, 2017), somatic symptom disorder, illness anxiety disorder, and psychotic spectrum disorders (Koven & Abry, 2015). A study by Hayes et al., (2017) looked at impairment in variables including perfectionism, disordered eating, anxiety about appearance, and obsessive-compulsive symptoms. The data revealed small to medium correlations with these variables of impairment, suggesting modest associations of psychopathology (Hayes et al., 2017). Among the three major EDs (AN, BN, BED), common comorbid symptoms include affect regulation dysfunction and negative affect, and features that include perfectionism, difficulty with cognitive-behavioral flexibility, and impulse control difficulties (Halmi, 2018). Therefore, to further explore ON as a proposed ED, examination of cooccurring symptoms and features is needed.

Depression and Orthorexia. The DSM-5 has identified that the presence of undernourishment is often accompanied by depressive features that encompass decreased mood, social withdrawal, irritability, insomnia, and diminished interest in sex (APA, 2013). Although these depressive features may be secondary to the physiological state of malnourishment, some individuals may warrant an additional diagnosis of major depressive disorder (APA, 2013). Depressive disorders have been found to be a common

comorbid disorder alongside EDs (APA, 2013). The literature on ON contains a gap in this specific area; therefore, further exploration of the relationship between depression and presence of ON is needed to better understand ON's diagnostic profile.

Anxiety and Orthorexia. Anxiety disorders have been found to be a common comorbid disorder alongside EDs (APA, 2013). Due to the nature of restrictive eating, common emotional experiences among individuals with EDs include feelings of fear and anxiety regarding food (APA, 2013). As evidenced by Bratman and Dunn's (2016) criteria, anxiety is identified as consequence of the rigid self-imposed dietary rules that individuals with ON practice. The proposed diagnostic criteria and case studies presented display some symptomology resemblance to health-related anxiety, which can be seen in the somatoform disorders (Koven & Abry, 2015). The current literature on ON lacks studies that include an isolated measure to assess severity of anxiety. However, anxiety related to health has been found to be positively correlated with food and diet concern (Hadjistavropoulos & Lawrence, 2007), and health-anxiety has also been found to create problematic eating behaviors (Quick et al., 2012). Therefore, additional research is needed to investigate the severity of anxiety among individuals presenting with ON.

Obsessive-Compulsive Features and Orthorexia. Obsessive-compulsive features are identified by the DSM-5 in reference to anorexia, which are related to food and other concerns such as body weight and/or shape (APA, 2013). A preoccupation with food, recipes, and/or hoarding of food are prominent features among anorexia (APA, 2013). Obsessions and compulsions have been observed to be exacerbated by malnourishment (APA, 2013). Obsessive compulsive disorder is not uncommon among anorexia, particularly among those who present with the restricting type (APA, 2013).

Due to the obsessional nature that defines the proposed disorder, researchers have speculated about the presence of obsessive-compulsive symptoms among individuals with ON (Brytek-Matera, 2012). Bratman and Knight (2000) emphasized the obsessive-compulsive tendencies among individuals with ON through the recurrent, intrusive thoughts about food, intense concern regarding purity of food, and ritualized food preparation observed among patients. However, studies have not found a correlation between obsessive-compulsive symptoms and ON using screening measures (Brytek-Matera et al., 2017). Further research is needed in this area, using strong psychometric instruments to better understand the possible relationship between obsessive-compulsive disorder symptoms and ON.

Diagnostic Measures to Assess Orthorexia

Instruments to measure ON have been developed around the world, in multiple languages, and validated on diverse populations. The first instrument to assess ON was developed by Bratman (Bratman & Knight, 2000), the Bratman Orthorexia Scale (BOT). The BOT was provided in his publication, *Health Food Junkies*, to allow readers the opportunity to assess their eating behaviors relative to ON (Bratman & Knight, 2000). Since then, new instruments have become available in different languages with existing variations. Measures based on the BOT include the ORTO-11 and the ORTO-15. The ORTO-11 is available in Turkish, Hungarian, Portuguese, and Spanish. The ORTO-15 is available in German, English, Turkish, Italian, Polish, and Spanish. Additional measures include the Teruel Orthorexia Scale (TOS; Barrada & Roncero, 2018), the Eating Habits Questionnaire (EHQ; Gleaves et al., 2013) and the Dusseldorf Orthorexia Scale (Barthels et al., 2015), available in English and Spanish. Due to factors such as culture, language,

and lack of instrument validation, the study of ON has become complex. The most widely used instrument in the literature has been the ORTO-15 (Donini et al., 2005). Researchers used the BOT, a 10-item “yes/no” questionnaire created by Bratman to construct several of the ORTO-15 items. The ORTO-15 was validated on an Italian sample of 121 participants. The measure yielded good predictive value (efficacy 73.8%, sensitivity 55.6%, and specificity 75.8%). The ORTO-15 is comprised of 15 test items based on 4-point Likert scales. Test scores range from 0 to 40 with lower scores indicative of ON. Since the Donini et al. validation study publication, many research studies have used this measure to screen for the prevalence of ON in populations around the world. However, a significant variance in point prevalence data (6%–90%) has been the result of using this measure (Dunn et al., 2017). Researchers have concluded the ORTO-15 is a good measure of healthy eating; however, it lacks the ability to assess pathology associated with healthy eating (Dunn et al., 2017). Therefore, researchers have urged professionals in the field to produce studies on reliable diagnostic measures to assess ON (Dunn et al., 2017).

In 2015, a German measure called the Dusseldorf Orthorexia Scale (DOS) was developed by Barthels et al. to measure orthorexic eating behavior. The DOS has become the first measure of ON to yield consistent prevalence rates around 3% in five studied German samples, which have included college students, patients in ED treatment, and the general public through online survey (Barthels et al., 2015; Barthels et al., 2016; Barthels & Pietrowsky, 2012; Depa et al., 2017; Rudolph, 2017). In a recent study by Chard et al. (2019), an English version of the DOS was developed and is referred to as the English-Dusseldorf Orthorexia Scale (E-DOS). After translating the measure, researchers

completed a psychometric evaluation of the English version and collected data on prevalence of ON in a U.S. sample. Findings of the study showed reliable psychometric properties including good internal consistency of the E-DOS. Researchers have concluded additional studies are needed to understand potential differences in prevalence rates across diverse samples (Chard et al., 2019).

Rationale of Current Study

Professionals in the field of health care and ED treatment community have become increasingly interested in ON. A growing amount of case reports and studies on ON have created more dialogue in the professional community regarding ON, questioning whether this cluster of symptoms is a rare syndrome, a societal trend displaying higher concern for healthful eating, or a potential mental health disorder. A bulk of the current literature on ON has used the ORTO-15 to assess the population. Researchers have called for new studies to include psychometrically reliable instruments to assess for the prevalence of ON. Although the prevalence of EDs such as anorexia are rare in the general population, further exploration of this proposed condition is needed due to the serious mental health issues and medical complications that can lead to mortality as presented in the case studies. Therefore, further research on prevalence rates and clinical impairment are urgently needed.

EDs and the proposed criteria of ON present clinically significant impairments in interpersonal, emotional, cognitive, social functioning, and grave health conditions accompanied by malnourishment. EDs have proven to be some of the most treatment resistant disorders, typically requiring an intensive integrative approach (counseling, routine medical care, nutritional coaching; Klump et al., 2019; Reiff & Reiff-Lampson,

1992). The severe negative emotional impact EDs inflict on individuals pose a serious threat to physical health and vulnerability to comorbid disorders (Klump et al., 2009). EDs have been found to be linked to chronicity, severe distress, functional impairment across multiple domains, relapse-prone, depression, suicide attempts, substance use disorders, anxiety disorders, risk for future obesity, and mortality (Allen et al., 2013; Arcelus et al., 2011; Stice et al., 2013; Swanson et al., 2011).

The current state of research on ON includes studies from countries including Turkey, Portugal, Australia, Spain, Germany, Italy, Poland, Sweden, Greece, United Kingdom, Hungary, Korea, and the United States. The literature has yielded significant variance in point prevalence rates using the ORTO-15 (Dunn et al., 2017). This research study aims to assess the prevalence rate of ON in a U.S. sample using a measure that has shown favorable psychometric properties. In addition, a serious critique of previous studies has included the lack of assessment in clinical impairment associated with orthorexic eating behaviors (Dunn et al., 2017). To assess for the presence of associated clinical impairment, this study will supplement the E-DOS with the Clinical Impairment Assessment (CIA), along with additional measures to capture potential diagnostic features of ON that are proposed in the working criteria by Dunn and Bratman (2016) and Moroze et al. (2015). Therefore, the six variables of study include the presence of ON as measured by the E-DOS and the presence of clinical impairment, anxiety, depression, and typical ED pathology. The FOCI will also be included as a measure of obsessive compulsivity. Analysis of the potential relationship between orthorexic eating behavior and clinical impairment will be critically explored.

Research Questions

Research questions that aim to be addressed in the present study include:

1. Will the prevalence of orthorexia using the E-DOS reveal a consistent data point (within 3%) compared to 8%-point prevalence data collected by Chard et al. (2019)?
2. Will elevated scores on the E-DOS show a positive correlation with scores on the EAT-26?
3. Will participants who report having a history of ED treatment show more elevations on the E-DOS compared to those who did not endorse a history of ED treatment?
4. Will elevated scores on both the E-DOS and the CIA reveal a prevalence rate of less than 1%?
5. Will participants who receive a high score on the E-DOS receive elevated scores on the CIA?
6. Will the PHQ-9, GAD-7, and EAT-26 moderate the relationship between scores on the E-DOS and CIA?
7. Will participants who receive elevated scores on the E-DOS and CIA show obsessive compulsivity concerns as measured by the FOCI?

