

IMPACT OF INCORPORATING INTUITIVE EATING PRINCIPLES INTO A COLLEGE
NUTRITION COURSE ON EATING BEHAVIORS

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ABSTRACT

Impact of incorporating intuitive eating principles into a college nutrition course on eating behaviors

Kira Minot

Objective: This study aimed to assess the impact of an online introductory college nutrition course that implements evidence-based intuitive eating (IE) concepts and principles on students' application of IE behaviors. A secondary outcome explored the relationship between student grades and changes in IE behavior implementation. Researchers hypothesized an increase in the average use of IE practices post-intervention.

Methods: This study was a non-randomized pilot intervention using pre- and post-test surveys. Enrolled students completed the intuitive eating scale-2 (IES-2) survey on the first and last days of the 16-week course. Students participated in typical nutrition coursework throughout the semester with the addition of information on IE. Total and subscale average IES-2 scores were calculated and analyzed before and after the intervention.

Results: Weight-neutral, non-diet nutrition education on IE led to improvement in the total average implementation of IE behaviors ($p=0.022$) in twenty-three college students. No significant changes were detected in the IES-2 subscale measures. A significant positive association was observed between student grades and changes in mean IES-2 scores.

Conclusions and Implications: Based on study findings, adding education regarding IE principles into a basic nutrition course is an effective way to significantly increase total IE habits within an undergraduate student population. Results warrant consideration for standardizing incorporation of weight-neutral education in health courses to improve health behaviors.

Keywords: intuitive eating, IES-2, weight-neutral, internal cues, nutrition, health education

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Chapter 1

INTRODUCTION

The prevalence of individuals who are overweight and obese has led to increasingly pressing health issues in the United States (US), questioning the effectiveness of current education and promotion of health behaviors. Of the approximately 327 million adults living in the US, 73.6% ages 20 years and older are considered overweight or obese (Center for Disease Control and Prevention [CDC], 2018). Obesity is linked to mortality and chronic diseases such as Type 2 Diabetes Mellitus (T2DM), cardiovascular disease (CVD), osteoarthritis, and some cancers, making it a major health concern (Van Dyke et al., 2014). Over 40% of the US adult population is obese (having a body mass index [BMI] equal or greater to 30) and almost 50% of the population tried to lose weight in the past 12-months according to the CDC (CDC, 2021). Similarly, a global study published in 2020 reports that 45% of individuals across 30 countries were trying to lose weight at the time of publication (Ipsos' Global Advisor, 2020). The weight loss attempts of Americans lead to upwards of \$60 billion spent annually and yet 95% of diets fail with most individuals regaining, or exceeding their weight in 1-5 years (Pell, 2019).

Traditionally, individuals strive to lose weight through reducing caloric intake, diet plans, supplements, and increasing exercise. In many cases, this results in repeated dieting attempts (i.e. “yo-yo dieting”) which affects mental and physical health and typically fails to result in sustainable weight loss (Van Dyke, 2014). Some evidence even suggests that self-restricted eaters consume a similar amount of calories to non-restrictive eaters, but are at higher risk for mental health concerns, such as disordered eating, depression, anxiety and body dissatisfaction (Anderson et al., 2016). The increased susceptibility to mental health problems as a result of restrictive food intake is concerning, as it is estimated 9% of individuals globally suffer from eating disorders (ED), many of which have their origin in low-calorie diets (National Association of Anorexia Nervosa and Associated Disorders [ANAD], 2021; Van Dyke, 2014). Eating disorders are expensive for both individuals and the healthcare community with a societal cost of

more than \$38,000 USD per patient annually (Christensen et al., 2020). Weight-centric and diet-focused approaches to health can lead to disordered eating. These disordered habits have been strongly correlated with the lack of sustainable weight-loss produced by calorie and food restricted diets (Christensen, 2020). This strong relationship between calorie restricted dieting and increased risk for negative mental health outcomes warrants exploration of other approaches to health. Such exploration has led to the creation of a different evidence-based method for achieving health, referred to as “intuitive eating” (IE).