The purpose of this study was to further investigate if ON warrants a diagnostic entity. Due to the lack of reliable measures to screen for ON, data on prevalence rates and associated severity of the potential disorder remains unclear. Although the current literature offers a construct of ON and proposed criteria, further investigation of pathology is warranted to aid additional test-construction, a potential diagnostic profile,

and treatments should ON be found as a significant mental health concern. This study aimed to collect data on prevalence in a U.S. sample using a reliable measure and reveal level of clinical impairment associated with ON, with depression, anxiety, and ED pathology as moderating variables, see Figure 1. The following hypotheses are offered:

H1: The prevalence of ON using the E-DOS will be roughly 8% in a U.S. sample, the same data point collected by the Chard et al. (2019) study.

H2: Elevated scores on the E-DOS will show a positive correlation with elevated scores on the EAT-26.

H3: Participants who report having a history of ED treatment will show more elevations on the E-DOS compared to those who did not endorse a history of ED treatment.

H4: Elevated scores on both the E-DOS and the CIA will reveal a percentage of less than 1%, consistent with Dunn et al. (2017).

H5: Elevated scores on the E-DOS will be predictive of scores on the CIA.

H6: The PHQ-9 will moderate the relationship between E-DOS and CIA.

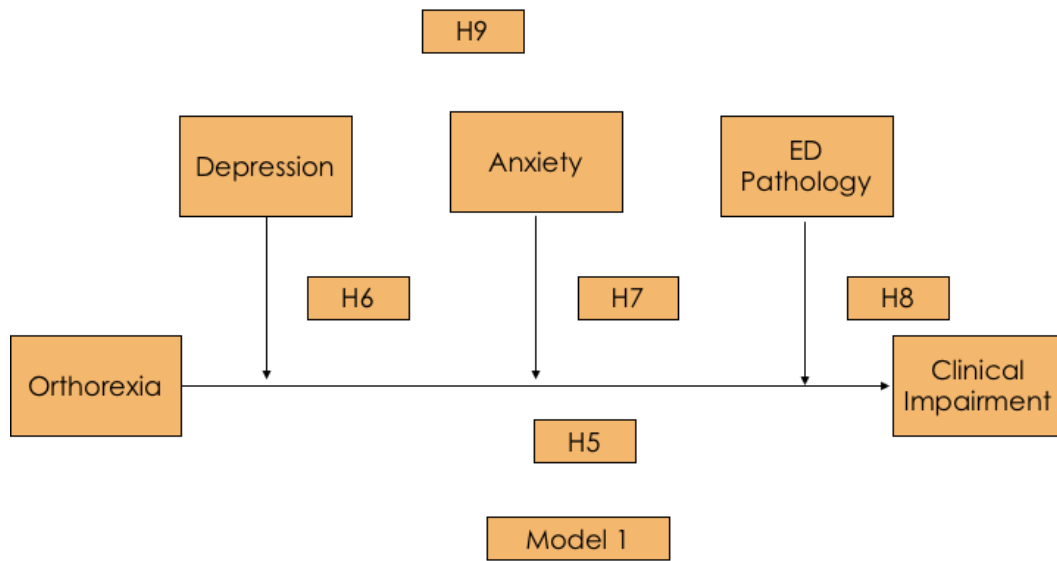
H7: The GAD-7 will moderate the relationship between the E-DOS and CIA.

H8: The EAT-26 will moderate the relationship between the E-DOS and CIA.

H9: The multiple moderator model will be significant.

Figure 1

Model Hypothesis



Chapter 2

Methodology and Research Design

The purpose of researching ON is to better understand if this phenomenon is a rare syndrome or if it warrants a diagnostic entity. The current study used a quantitative research design and survey methodology to investigate the prevalence of ON and associated clinical impairment. A hierarchical regression analysis was conducted to determine if depression, anxiety, and ED pathology moderate the relationship between ON and clinical impairment. A correlational analysis was conducted on all of the study variables to investigate the relationship between ON, clinical impairment, depression, anxiety, and ED pathology. Participant profiles that received elevated scores on both the E-DOS and CIA were isolated for further analysis to provide data on clinically significant profiles and to assess symptoms of obsessive compulsivity using responses from the FOCI. Chapter 2 outlines the methods applied in the current study.

Participants

Participants in this study consisted of 200 adults between the ages of 18 and 76 years old ($M = 36.98$, $SD = 12.88$) recruited through online convenience sampling. Inclusion criteria to participate in the survey required all participants be 18 years of age or older. Participants under the age of 18 years of age were not permitted to join the study. Demographics and descriptive statistics are presented in Table 2.

Table 2*Demographic and Descriptive Statistics*

Variable	% or <i>M</i> (SD)
Gender	
Male	19.8%
Female	73.4%
Race/Ethnicity	
American Indian or Alaska Native	.9%
Asian	17.6%
Black or African American	3.2%
Native Hawaiian or Other Pacific Islander	.9%
White	55.9%
Hispanic or Latino	15.3%
Age	36.98 (12.88)

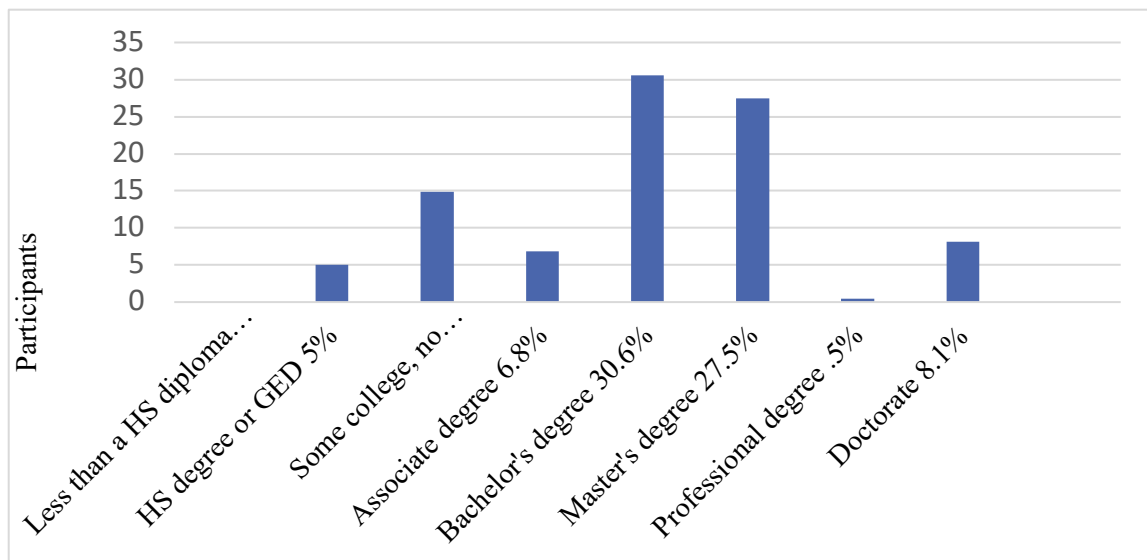
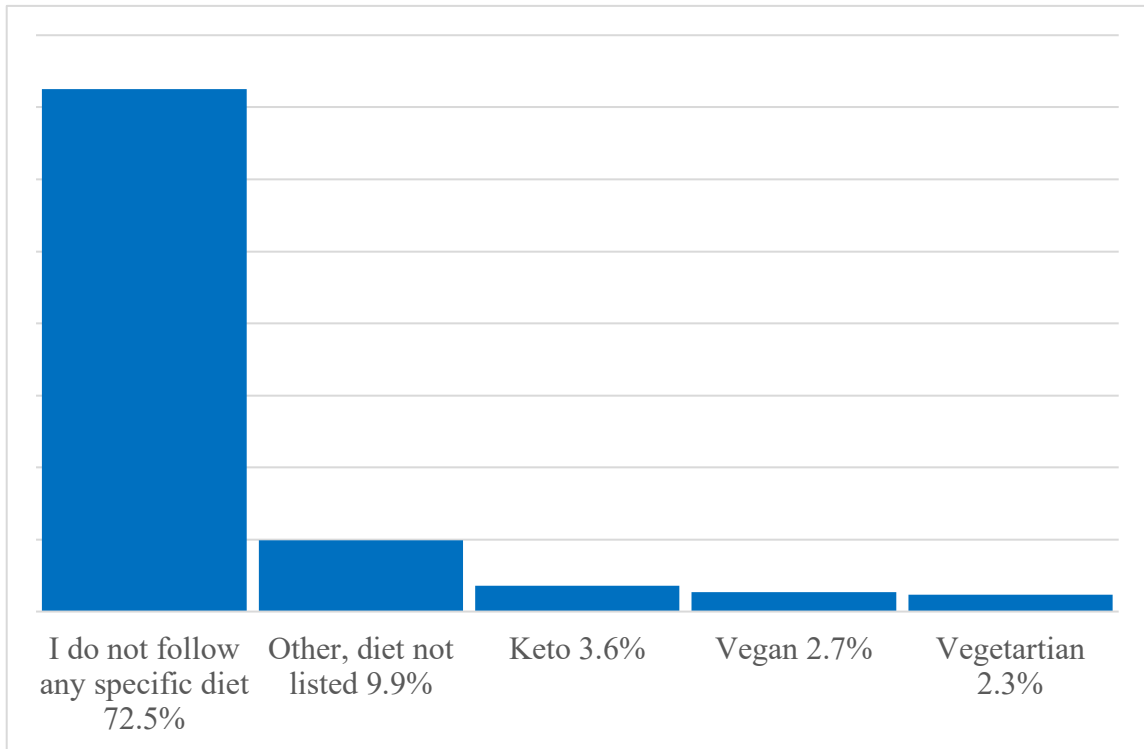
Figure 2*Education Demographics*

Figure 3*Dietary Preferences*

Note. Participants who endorsed the “Other, diet not listed” category, reported diets including a bariatric diet, low carb, flexitarian, intermittent fasting, clean eating, Jenny Craig, low sugar, and a strictly fish and vegetables diet.