Intuitive eating was developed in response to risks and negative outcomes associated with dieting in 1995 by two registered dietitians (RD), Evelyn Tribole and Elyse Resch (Tribole, 2019). These authors define IE as “a personal process of honoring health by listening and responding to the direct messages of the body in order to meet your physical and psychological needs” (Tribole, 2019). It is a weight-inclusive, evidence-based model with a validated assessment scale and over 100 published studies to date (Tribole, 2019). In contrast to typical weight-focused diet approaches, IE supports teachings focused more on overall health and wellbeing by placing emphasis on checking in with internal hunger and fullness cues and building trust with the body. In the context of this paper, the term ‘internal cues’ refers to the bodily sensations that indicate feelings of hunger, satiation, and satiety. Intuitive eating behaviors have been found to be; (1) positively related to self-esteem, body appreciation, and satisfaction with life; (2) inversely related to ED symptomatology, BMI, body shame, poor interoceptive awareness, body surveillance, and internalization of media appearance ideals; and (3) negligibly related to social desirability (Tylka, 2013).

Information related to diet and nutrition is abundant, and many individuals seek out informal and formal education to explore their curiosities. Informal is defined here as information coming from the media, friends, and family, while formal education relates to courses delivered by an accredited school or university, and seminars or workshops with professionally trained experts in the field such as RDs. Current college introductory nutrition course curricula focuses

on the properties, functions, and sources of major nutrients, human nutrient needs across the life-span, the role of nutrition in chronic disease and prevention, and how to plan diets for optimal health (Johnson, 2021). While these concepts are imperative to wellbeing, they typically lack discussion around the influence of mental health and internal cues on the regulation of nutrient intake, and instead, focus more on external feedback, such as separating foods into health promoting vs. health hindering categories (i.e. good vs. bad foods). Unfortunately, this can have unforeseen consequences for individuals whose practices do not consistently fit in the “health promoting” category since research shows that individuals often associate the type of food they consume with their identity (Blake et al., 2013). This means that an individual’s mental health is impacted by their knowledge of and associations with food and nutrition (Blake, 2013).

Intuitive eating promotes the knowledge and understanding of health from a body-guided, non-judgmental perspective and decreases weight stigma by focusing on behaviors rather than weight (Tribble et al., 2012). Intuitive eating would be an asset if included in college curricula given that college students are at particularly high risk for disordered eating and EDs (National Eating Disorders Association [NEDA], 2017). Eating disorders are severe, brain-based illnesses diagnosed by trained practitioners, whereas disordered eating refers to unhealthy food and body behaviors, typically done with the intention of weight loss, that may put a person at risk for significant harm (Emily Program, 2022). The National Eating Disorders Association estimates that 35% of people who diet progress to harmful dieting, and of those, 20-25% develop partial or fully diagnosable EDs (NEDA, 2017).

The purpose of this study was to assess the impact of an introductory college nutrition course that implements evidence-based IE concepts and principles on students’ application of IE behaviors. Additionally, the relationship between student grades and the use of IE practices was examined. Researchers aimed to teach an additional approach to health by emphasizing improvement of health-related behaviors, as opposed to focusing exclusively on weight as an indicator of health. Introductory college level nutrition courses are a good place to introduce IE

concepts as they are offered at most institutions, including community colleges and universities. Courses also typically satisfy general education requirements and therefore include health-related majors and non-majors, enabling the information to reach a variety of individuals. Additionally, by focusing on introductory courses, students can be exposed to foundational knowledge of health and wellness that includes a non-diet, weight-neutral perspective, decreasing risk of disordered eating, EDs, and yo-yo dieting. The majority of EDs occur between ages 18-21 and many students in this age group enroll in introductory courses, providing an opportunity to prevent unhealthy lifestyle habits as young adults (NEDA, 2022). With 44% of college women and 27% of men dieting to lose weight, there is an opportunity to challenge misinformation and manipulation from diet culture with evidence-based teachings related to health to a vulnerable population (Ekern & Karges, 2019). Evidence shows that weight neutral teachings also lead to reduced weight bias in both educators and students, which is necessary, especially for students entering professions related to health, diet and nutrition (Humphrey et al., 2015). This research is important to expose the influences of diet culture and enhance students' knowledge and relationship with their body and mind by allowing them to explore and possibly practice IE principles. The researchers hypothesize that incorporating evidence-based IE principles into an introductory nutrition course will increase the implementation of IE behaviors in college students. Additionally, it is thought that students who get an 'A' grade in the course are more likely to engage in more IE practices.