Measures and Materials

To assess ON in the sample, participants were asked to complete the English version of the Dusseldorf Orthorexia Scale (E-DOS), a 10-item self-report measure. The E-DOS was translated from the German (DOS), the original measure. Using the back-translation process, researchers established the E-DOS. The measure consists of 10 test items. The test format is self-report and aims to measure orthorexic eating behavior. Test questions are based on 4-point Likert scales from 1 = *this does not apply to me* to 4 = *this applies to me*. Examples of a couple of the test items include: *Eating healthy food is more*

important to me than indulgence/enjoying the food and My thoughts constantly revolve around healthy nutrition and I organize my day around it. Higher scores on the E-DOS indicate more evident orthorexic tendencies. Test scores range from 10-40 points. A preliminary cutoff score to indicate the presence of ON is a score ≥ 30 . Scores ranging between 25 and 29 (95th percentiles) is suggestive of concerning eating behavior. Test construct validity compared the Eating Habits Questionnaire (EHQ) to the E-DOS and showed a high correlation ($r = 0.76, p < .001$), indicating very good construct validity. The E-DOS has demonstrated very good internal consistency (Cronbach's alpha = 0.84) and high retest reliability ($r = 0.67-0.79, p = .001$) from three time points. Two questions referring to self-assessment of eating behavior as healthy (self-assessment/healthy eating bx) and subjective importance of a healthy diet (importance of healthy diet) were used to test construct validity. The correlations showed: self-assessment/healthy eating bx ($r = 0.21, p < .001, n = 1, 303$) and importance of health diet ($r = 0.42, p < .001, n = 1, 297$). Confirmatory factor analysis indicated a poorly fitted one-factor model, however the standardized coefficients for all of the test items ranged between 0.52 and 0.82 (Chard et al., 2019).

Clinical Impairment

To assess clinical impairment associated with eating, participants were asked to complete the Clinical Impairment Scale (CIA). The CIA was developed by Bohn et al. (2008), the Credo group in Oxford. The instrument was designed to assess the effect of EDs on psychosocial functioning. The developers identified general well-being and ability to have meaningful friendships as features of psychosocial functioning. The CIA includes 16 self-reported test items based on Likert point system. Scores can range from

0 to 48 points. Higher elevations on the instrument are indicative of increased levels of psychosocial impairment associated with an ED symptomology. Researchers found a score of 16 or higher may be suggestive of an individual with an ED (Bohn et al., 2008). The CIA includes three domains: personal, cognitive, and social. Psychometric testing of the CIA revealed very good internal consistency (Cronbach's alpha = 0.97). Test-retest reliability data at times 1 and 2 were 10.56 (7.58) and 9.02 (8.18). Researchers stated, "While the small reduction in score (0.20 of a standard deviation) was statistically significant ($p = 0.022$), the intra-class correlation coefficient was high at 0.86 (95% CI 0.75-0.92; $p < 0.001$) indicating acceptable overall test-retest reliability" (p. 1107). Data also revealed positive correlations measuring construct validity between the CIA and the Eating Disorder Exam – Questionnaire ($r_s = 0.89$, $p < 0.001$) and the clinicians impairment ratings ($r_s = 0.68$, $p < 0.001$). These data were apparent at each time point ($p < 0.001$) on fitting multilevel models. The measure also yielded a sensitivity of 76% and specificity of 86% (Bohn et al., 2008).

Depression

Participants were instructed to complete the Patient Health Questionnaire (PHQ-9), a multipurpose instrument for screening symptoms of depression in mental health settings and medical settings. The screener consists of 9 self-report questions that assess severity of depression and suicidality within the past 2 weeks. Scores on the PHQ-9 can range from 5-9 (indicating mild depression), 10-14 (indicating moderate depression), and 15-19 (indicating moderately severe depression), and 20+ (indicating severe depression). The screener asks test takers to rate how often they have been bothered by the nine statements within the past 2 weeks (e.g., "Feeling down, depressed, or hopeless"), where

0 = *not at all*, 1 = *several days*, 2 = *more than half the days*, and 3 = *nearly every day* (Kroenke et al., 2001). The PHQ-9 has demonstrated high reliability and internal consistency $\alpha = .83$ (Cameron et al., 2008).

Anxiety

To assess symptoms of anxiety, participants completed the Generalized Anxiety Disorder-7 (GAD-7), a self-report questionnaire that consists of 7 items, based on a 4-point Likert scale. The GAD-7 is widely used as a brief measure in mental health settings and medical settings to screen for symptoms of anxiety. The screener asks test takers to rate how often they have been bothered by the seven statements within the past 2 weeks (e.g., “Feeling nervous, anxious, or on edge”), where 0 = *not at all*, 1 = *several days*, 2 = *more than half the days*, and 3 = *nearly every day*. Interpretation of scores range from 5 (*mild*), 10 (*moderate*), and 15 (*severe*). The GAD-7 has shown excellent reliability and internal consistency (Cronbach $\alpha = .92$). The test-retest reliability is also excellent with an intraclass correlation of 0.83 (Spitzer et al., 2006).

Obsessive Compulsive Disorder Symptoms

To evaluate symptoms of obsessive compulsivity, the Florida Obsessive Compulsive Inventory (FOCI) was included in the survey. The FOCI is a widely used self-report instrument used to screen for symptomology and severity of obsessive-compulsive disorder. The instrument was based on the Yale-Brown Obsessive-Compulsive Scale-Self Report (Y-BOCS-SR), and serves as a brief assessment. The instrument contains two parts: The symptom checklist (SC) and the severity scale (SS). The symptom checklist is based on 20 items (10 obsession-related items and 10 compulsion-related items) with yes or no options. The test taker will rate any “yes”

response on the symptom severity section that is based on a Likert scale. A screener with 8 or more yes responses accompanied by self-reported severity is suggestive of possible OCD traits. The psychometric testing of the FOCI has yielded good internal consistency ($\alpha = 0.89$), adequate reliability (K-R 20 = 0.83) for the symptom checklist. Compared to the Y-BOCS-SR, the FOCI has been shown to be highly correlated (Storch et al., 2007).

ED Pathology

To assess ED pathology, participants completed the EAT-26, a widely used 26-item self-report measure that evaluates at-risk ED symptomology. The EAT-26 is a brief version of the EAT-40, developed by Garner and Garfinkel (1979). The EAT-26 revealed to be highly predictive of the total EAT-40 measure ($r = 0.98$). The instrument includes a three-factor model of Dieting, Bulimia and Food Preoccupation, and Oral Control. Scores that reach 20 and above are considered elevated and may be indicative of ED pathology. The EAT-26 displayed acceptable criterion-related validity and reliability ($\alpha = .90$) when evaluating a group of patients diagnosed with anorexia (Garner et al., 1982).

Demographic Questions. The demographic portion of the survey (see Appendix D) consists of five questions. Participants were asked to indicate their age, sex, race/ethnicity, and any special dietary preferences. If participants wished to join a raffle for the chance to win a \$100.00 electronic Amazon gift card, they were asked to provide an email address. Participants were informed their email address would not be viewed in connection to their survey responses.

Consent Form. The Consent Form (see Appendix C) introduced participants to the nature of the study which described that the researcher is interested in learning about eating habits and mental health. The Consent Form indicated the survey included six

questionnaires and would take approximately 20-25 minutes. Participants were also informed all test data would remain anonymous. In addition, the consent informed participants involvement in the study involved a low risk of harm. However, should any distress be prompted due to answering questions about eating habits, resources for mental health services were listed, as well as contact information for this researcher, the dissertation committee chair, and IRB. For any questions or concerns regarding the study, participants were also provided with the researcher's, dissertation chair, and IRB contact information. Participants were then prompted to proceed by agreeing to the terms and conditions or disagree and be exited from the survey. All participants who agreed to the informed consent and who indicated they are 18 years of age or older were directed to the demographic questionnaire, and the survey measures. Once the study was closed, responses were reviewed and analyzed.

Procedures

Before participant recruitment, research approval was obtained from Northwest University's Institutional Review Board in January of 2020. Subsequently, the data collection survey was created using the online platform, Qualtrics. Participants were recruited through emailed survey links distributed through U.S. universities and colleges, see Appendix A, as well as through advertised link on Facebook, see Appendix B. An optional \$100 Amazon gift card raffle was used as an incentive for participation in the survey. Participants who clicked on the survey link were prompted to review the research consent form, see Appendix C. Participants were informed the demographic questions and total survey questions on Qualtrics could take between 20-25 minutes. The data collection phase began in February of 2020 and ended in April of 2020, with the majority

of data collected during the month of February. Once data collection was completed, descriptive statistics, a hierarchical multiple regression, and correlational analysis was conducted to analyze the data. Statistical processing was conducted using IBM SPSS Statistics (Version 23) predictive analytic software.

Procedural Analysis

A power analysis was conducted to estimate a sufficient sample size. Considering an effect size of 0.15, a significance level of $\alpha = .05$ and a statistical power level of .95, with one predictor in set A and three in set B, a minimum of 119 participants is required. Fortunately, the resulted sample exceeded the target sample size.

Analytic Strategy

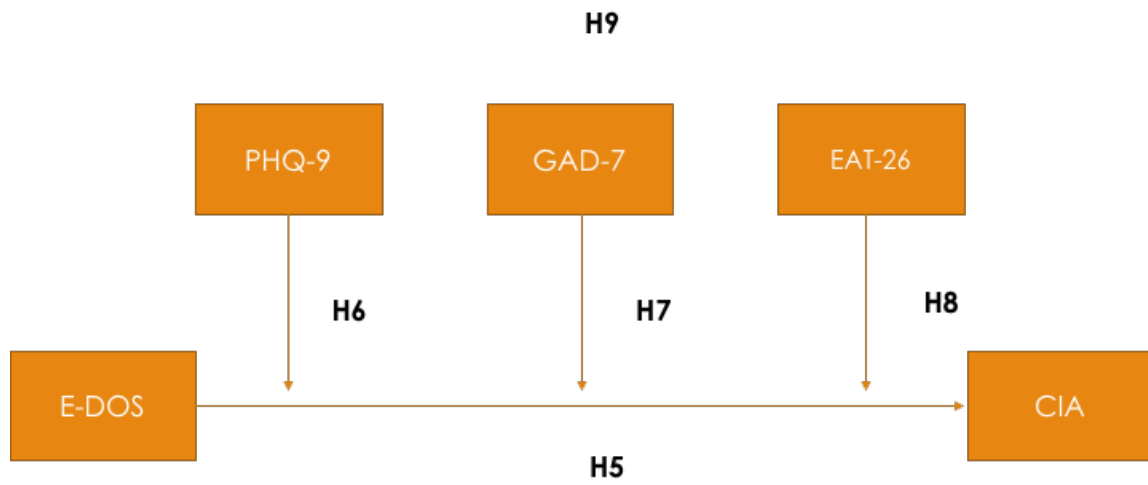
To collect the prevalence rate of ON, descriptive statistics were conducted to examine elevated scores on the E-DOS. A correlation analysis was conducted to look at the potential relationship between ON and ED pathology, in addition to the relationship between elevated scores on the E-DOS and EAT-26. A code was created on SPSS to identify the percentage of participants who received elevated scores on both the E-DOS and CIA.

Hierarchical Multiple Regression

Moderation analysis known as hierarchical multiple regression was used to examine whether the relationship between ON and clinical impairment was moderated by depression, anxiety, and ED pathology. Moderation model 3 was chosen, which includes one predictor variable, one outcome variable, and three moderator variables, see Figure 4.

Figure 4

Model Hypothesis With Current Study Measures



Chapter 3

Results

Chapter 3 proceeds in two sections. In the first section, descriptive statistics address Hypotheses 1-4. Due to the novelty of ON and its developing conceptual nature, Table 5 will present data from participant profiles who received elevated scores on the E-DOS and Clinical Impairment Assessment (CIA) to serve as brief case studies for examination. In the second section, inferential statistics provide a correlational analysis among the study instruments such as the E-DOS and other standardized measures. In this section, Hypotheses 5-9 are addressed, testing the predictive ability of ON on clinical impairment with depression, anxiety, and ED pathology as moderating variables.

Descriptive Statistics

Descriptive Statistics of Measures

The mean score on the E-DOS was 20.84 ($SD = 5.30$), indicating the average score was not in the at-risk or orthorexic range. The mean score on the CIA was 10.36 ($SD = 9.43$), indicating the average participant score did not suggest clinical impairment associated with eating. The mean score on the PHQ-9 was 6.14 ($SD = 5.73$), and the mean score on the GAD-7 was 5.14 ($SD = 4.75$), indicating the average participant score on both measures revealed scores suggestive of minimal depression and anxiety. See Table 3 for descriptive statistics on the E-DOS, CIA, PHQ-9, and GAD-7.

Table 3*Descriptive Statistics of E-DOS, CIA, PHQ-9, and GAD-7*

Measure	<i>M</i>	<i>SD</i>
E-DOS	(<i>N</i> = 200) 20.84	5.30
CIA	(<i>N</i> = 196) 10.36	9.43
PHQ-9	(<i>N</i> = 196) 6.14	5.73
GAD-7	(<i>N</i> = 182) 5.14	4.75
EAT-26	(<i>N</i> = 189) 9.44	9.38

Hypothesis 1 – Prevalence Rate of Orthorexia. ON is a relatively novel illness in clinical contexts, and as such, it was important to compare its prevalence in the current study to the global prevalence. The current research hypothesized a comparable prevalence rate to U.S. prevalence of approximately 8% would be collected (Chard et al., 2019; H1). In relative support of this hypothesis, 7% of the present sample scored in the orthorexic range. In addition, using the cutoff categories proposed by Chard et al. (2019), 16.5% of participants scored in the at-risk range of developing ON, and 75.5% did not receive elevated scores (see Table 4).

Table 4*Prevalence Rate of Orthorexia and Cutoff Categories in a U.S. Population*

		Frequency	Percentage	Valid Percentage
Valid	Negative	153	68.9%	76.5%
	At-Risk Range of Orthorexia	33	14.9%	16.5%
	Presence of Orthorexia	14	6.3%	7%
	Total	200	90.1%	100%
Missing	System	22	9.9%	
Total		222	100%	

Hypothesis 2 – Relationship Between Orthorexia and ED Pathology. The psychological construct of ON includes disordered eating behavior and attitudes as primary diagnostic features (Bratman, 2016). Therefore, Hypothesis 2 anticipated ON

and ED pathology would be correlated. To test this, a correlation between the E-DOS and EAT-26 measures was conducted. In support of Hypothesis 2, the correlation was statistically significant, $r(189) = .444, p < 0.001$, such that higher scores on the E-DOS were associated with higher scores on the EAT-26.

Hypothesis 3 – ED History and E-DOS Scores. Hypothesis 3 proposed that participants with a history of an ED would report elevated scores on the E-DOS relative to those without a history of an ED. However, only seven participants self-reported having a history of ED, and, as such, it was not feasible to test this hypothesis.

Hypothesis 4 – Orthorexia and Clinical Impairment. Previous research on ON has questioned if orthorexic eating behavior is a dietary trend, or a true mental health disorder resulting in clinical impairment. Among EDs, prevalence rates are reported as under 2%, with anorexia's prevalence rate cited as roughly 0.4% (APA, 2013). A core diagnostic feature of EDs includes functional impairment due to food intake (APA, 2013). The current study aimed to compare prevalence rates and clinical impairment of EDs to ON. Descriptive statistics were used to assess the prevalence of ON eating behaviors and clinical impairment. Hypothesis 4 specifically proposed the percentage of participants who received elevated scores on both the E-DOS and CIA would be approximately less than 1%, a rough estimate based on prevalence rates of other EDs. To assess both orthorexic eating patterns and clinical impairment as a result of dieting behavior, the percentages of participants who received elevated scores on the E-DOS and CIA were evaluated. A total of 3.5% of participants scored in both the ON range and had elevated CIA scores, thus rejecting hypothesis 4. Note that this was not meant as an explicit statistical test, but rather, as general descriptive comparison. This result suggests

3.5% of participants who scored in the orthorexic range may also be showing cooccurring clinical impairment.

Examination of Clinically Significant Profiles. Researchers have requested clinicians in the field share case studies of individuals fitting the proposed ON criteria to further understand orthorexic presentation and diagnostic features. Table 5 presents descriptive statistics of these participant profiles to provide an in-depth analysis of their results on other measures.

Inferential Statistics

Correlational Analysis of Measures

To provide a clearer picture of how the variables in the present research related to each other, a correlational analysis was conducted. Table 6 presents correlation coefficients that were computed among the E-DOS, CIA, PHQ-9, GAD-7, and EAT-26. Most notably, the results of the correlational analysis revealed E-DOS scores were significantly correlated to the CIA, $r = .270, p < .001$ and to the EAT-26, $r = .444, p < .001$. The CIA was highly correlated to the PHQ-9, $r = .690, p < .001$ and to the EAT-26, $r = .681, p < .001$. The PHQ-9 was also significantly correlated with the EAT-26, $r = .539, p < .001$. The GAD-7 was significantly correlated with the CIA, $r = .618, p < .001$, significantly correlated to the PHQ-9, $r = .724, p < .001$, and was also significantly correlated with the EAT-26, $r = .484, p < .001$.

Table 5*Clinically Significant Participant Profiles*

	Age	Gender	Race/Ethnicity	E-DOS Score	CIA Score	EAT-26 Score	PHQ-9 Score	GAD-7 Score	FOCI Data	BMI	Dietary Preferences
Participant 1	26	Female	White/Caucasian	31 Orthorexic range	41 Psychosocial Impairment range	33 * Uses laxatives daily	17* Moderately Severe Depression	20* Severe Anxiety	4 yes – Moderate Impairment	39.5 Obese	Low Carb
Participant 2	24	Female	White/Caucasian	30 Orthorexic range	40 Psychosocial Impairment range	9	17* Moderately Severe Depression	11* Moderate Anxiety	0 yes	33.6 Obese	Does not follow any specific diet
Participant 3	40	Female	Hispanic/Latino	31 Orthorexic range	44 Psychosocial Impairment range	44*	9 Mild Depression	15* Severe Anxiety	2 yes – Moderate Impairment	23.8 Normal	Vegetarian
Participant 4	23	Female	White/Caucasian	30 Orthorexic range	39 Psychosocial Impairment range	41* Purging Behavior x3 a week	13* Moderate Depression	15* Severe Anxiety	10 yes * – Moderate to Severe Impairment (Elevated)	32.1 Obese	Jenny Craig Diet
Participant 5	31	Female	White/Caucasian	31 Orthorexic range	45 Psychosocial Impairment range	25* Purging Behavior x1 within past 6 months	13* Moderate Depression	17* Severe Anxiety	5 yes – Moderate Impairment	22.3 Normal	No red meat or pork, grains only 1 day a week
Participant 6	36	Male	White/Caucasian	30 Orthorexic range	25 Psychosocial Impairment range	26*	9 Mild Depression	7 Mild Anxiety	3 yes – No impairment indicated	32.3 Obese	I do not follow any specific diet
Participant 7	34	Female	Black/African American	30 Orthorexic range	18 Psychosocial Impairment range	30* Binging behavior x3-4 within a week Purging Behavior x1 within past 6 months	2 No/minimal Depression	1 No/minimal Anxiety	9 yes* - Mild to Moderate Impairment	31.7 Obese	Vegan

Note. * = Elevated Screener. EAT-26 elevated screeners = ED pathology

Table 6*Correlations Between Key Measures*

	E-DOS	CIA	PHQ-9	GAD-7	EAT-26
E-DOS	-				
CIA	.27***	-			
PHQ	.03	.690***	-		
GAD-7	.11	.618***	.724***	-	
EAT-26	.444***	.681***	.539***	.484***	-

Note. * $p < .05$. ** $p < .01$. *** $p < .001$.

Hypothesis Testing of Orthorexia as a Predictor of Clinical Impairment

The main purpose of this study was to test Hypothesis 5-9. Elevated E-DOS scores were hypothesized to be predictive of elevated scores on the CIA (H5). Elevated scores on the PHQ-9 (H6), GAD-7 (H7), and EAT-26 (H8) were hypothesized to moderate elevated scores between the E-DOS and the CIA.