Chapter 2

LITERATURE REVIEW

While most current public health approaches to obesity implement interventions focusing on dieting and weight loss, there has been little success with these approaches. In 1992, the National Institutes of Health (NIH) released a consensus statement suggesting dieting is an ineffective method of achieving sustained weight loss (NIH, 1992). Research suggests that diet-induced weight loss stimulates somatic and psychological mechanisms that later induce weight gain (Maclean et al., 2011). These mechanisms include increased hunger, hormonal alterations, and reduced energy expenditure and satiety (Bombak, 2014). The National Eating Disorder Association also reports that a history of dieting and using other weight-controlled methods is a major biological risk factor for developing an ED (NEDA, 2021). Many researchers and organizations, including the Health at Every Size (HAES) movement, suggest that public health would benefit from a shift in focus from weight loss to disease prevention (Bombak, 2014; Hunger et al., 2015).

Obesity and disordered eating have been shown to have common mechanisms of onset including a genetic basis and shared cognitive characteristics such as body dissatisfaction (Anderson, 2016). Restraint, or the external regulation of caloric intake, is a common cognitive variable for both obesity and disordered eating. Restraint has been shown to be a risk factor for disordered eating and has historically low compliance rates ending in less than 5kg weight loss after long-term (2-4 year) follow-up (Anderson, 2016). Research demonstrates that practicing caloric restriction increases risk of disordered eating and lacks the ability to promote long-term weight loss; therefore, alternative approaches to attaining healthy eating and lifestyle habits are needed (Bombak, 2014; Anderson, 2016; NEDA, 2021).

While caloric restriction has been associated with disordered eating, the co-occurrence of disordered eating and depression has long been correlated with negative body image (Koenig & Wasserman, 1995). Negative body image, also known as distorted body image, or body

dissatisfaction, refers to the act of being overly focused on comparing size, shape, and/or appearance to unrealistic ideals (Stanborough, 2020). Medical doctor Naveed Saleh, and licensed marriage and family therapist (LMFT) Nicole Arzt, explain that body dissatisfaction is largely related to an individual aligning with the influence of “diet culture”, which refers to a set of beliefs that values appearance, thinness, and shape above health and wellbeing. Additionally, diet culture places importance on achieving these values through means of restricting calories, classifying foods as “good” or “bad”, and normalizing negative self-talk. Diet culture messages condition individuals to believe that dieting and thinness equate to health and that the pursuit of health makes one person morally superior to another (Arzt & Saleh, 2022).

Individuals, especially women in Western culture, are often influenced by diet culture, and more specifically the “thin ideal”, or the concept that the ideal female body is slender and slim (Runfola et al., 2013). It is estimated that 69-84% of women in the US ages 25-89 years are dissatisfied with their body and typically prefer a smaller figure to their current shape (Runfola, 2013). However, thinness has not always been the ideal body type, as past civilizations regarded excess body fat as a sign of wealth and prosperity during times of famine and food shortages (Ferris & Crowther, 2011). While ideas of beauty have changed over time, thinness became the more dominant beauty aesthetic around the 1960’s through promotion by celebrities, fashion models, and the media (Kagie, 2018). In addition to images reflecting thin bodies as the beauty standard, disordered eating behaviors, such as starvation practices were promoted as acceptable means of achieving weight loss. As many figures in the media did not reflect the average body, struggles with body acceptance increased (Kagie, 2018).

Sabrina Strings, sociologist and author of “Fearing the Black Body: The Racial Origins of Fat Phobia,” argues that the thin ideal and related fat-phobia are not rooted in health concerns. She emphasizes that fat-phobia has racial connotations beginning in the trans-Atlantic slave trade when colonists deemed black individuals as prone to sexual and oral excess, connecting fatness to immorality and racial inferiority (Strings, 2019). The perpetuation of the thin ideal and fat-phobic

perspectives seem to have persisted, as the incidence of weight discrimination has increased 66% since 1995 and is now similar to that of racial discrimination (Schvey, 2010).

Perpetuation of the idea that thinness equates to health has led to weight bias, also discussed as weight stigma, or the negative beliefs and attitudes about an individual because of their weight (Dennett, 2018). This often results in larger-bodied individuals receiving messages that they are not healthy since they do not match the mainstream media's portrayal of a healthy physique. These messages are often internalized by their recipients to equate to not being worthy of attention, love, or respect (Dennett, 2018). Diet culture and weight bias often perpetuate disordered eating habits and/or EDs by promoting the goal of achieving the thin ideal as a means of gaining self-worth and acceptance within society's current beauty standards (Dennett, 2018). When surveyed, 65% of American women admitted to having unhealthy behaviors, thoughts, or feelings related to their bodies and food (Pell, 2019). Unfortunately, negative body image is also associated with obesity, worse psychological and physical health, and disordered eating (Baceviciene et al., 2020). While it is commonly thought that weight stigma will motivate individuals to change their behaviors to avoid further stigma, this is not the case. Instead, research shows that stigma leads to greater risk of depression, body dissatisfaction, disordered eating, negative self-esteem, increased stress, avoidance of physical activity, and can often lead to additional weight gain (Dennett, 2018). These negative health outcomes increase health care costs and demand, placing more burden on both the individual and society.