Hypothesis 5 – The Predictive Ability of Orthorexia on Clinical Impairment.

A regression assessed the relationship between CIA scores and E-DOS scores. Results of this analysis indicated E-DOS scores were a strong and significant predictor of CIA, confirming Hypothesis 5 (see Table 7).

Table 7*Regression Table for Model 1*

Predictor	<i>B</i>	<i>SE</i>	Beta	<i>t</i>	95% lower	95% upper	Tol
E-DOS	.518	.129	.287	4.014***	.263	.773	1.000

Note. * $p < .05$. ** $p < .01$. *** $p < .001$. Tol = Tolerance. Model R = .287, Adjusted $R^2 = .077$, $F(1, 181) = 16.115$.

Hypothesis 6 – Depression as a Moderator Between Orthorexia and Clinical

Impairment. A multiple regression analysis was conducted to analyze whether PHQ-9

scores moderated the relationship between E-DOS and CIA. Results of this analysis indicated PHQ-9 scores were a significant moderator between E-DOS and CIA scores (see Table 8), confirming Hypothesis 6.

Table 8*Regression Table for Model 2*

Predictor	<i>B</i>	<i>SE</i>	Beta	<i>t</i>	95% lower	95% upper	Tol
E-DOS	-.719	.224	-.398	-3.214**	-1.161	-.278	.140
PHQ-9	-.414	.282	-.245	-1.468	-.970	.143	.077
E-DOS x PHQ-9	.076	.013	1.184	5.770***	.050	.101	.051

Note. * $p < .05$. ** $p < .01$. *** $p < .001$. Tol = Tolerance. Model R = .786, Adjusted $R^2 = .611$, $F(3, 181) = 95.721$.

Hypothesis 7 – Anxiety as a Moderator Between Orthorexia and Clinical

Impairment. A multiple regression analysis was conducted to analyze GAD-7 scores as a moderator between E-DOS and CIA scores. Results of this analysis indicated GAD-7 scores were not a significant moderator between E-DOS and CIA scores (see Table 9), rejecting Hypothesis 7.

Table 9*Regression Table for Model 3*

Predictor	<i>B</i>	<i>SE</i>	Beta	<i>t</i>	95% lower	95% upper	Tol
E-DOS	-.772	.227	-.427	-3.405***	-1.219	-.324	.132
PHQ-9	-.023	.406	-.014	-0.58	-.824	.777	.036
E-DOS x PHQ-9	.047	.019	.732	2.389**	.008	.085	.022
GAD-7	-.441	.466	-.217	-.945	-1.362	.480	.039
E-DOS x GAD-7	.037	.021	.511	1.719	-.005	.079	.023

Note. * $p < .05$. ** $p < .01$. *** $p < .001$. Tol = Tolerance. Model R = .797, Adjusted $R^2 = .625$, $F(5, 181) = 61.31$.

Hypothesis 8 – ED Pathology as a Moderator Between Orthorexia and

Clinical Impairment. A multiple regression analysis was conducted to analyze EAT-26 scores as a moderator between E-DOS and CIA scores. Results of this analysis indicated EAT-26 scores were not a significant moderator between E-DOS and CIA scores (see Table 10) rejecting Hypothesis 8.

Table 10

Regression Table for Model 4

Predictor	<i>B</i>	<i>SE</i>	Beta	<i>t</i>	95% lower	95% upper	Tol
E-DOS	-.708	.215	-.392	-3.288***	-1.133	-.283	.131
PHQ-9	-.119	.403	-.071	-.295**	-.915	.677	.032
E-DOS x PHQ-9	.040	.019	.627	2.071	.078	.020	.020
GAD-7	-.286	.443	-.141	-.645	-1.161	.589	.039
E-DOS x GAD-7	.028	.020	.383	1.347	-.013	.068	.023
EAT-26	.444	.245	.433	1.809	-.040	.928	.032
E-DOS x EAT-26	-.006	.010	-.164	-.613	-.026	.014	.026

Note. * $p < .05$. ** $p < .01$. *** $p < .001$. Tol = Tolerance. Model $R = .822$, Adjusted $R^2 = .663$, $F(7, 181) = 51.906$.

In summary, depression was a significant moderator between ON and clinical impairment, however by the end, the multiple moderator model was not significant, rejecting Hypothesis 9.

Chapter 4

Discussion

The purpose of the current study aimed to collect the prevalence rate of ON nervosa in a U.S. sample using the E-DOS, and to further assess clinical impairment associated with ON using the CIA. Due to the novelty of ON, clinical profiles of participants who received elevated scores on the E-DOS and CIA were isolated for further analysis. Obsessive-compulsivity was assessed in clinically significant profiles to determine if OCD-type symptomology was related to ON. Depression, anxiety, and ED pathology were analyzed as moderating variables between ON and clinical impairment. During the time of this writing, this is the second study that examined ON in a U.S. population using the E-DOS and CIA. Overall, the findings suggest ON is a predictor of clinical impairment, with depression as a moderator between ON and clinical impairment. However, anxiety and ED pathology were not found to moderate the relationship between ON and clinical impairment. Obsessive-compulsive symptomology was only evidenced in one out of seven significant participant profiles. In this discussion section, the research questions, hypotheses, clinical implications, and limitations of the study are discussed.

Prevalence Rate of Orthorexia

The majority of past research on ON has used the ORTO-15 to collect data on prevalence rates globally. However, researchers have criticized the validity of the ORTO-15 due to the wide range in prevalence rates, ranging from less than 1% to 90% (Dunn et al., 2016; Dunn et al., 2017). Thus, researchers have stated the ORTO-15 is sensitive to healthful eating habits, however unable to detect clinical impairment associated with

healthful eating (Dunn et al., 2017). Of the various instruments developed to assess ON, the E-DOS has shown promising results (Chard et al., 2019). To date, limited research has used the E-DOS to assess ON, and a large portion of the existing literature does not include U.S. samples. Therefore, the current study aimed to assess ON in a U.S. population using the E-DOS. Chard et al. 2019 collected a prevalence rate of 8% in a U.S. sample. The current study's hypothesis about yielding a comparable prevalence rate was confirmed, with 7% of the sample receiving scores in the orthorexic range. In comparison to the prevalence rate of EDs recognized by the DMS-5, a prevalence rate of 7% seems overestimated. ON has also been theorized as an anxiety disorder, specifically, an obsessive-compulsive disorder (Barthels, 2012). However, a 7% prevalence rate is still much higher than prevalence rates reported by anxiety disorders and OCD (APA, 2013).

One explanation for this potentially inflated prevalence rate could be due to a highly sensitive screener and/or cultural differences. As mentioned previously, the E-DOS has shown promising reliability across five studies (Barthels et al., 2015; Barthels et al., 2016; Barthels & Pietrowsky, 2012; Depa et al., 2017; Rudolph 2017). However, these data were collected in German samples, with prevalence rates closer to 3%. Therefore, U.S. populations are scoring much higher on the E-DOS. The test construction of the E-DOS and cultural factors may play a role in higher prevalence rates in the United States. As mentioned in the literature review, the culture of clean eating has become a predominant ideal in the United States, infiltrating major media platforms, voiced through public figures, and valued as an ideal diet. Perhaps the instrument is picking up on general anxiety surrounding unhealthful foods that applies to many people. Incorporating a severity index might help eliminate individuals who receive elevated

screeners, but do not endorse moderate to severe impairment as a result of their dietary preferences.

Another perspective regarding the prevalence rate of ON collected in this sample is that it is not a representation of inflation. The cluster of symptoms identified as ON may be highly prevalent among the United States. Considering this is the second study to receive a comparable prevalence rate is noteworthy. However, when considering the working criteria of ON proposed by Dunn and Bratman (2016), one major criterion includes either a significant impairment in physical health (malnourishment), functional impairment due to diet, and/or positive body-image or self-worth due to dietary practices (Dunn & Bratman, 2016). The E-DOS as a measure of ON does not account for these criteria. The current study looked at psychosocial impairment as a variable but did not assess for physical impairment, which could include serious health risks such as malnourishment. The next section will explore psychosocial impairment as one of the Dunn and Bratman criteria in the current sample.

Orthorexia and Clinical Impairment

In previous research, instruments aimed to measure ON have lacked in their ability to detect clinical impairment. Therefore, the present study incorporated a measure that assessed psychosocial impairment to supplement the E-DOS and serve as a tool to assess Dunn and Bratman's 2016 criterion B. (2), of ON. Three percent of participants met criteria for both orthorexic eating behavior and psychosocial impairment, as measured by the E-DOS and CIA. The current study provides two important prevalence rates: one being the 7% prevalence rate of ON, and the second being the 3% of participants who reported both symptoms of ON and psychosocial impairment. An

argument could be made that the true prevalence rate of ON in the current study is the 3% data point, since this percentage can account for one of Dunn and Bratman's required diagnostic criteria: psychosocial impairment due to eating behavior. Considering a 3% prevalence rate is more comparable to prevalence rates of existing EDs (APA, 2013), yet is still slightly higher than expected.

Examination of Clinically Significant Profiles

Researchers have called for additional data on ON, especially detailed case studies to better understand the potential heterogeneous characteristics of ON. A presentation of participant profiles who scored in the orthorexic range, with symptoms of clinical impairment, were highlighted to ascertain if any themes in data emerged across their clinical profiles. Seven participants out the sample size produced clinically significant profiles (see Table 5). Participant ages ranged from 23 to 36 years of age, with all participants except one identifying as female. Five out of seven of the participants identified as White, with the remainder identifying as Hispanic/Latino and Black/African American. The gender and racial factors presented in the present study are consistent with the risk factors associated with EDs (Klump et al., 2009). Five of seven participants reported they followed a specific diet or set of guidelines, which included: veganism, vegetarianism, low carb, the Jenny Craig diet, and "no red meat or pork, grains once a week." Six of seven participants also received elevated scores on the EAT-26, which is suggestive of ED symptomology. Four of seven participants endorsed moderate to severe levels of depression based on the PHQ-9. Four of seven participants endorsed severe levels of anxiety and one participant endorsed moderate levels of anxiety based on the GAD-7. One of seven participants endorsed 10 obsessive-compulsive symptoms on the

FOCI, rating these symptoms as moderate to severe, suggestive of a potential obsessive-compulsive disorder. Brytek-Matera (2012) suggested ON may be better characterized as an obsessive-compulsive disorder; however, the current sample of isolated profiles was unable to support this theory, likely due to the small sample size. Although, a recent study by Lucka et al. (2019) found ON was better explained by the ED spectrum, not the OCD spectrum. Overall, the majority participants with clinically significant profiles endorsed moderate to severe levels of depression and anxiety, suggesting mood dysregulation could be cooccurring among those with ON. Barthels et al. (2017) explored ON as a coping mechanism for patients in recovery from EDs. One of seven participants endorsed a history of ED treatment. Although the sample size of clinically significant profiles was small, findings support the need for additional research on the clinical implications of ON.

The most surprising result from the clinical profiles was the data collected on BMIs. Five of seven participants received BMIs in the obese range, with two participants scoring in the normal range. In the case studies discussed in the literature review, 3 of 5 individuals who exhibited ON presented with severe malnourishment and BMIs in the underweight category, with the remaining two presenting with normal BMIs (Moroze et al., 2015; Park et al., 2011; Saddichha et al., 2012; Wilsher & Panagiotaki, 2018; Zamora et al., 2005). In Dunn and Bratman's (2016) proposed criteria for ON, clinical impairment is outlined as having impairment in physical health (such as malnourishment or severe weight loss), functional impairment due to diet, and/or positive body image or self-worth due to dietary practices. An important consideration regarding the physical health criteria is that a weight specification is not indicated. The current study found 5 of

7 participants were in the obese range of BMI. Elevated BMIs may seem counterintuitive when conceptualizing a restrictive ED. However, low weight is not always an indication of an ED, in fact, the most current DSM does not include low weight as a criterion for anorexia, mainly because individuals at all weight indexes can experience an ED. The current sample was likely not large enough to capture any cases of severely underweight participants. However, it is important to consider that individuals in the severe underweight range with anorexia are rare among the population (Klump et al., 2009). BMI as a risk factor for ON has revealed inconsistent findings throughout the literature (McComb & Mills, 2019), with some studies finding higher BMIs as a risk factor (Fidan et al., 2010; Lucka et al., 2019), and others finding low BMIs associated with ON (Brytek-Matera et al., 2018).

It is worth noting 60% of the U.S. population lies within the obese range of BMI (Paharia & Kase, 2012). Although BMI is a controversial measurement among the ED field, this has been a significant factor of study across the international research of ON. An additional consideration regarding higher BMIs represented in the current sample includes the possibility that individuals at higher weights may be more self-conscious about their dietary needs/preferences, and as a result scored high on a measure that evaluates health-consciousness regarding food. In addition, those with health-related conditions, in the at-risk category for chronic disease, are informed by healthcare providers to practice healthy eating and weight loss as a form of preventative care (Paharia, 2008), which could create distress surrounding health and diet. Nonetheless, based on the proposed criteria of ON, the participants highlighted above are likely to meet criteria for a diagnosis based on the psychosocial impairment criteria being met.

Orthorexia as a Predictor of Clinical Impairment

ON was found to be a predictor of clinical impairment. These data suggest individuals presenting with orthorexic eating behavior are likely to experience psychosocial impairment due to eating behaviors. Psychosocial impairment was correlated with ON, depression, anxiety, and ED pathology. Two major implications can be delineated. First is the E-DOS has shown the ability to detect both orthorexic eating behavior and clinical impairment, which previous instruments have failed to achieve. Elevated scores on the E-DOS alone are likely to be an indicator of clinical concern. Secondly, these data support the construct of ON as a mental health concern, with symptoms consisting of both cognitive and behavioral components associated with functional impairment. From the correlation results, ON was associated with psychosocial impairment and ED pathology. It is worth mentioning that based on the data, ON is not a perfect predictor of clinical impairment. While ON was found to be predictive of psychosocial impairment, only 3% of the sample received elevated scores on both the E-DOS and CIA, while ON and psychosocial impairment were also strongly correlated. Theoretically, this could be another indication that the E-DOS warrants additional test construction to more accurately capture clinical impairment associated with orthorexic eating habits. Nonetheless, the overall data continues to be supportive of the theory that ON should continue to be investigated as a potential mental health disorder.

Depression as a Moderator Between Orthorexia and Clinical Impairment

Depression was found to be a moderator between ON and clinical impairment. During the time of this writing, this is the first study to look at depression as a moderating

variable. Depression was correlated with clinical impairment, anxiety, and ED pathology. Low self-esteem and/or low self-worth have been found to be prominent among EDs (Cervera et al., 2003). Considering Dunn and Bratman's (2016) criteria, depression may be exhibited by feelings of guilt associated with food transgressions, foods deemed "unhealthy" or "impure." The proposed criteria also reference additional factors that may cause feelings of depression including financial stress, social isolation, and/or malnutrition. The financial component includes purchasing health foods that may come at higher costs, resulting in stress that one might be overspending or unable to afford desired food choices. Social isolation as a result of ON may also explain why depression is a moderator. Individuals with orthorexic eating behaviors may avoid social gatherings or eat meals alone out of fear of being faced with perceived unhealthy foods or judgment surrounding their dietary choices. Naturally, malnutrition is likely to cause symptoms such as low energy, fatigue, and sleeping difficulties, all of which can emulate depression. The experience of these feelings would likely be contributing factors to symptoms of depression among those with ON. Behavioral activation is an evidence-based intervention that has been shown to effectively treat depression (Martell, 2008). Clinically, this intervention could potentially be included in a treatment plan such as CBT-E (Fairburn et al., 2003) to effectively treat ON.

Conversely, some research on ON has proposed that individuals may experience feelings of superiority or an inflated sense of self-worth due to their adherence of a healthful diet. (Bratman & Knight, 2000). Bratman and Dunn also include a criterion that addresses positive body-image, higher sense of self-worth, and identity contingent on obedience with the perceived healthful diet. The theory is that individuals in good health

exhibit a higher sense of self-worth because of their dietary choices. Variables such as culture and health status may be worth exploring as researchers continue to investigate the role of depression between ON and clinical impairment. Cultural implications might include exploration of family or societal messages about healthful eating, which may drastically vary across different countries and within the diverse ethnic backgrounds in the United States. Health status may also be an important factor to consider when understanding the role of depression in dietary practices. On the one hand, individuals who might be adopting a perceived healthful diet due to health issues may experience higher rates of stress, depression, and/or report higher BMIs, and on the other, individuals who are in good health and practice healthful eating may experience an inflated sense of self-worth. Another perspective regarding the relationship between ON and depression includes the transdiagnostic theory of psychiatric disorders (Clark, 2009), originally theorized among EDs by Fairburn et al. 2003. Depression and anxiety have been considered within the transdiagnostic context (Clark, 2009), which suggests psychiatric disorders would be better conceptualized as noncategorical, but rather as clusters of symptoms that move on a spectrum that can be treated effectively regardless of symptom phase using a cognitive behavioral approach. Perhaps ON could be theorized as a phase of symptoms that are included on the spectrum of EDs or among mood disorders, particularly depression. Thus, those with ON would be conceptualized to demonstrate the same core psychopathology of those with EDs or depression, warranting an evidenced-based intervention such as cognitive behavioral therapy to treat the functional impairment.

Anxiety as a Moderator Between Orthorexia and Clinical Impairment

Anxiety was not found to be a moderator between ON and clinical impairment, which was a surprising result. In the present study, anxiety was correlated with depression, clinical impairment, and ED pathology; however, it was not correlated with ON. ON has been characterized as a pathological obsession with healthful foods. Brytek-Matera (2012) conceptualized the symptoms of ON as obsessive-compulsive, which is indicative of underlying anxiety. One possible explanation for this result could include the brevity of the GAD-7. In addition, the GAD-7 focuses primarily on the physiological symptoms of anxiety, which could be less sensitive to detecting anxiety in individuals who are not self-aware of physiological symptoms. Future studies could include a measure such as the Beck Anxiety Inventory, which includes more questions regarding the cognitive and behavioral experience of anxiety. Another explanation could be that anxiety is not an underlying feature between ON and clinical impairment. Depression, along with additional variables yet to be known may be the key variables accounting for the relationship between ON and clinical impairment. However, EDs have been known to be comorbid with symptoms of anxiety and anxiety-related disorders (Halmi, 2018), therefore, anxiety should not be ruled out of the clinical picture of ON.

ED Pathology as a Moderator Between Orthorexia and Clinical Impairment

ED pathology was not found to be a moderator between ON and clinical impairment. One main consideration for this result is that the measure used to assess ED pathology, the EAT-26, specifically looks at ED symptoms related to restriction, bingeing/purging, and fear of weight gain. Comparatively ON is more concerned with restriction of food groups, quality of food, and concern with health. Thus, construct of

ON may not be captured well in the EAT-26. As mentioned previously, Barthels et al. (2017) has discussed having a history of an ED may be a significant risk factor in the development of ON, and that in some cases, orthorexic eating behaviors may be used as a coping strategy in recovering patients with an ED. This theory works well with Fairburn's (2003) transdiagnostic approach, and the findings of the current study suggest further research on ED history as part of the clinical profile of ON remains warranted.

In the present study, ED pathology was correlated with all of the variables: ON, clinical impairment, depression, and anxiety. The correlational relationship between ED pathology, clinical impairment, depression, and anxiety is consistent with prior research (Halimi, 2018). The correlation between ED pathology and ON suggests orthorexic ED may be comorbid with other EDs.

Limitations

The current study has several limitations. First, the main source of data collection was gathered through self-report measures, which warrants some caution in the interpretation of reported symptomology. The majority of the sample was female, creating a lack of generalizable data for men. It must also be noted a small percentage (5%) of data was collected after the declaration of the COVID-19 pandemic, which may be a variable that influenced responses on measures assessing anxiety and depression. Lastly, due to the novelty of ON and lack of research in U.S. populations, the hypotheses and results addressed in the current study were created on working theories and a new instrument. Therefore, the implications of results presented in this study should also be interpreted as developing theories.

Future Directions

Future studies are needed to collect data using the E-DOS in U.S. populations to continue assessing prevalence rates of ON. Research studies using a mixed methods approach or qualitative design to conduct clinical interviews may provide more useful information on the presence of clinical impairment associated with the symptoms of ON. Due to the fact that EDs are highly prevalent among adolescents, future studies should study ON in adolescent populations. In addition, incorporation of health-related questionnaires to assess for participants health status and medical history would be helpful in assessing potential physical impairment such as malnourishment, a criterion proposed by Dunn and Bratman (2016). Questions pertaining to chronic health conditions may be helpful in understanding the role of BMI and depression between individuals with medical conditions versus those who are healthy and who pathologically practice healthful eating. Other variables of importance might include dietary preferences, ED history, and cultural considerations. Regarding test construction, one potential addition to the E-DOS might include assessment questions inquiring about physical impairment or psychosocial impairment, with a severity index (mild, moderate, to severe impairment). These assessment questions may help to better assess clinical impairment associated with dieting.

Conclusion

ON remains an evolving construct. Depression may be a key symptom in the presentation of ON. Anxiety and ED pathology were not able to explain how much of an impact they had on the relationship between ON and clinical impairment. ON's predictiveness of psychosocial impairment suggests this cluster of symptoms should

continue to be investigated as a mental health concern. The rate at which ON is presenting in U.S. populations warrants urgency and precision in research due to the severe mental and physical risks EDs pose. Diagnostic criteria and test construction for ON require additional refinement to provide clear guidelines for evaluating ON and for reporting true prevalence rates. The E-DOS as a measure has shown a prevalence rate consistent with one previous study, Chard et al. (2019), which suggests the measure is on track for collecting reliable prevalence rates on U.S. samples.

The classification of ON remains indistinguishable. It is unclear if ON warrants its own diagnostic entity, or if it should be characterized as a form of another ED such as avoidant/restrictive food intake disorder. Perhaps ON would be better characterized as its own disorder, with diagnostic specifiers for severity based on physical and psychosocial impairment. On the contrary, Fairburn et al.'s (2003) transdiagnostic theory and approach to EDs offers a more credible perspective. The transdiagnostic approach describes a spectrum where individuals who present with ED symptoms are not diagnosed based on one disorder, but rather are viewed as having a fundamental disorder that can present with varying symptoms throughout the lifespan (Fairburn et al., 2003). These changing symptoms, which may be consistent with anorexia, bulimia, or ON, and be treated with a cognitive behavioral approach. Thus, ON may be considered as a phase of symptoms that individuals experience across the ED spectrum. This theory would also be able to account for the connection found between ED history and orthorexic eating behavior in the literature. Furthermore, the transdiagnostic approach applied to general psychiatric conditions such as depression (Clark, 2009), could explain the findings of the current study, suggesting ON may be cluster of symptoms under the umbrella of depression, or

spectrum of mood disorders. However, viewing ON as part of the ED spectrum seems to be more appropriate, especially considering symptoms such as depression are highly comorbid among EDs. Clinical implications from the current study suggest an effective approach to treating individuals with ON, once medically stable if they are recovering from physical impairment secondary to disordered eating, is Fairburn's cognitive behavioral therapy for EDs (CBT-E), psychoeducation focused on the balance of nutritional therapy, and behavioral activation for depression.

Regardless of the diagnostic potential of ON, the current study has shown a fixation toward consuming healthful foods can be harmful. Mental health professionals, especially those who treat mood-related disorders and EDs, working in outpatient and medical settings should be informed of the clinical implications diet can have on psychological and physical health. Providers can help alleviate distress and potentially reduce the risk of developing orthorexic eating behavior by noticing symptoms associated with ON and addressing the problematic cognitions and behaviors. As medical care moves toward integrated healthcare, doctors' offices could provide early prevention and resources to patients by assessing dietary practices during annual exams. On a societal level, use of media to emphasize the *balance* of healthful eating as a source of nourishment for the body is needed, with the message that diet is but one of the many factors that contribute to one's overall health.

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Appendix A

Email Recruitment Letter

Hello,

You are invited to participate in a dissertation study conducted by a psychology student in the doctoral counseling program at Northwest University.

The purpose of this study is to explore the eating habits and general mental health. It will involve answering demographic questions and filling out a web-based survey approximating 20-25 minutes of your time. You will be in control of information you offer and may exit the survey at any time. Additionally, you will be given the option to enter into a raffle for the chance to win a \$100 amazon gift certificate.

If you are interested in participating in this study, please click the link below and proceed to the informed consent. All participants must be over the age of 18 years to proceed. If you have any questions, please email xxxxx@northwestu.edu or call at (XXX) XXX-XXXX.

Thank you for your time and consideration.

Appendix B

Social Media Advertisement/Recruitment

Hello,

Are you interested in the chance to enter a raffle for a \$100 Amazon gift certificate? If you are, your participation in filling out a web-based survey can enter you in. The study is conducted by a psychology student in the doctoral counseling program at Northwest University.

The purpose of this study is to explore eating habits and general mental health. Your contribution would be greatly appreciated and help the field of psychology move forward in research. It will involve answering demographic questions and filling out a web-based survey approximating 20-25 minutes of your time. You will be in control of information you offer and may exit the survey at any time.

If you are interested in participating in this study, please click the link below and proceed to the informed consent. All participants must be over the age of 18 years to proceed. Please feel free to share this post. If you have any questions, please email xxxxx@northwestu.edu or call at (XXX) XXX-XXXX.

Thank you for your time and consideration.

Appendix C

Eating Habits and Mental Health

Consent Form
PSYC 8943 Doctoral Dissertation, Northwest University
Bralin L. Jimenez

You are invited to participate in a research study conducted by Bralin Jimenez in the doctoral Counseling Psychology program at Northwest University. The study is being conducted as a class requirement for PSYC 8943 Doctoral Dissertation. The purpose of this study is to investigate the relationship between eating habits and mental health.

If you agree to participate in the study, you will be directed to take six web-based surveys that will take approximately 20-25 minutes to complete. Your participation will contribute to the understanding of the impact of eating habits on mental health and could offer important information to the field of psychology and counseling.

There are minimal risks associated with participation. Some individuals may be uncomfortable answering personal questions. The benefit of taking part in this study is the opportunity to participate in the research process as a research subject.

Participation in this study is voluntary. You may choose not to participate in this study at any time and for any reason. There will not be any negative consequences for you if you refuse to participate. You may refuse to answer any questions asked. All responses are anonymous; however, if you would like the chance to win a \$100.00 Amazon gift card for your participation, you may enter your email address for the raffle at the end of the survey. Your email address will not be linked to your responses. You may keep this consent form for your records. By turning in this questionnaire, you are giving permission to use your responses in this research study.

The results from this study will be presented in a doctoral dissertation study and potentially with eating disorder treatment centers. All data forms will be destroyed on or before August 2020.

If you have any questions about this study, contact Bralin L. Jimenez, (XXX) XXX-XXXX, xxxxx@gmail.com. If you have further questions, please contact my/our faculty Kim Lampson, PhD, (425) 889-5294, kim.lampson@northwestu.edu. You may also contact the Chair of the Northwest University IRB, Dr. Cherri Seese, at cherri.seese@northwestu.edu or 425-285-2413. If participation in this survey has brought up any distress and you feel that you need to talk to someone, you can visit PsychologyToday.com to find a therapist near you. If you feel that you need to speak to someone urgently, you can call the national hotline SAMHSA at 1-800-662-HELP (4357).

Thank you for your consideration of this request.

Bralin L. Jimenez
Doctoral Student in Counseling Psychology
College of Social and Behavioral Sciences
(XXX) XXX-XXXX
xxxxx@northwestu.edu

Kim Lampson, PhD
Professor
College of Social and Behavioral Sciences
(425) 889-5294
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Appendix D

Eating Habits and Mental Health

1. Please enter your age:
2. Please select sex:
 - Female
 - Male
 - Prefer not to say
3. Please indicate your Race/Ethnicity:
 - American Indian or Alaska Native
 - Asian
 - Black or African American
 - Native Hawaiian or Other Pacific Islander
 - White
 - Hispanic or Latino
4. Please indicate your highest level of education:
 - Less than a high school diploma
 - High School degree or equivalent (e.g., GED)
 - Some College, no degree
 - Associate degree
 - Bachelor's degree
 - Master's degree
 - Professional degree
 - Doctorate
5. Do you follow a specific diet such as:
 - Vegetarian
 - Vegan
 - Paleo
 - Keto
 - Whole 30
 - Other: please specify
 - I do not follow any specific diet
6. Have you ever received treatment for an eating disorder?
 - Yes
 - No
7. Please submit your email address if you would like to join the raffle for a \$100.00 Amazon E-gift card. The winner of the raffle will be contacted during the second week of April 2020 with the gift card code:

Appendix E

English – Dusseldorf Orthorexia Scale (E-DOS)

1. Eating health food is more important to me than indulgence/enjoying the food

<input type="checkbox"/> This applies to me	<input type="checkbox"/> This occasionally applies to me
<input type="checkbox"/> This rarely applies to me	<input type="checkbox"/> This does not apply to me

2. I have certain nutrition rules that I adhere to

<input type="checkbox"/> This applies to me	<input type="checkbox"/> This occasionally applies to me
<input type="checkbox"/> This rarely applies to me	<input type="checkbox"/> This does not apply to me

3. I can only enjoy eating foods considered healthy

<input type="checkbox"/> This applies to me	<input type="checkbox"/> This occasionally applies to me
<input type="checkbox"/> This rarely applies to me	<input type="checkbox"/> This does not apply to me

4. I try to avoid getting invited over to friends for dinner if I know that they do not pay attention to health nutrition

<input type="checkbox"/> This applies to me	<input type="checkbox"/> This occasionally applies to me
<input type="checkbox"/> This rarely applies to me	<input type="checkbox"/> This does not apply to me

5. I like that I pay more attention to healthy nutrition than other people

<input type="checkbox"/> This applies to me	<input type="checkbox"/> This occasionally applies to me
<input type="checkbox"/> This rarely applies to me	<input type="checkbox"/> This does not apply to me

6. If I eat something I consider unhealthy, I feel really bad

<input type="checkbox"/> This applies to me	<input type="checkbox"/> This occasionally applies to me
<input type="checkbox"/> This rarely applies to me	<input type="checkbox"/> This does not apply to me

7. I have the feeling of being excluded by my friends and colleagues due to my strict nutrition rules

<input type="checkbox"/> This applies to me	<input type="checkbox"/> This occasionally applies to me
<input type="checkbox"/> This rarely applies to me	<input type="checkbox"/> This does not apply to me

8. My thoughts constantly revolve around healthy nutrition and I organize my day around it

<input type="checkbox"/> This applies to me	<input type="checkbox"/> This occasionally applies to me
<input type="checkbox"/> This rarely applies to me	<input type="checkbox"/> This does not apply to me

9. I find it difficult to go against my personal dietary rules

<input type="checkbox"/> This applies to me	<input type="checkbox"/> This occasionally applies to me
<input type="checkbox"/> This rarely applies to me	<input type="checkbox"/> This does not apply to me

10. I feel upset after eating unhealthy foods

<input type="checkbox"/> This applies to me	<input type="checkbox"/> This occasionally applies to me
<input type="checkbox"/> This rarely applies to me	<input type="checkbox"/> This does not apply to me

Appendix F

Clinical Impairment Assessment (CIA)

INSTRUCTIONS					
Please place an 'X' in the column which best describes how your eating habits, exercising or feelings about your eating, shape or weight have affected your life over the past four weeks (28 days). Thank you.					
		Not at all	A little	Quite a bit	A lot
	Over the past 28 days, to what extent have your ...eating habits ...exercising or feelings about your eating, shape or weight ...				
1	... made it difficult to concentrate?				
2	... made you feel critical of yourself?				
3	... stopped you going out with others?				
4	... affected your work performance (if applicable)?				
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 G

Eating Attitudes Test (EAT-26)

Eating Attitudes Test (EAT-26)

Age: _____ Current Weight _____ Highest weight (excluding pregnancy): _____
 Sex: _____
 Height: _____ Lowest Adult Weight: _____ Ideal Weight: _____

✓ Please choose one response by marking a check to the right for each of the following statements:		Always	Usually	Often	Some times	Rarely	Never	Score	
1.	Am terrified about being overweight.								
2.	Avoid eating when I am hungry.								
3.	Find myself preoccupied with food.								
4.	Have gone on eating binges where I feel that I may not be able to stop.	-	-	-	-	-	-		
5.	Cut my food into small pieces.								
6.	Aware of the calorie content of foods that I eat.								
7.	Particularly avoid food with a high carbohydrate content (i.e. bread, rice, potatoes, etc.)	-	-	-	-	-	-		
8.	Feel that others would prefer if I ate more.								
9.	Vomit after I have eaten.								
10.	Feel extremely guilty after eating.								
11.	Am preoccupied with a desire to be thinner.								
12.	Think about burning up calories when I exercise.								
13.	Other people think that I am too thin.								
14.	Am preoccupied with the thought of having fat on my body.	-	-	-	-	-	-		
15.	Take longer than others to eat my meals.								
16.	Avoid foods with sugar in them.								
17.	Eat diet foods.								
18.	Feel that food controls my life.								
19.	Display self-control around food.								
20.	Feel that others pressure me to eat.								
21.	Give too much time and thought to food.								
22.	Feel uncomfortable after eating sweets.								
23.	Engage in dieting behavior.								
24.	Like my stomach to be empty.								
25.	Have the impulse to vomit after meals.								
26.	Enjoy trying new rich foods.								
Total Score =									
Behavioral Questions:									
In the past 6 months have you:								Yes	No
A.	Gone on eating binges where you feel that you may not be able to stop? (Eating much more than most people would eat under the same circumstances) If you answered yes, how often during the worst week:								
B.	Ever made yourself sick (vomited) to control your weight or shape? If you answered yes, how often during the worst week:								
C.	Ever used laxatives, diet pills or diuretics (water pills) to control your weight or shape? If you answered yes, how often during the worst week?								
D.	Ever been treated for an eating disorder? When: _____								

EAT-26 From: Garner et al. 1982, *Psychological Medicine*, 12, 871-878); adapted by D. Garner with permission.

Appendix H

Patient Health Questionnaire-9 (PHQ-9)

**PATIENT HEALTH QUESTIONNAIRE-9
(PHQ-9)**

Over the **last 2 weeks**, how often have you been bothered by any of the following problems?
(Use "✓" to indicate your answer)

	Not at all	Several days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself — or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed? Or the opposite — being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead or of hurting yourself in some way	0	1	2	3

FOR OFFICE CODING 0 + _____ + _____ + _____
=Total Score: _____

If you checked off **any** problems, how **difficult** have these problems made it for you to do your work, take care of things at home, or get along with other people?

Not difficult at all	Somewhat difficult	Very difficult	Extremely difficult
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix I

Generalized Anxiety Disorder-7 (GAD-7)

GAD-7

Over the <u>last 2 weeks</u> , how often have you been bothered by the following problems? (Use "✓" to indicate your answer)	Not at all	Several days	More than half the days	Nearly every day
1. Feeling nervous, anxious or on edge	0	1	2	3
2. Not being able to stop or control worrying	0	1	2	3
3. Worrying too much about different things	0	1	2	3
4. Trouble relaxing	0	1	2	3
5. Being so restless that it is hard to sit still	0	1	2	3
6. Becoming easily annoyed or irritable	0	1	2	3
7. Feeling afraid as if something awful might happen	0	1	2	3

Appendix J

Florida Obsessive Compulsive Inventory (FOCI)

General Instructions: The questions below are designed to help health professionals evaluate anxiety symptoms. Keep in mind, a high score on this questionnaire does not necessarily mean you have an anxiety disorder — only an evaluation by a health professional can make this determination. Answer these questions as accurately as you can.

PART A Instructions: Please check YES or NO for the following questions, based on your experience in the past MONTH:

Have you been bothered by unpleasant thoughts or images that repeatedly enter your mind, such as:

1	Concerns with contamination (dirt, germs, chemicals, radiation) or acquiring a serious illness such as AIDS?	Yes	No
2	Overconcern with keeping objects (clothing, tools, etc) in perfect order or arranged exactly?	Yes	No
3	Images of death or other horrible events?	Yes	No
4	Personally unacceptable religious or sexual thoughts?	Yes	No
	Have you worried a lot about terrible things happening, such as:		
5	Fire, burglary or flooding of the house?	Yes	No
6	Accidentally hitting a pedestrian with your car or letting it roll down a hill?	Yes	No
7	Spreading an illness (giving someone AIDS)?	Yes	No
8	Losing something valuable?	Yes	No
9	Harm coming to a loved one because you weren't careful enough?	Yes	No

Have you worried about acting on an unwanted and senseless urge or impulse, such as:

10	Physically harming a loved one, pushing a stranger in front of a bus, steering your car into oncoming traffic; inappropriate sexual contact; or poisoning dinner guests?	Yes	No
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Have you felt driven to perform certain acts over and over again, such as:

11	Excessive or ritualized washing, cleaning or grooming?	Yes	No
12	Checking light switches, water faucets, the stove, door locks or the emergency brake?	Yes	No
13	Counting, arranging; evening-up behaviors (making sure socks are at same height)?	Yes	No
14	Collecting useless objects or inspecting the garbage before it is thrown out?	Yes	No

15	Repeating routine actions (in/out of chair, going through doorway, relighting cigarette) a certain number of times or until it feels <i>just right</i> ?	Yes	No
16	Needing to touch objects or people?	Yes	No
17	Unnecessary rereading or rewriting; reopening envelopes before they are mailed?	Yes	No
18	Examining your body for signs of illness?	Yes	No
19	Avoiding colors (“red” means blood), numbers (“13” is unlucky) or names (those that start with “D” signify death) that are associated with dreaded events or unpleasant thoughts?	Yes	No
20	Needing to “confess” or repeatedly asking for reassurance that you said or did something correctly?	Yes	No

If you answered YES to one or more of these questions, please continue with Part B.

PART B Instructions: The following questions refer to the repeated thoughts, images, urges or behaviors identified in Part A. Consider your experience during the past 30 days when selecting an answer.

Click the most appropriate number from 0 to 4.

1. On average, how much <i>time</i> is occupied by these thoughts or behaviors each day?	0 None	1 Mild (less than 1 hour)	2 Moderate (1 to 3 hours)	3 Severe (3 to 8 hours)	4 Extreme (more than 8 hours)
2. How much <i>distress</i> do they cause you?	0 None	1 Mild	2 Moderate	3 Severe	4 Extreme (disabling)
3. How hard is it for you to <i>control</i> them?	0 Complete control	1 Much control	2 Moderate control	3 Little control	4 No control
4. How much do they cause you to <i>avoid</i> doing anything, going anyplace or being with anyone?	0 No avoidance	1 Occasional avoidance	2 Moderate avoidance	3 Frequent and extensive avoidance	4 Extreme avoidance (house-bound)
5. How much do they <i>interfere</i> with school, work or your social or family life?	0 None	1 Slight interference	2 Definitely interferes with functioning	3 Much interference	4 Extreme interference (disabling)

Keep in mind, a high score on this questionnaire does not necessarily mean you have an anxiety disorder – only an evaluation by a health professional can make this determination.