Puhl and Brownell (2006) investigated weight stigma among nearly 3,000 overweight and obese individuals. The first sample consisted of 2,449 adult women with a mean BMI of 37.6. The second sample consisted of 111 adult men and an equal number of women who matched the men in age (average 50.6 years), with mean BMIs of 39.73 and 38.05 respectively. When asked about sources of weight stigma, participants in sample one cited doctors as the second most common source, preceded only by family members. In sample two, women cited doctors as the most common source of weight stigma, while men cited them as the second source (Puhl &

Brownell, 2006). It is possible this difference is because the women in sample two had a slightly higher average BMI. Clearly, weight bias among health care professionals is prevalent. Weight bias is also seen to be extensive in other areas such as the media, politics, schools, courtrooms, and more (Puhl & Brownell, 2006). Weight bias needs to be addressed at a fundamental level to reduce perpetuation of negative health outcomes, difficult relationships with food and body, feelings of shame, and body dissatisfaction. Weight-neutral approaches to health such as IE and Health at Every Size (HAES) are a couple of the evidence-based models that are being recognized as addressing weight bias issues, although these issues remain prevalent.

Body dissatisfaction and weight stigma, combined with the importance placed on a thin appearance, has led many individuals to engage in dieting to achieve the desired level of thinness (McCarthy, 1990). As dieting rarely results in long-term body changes, it is often associated with feelings of failure which contribute to depression. Koenig and Wasserman (1995) examined 234 predominantly white, college students ages 17-22 years and found that depression was significantly related to eating problems in women. Additionally, failed dieting was significantly related to eating problems in females and males (Koenig & Wasserman, 1995). While evidence indicates that males are less likely to seek treatment for an eating pathology than females, they too face societal pressures to conform to an idealized body type characterized by a lean and muscular physique (Murray et al., 2019). While pursuing a muscular and lean build may differ from the traditional pursuit of thinness promoted largely among women, it is still known to promote an array of disordered eating symptoms. Nagata et al. (2019) performed a longitudinal study examining predictors of muscularity-oriented EDs in males and females, taking data at baseline and 7-year follow-up. Results showed nearly 1 in 4 males and 1 in 20 females reported muscularity-oriented disordered eating behaviors at the follow-up (Nagata et al., 2019). The emphasis placed on attaining a specific body image affects both men and women from adolescence into adulthood.

College students are particularly at risk for EDs and disordered eating behaviors due to fear of gaining weight (“the freshman 15”), social pressure to make new friends and romantic relationships, pressure to achieve academically, and the extensive use and influence of social media (Campbell, 2018). The CEO of NEDA, Claire Mysko, reports that, “College is a period of development in which disordered eating is likely to arise, resurface, or worsen for many young men and women” (Campbell, 2018). A study comparing the number of students engaging in ED behaviors on college campuses between 1995 and 2008 showed significant increases from 7.9% to 25% for men, and 23.4% to 32.6% for women (White et al., 2011). For comparison, national rates of hospitalizations for EDs as a primary diagnosis between the years of 1999-2008 ranged from 21-24%, and of those, 27-30% were individuals between the ages of 19-30 years, with 89-90% being female (Zhao & Ecinosa, 2011). This emphasizes that disordered eating in college campuses was increasing at higher rates compared to the national average for ED hospitalizations at that time. The data also highlights the prevalence of diagnosed EDs among college aged individuals. More recently, NEDA estimates that 10-20% of women and 4-10% of college men have diagnosed EDs (NEDA, 2017). As a whole, this data indicates that college students and college-aged individuals continue to be at risk for EDs, creating a need for nutrition education, especially among universities, to highlight the influence of diet culture, promote media literacy, and suggest additional methods to achieving health and wellness.

Christiansen et al. (2020) reports that EDs cost over \$38,000 annually per person in the US on average. The National Association of Anorexia Nervosa and Associated Disorders (ANAD) reports that EDs cost the nation around \$64.7 billion annually (ANAD, 2021). Additionally, over 10,000 deaths occur each year from EDs, making that an average of one death every 52-minutes. Among mental illnesses, EDs are the second deadliest, with only opioid overdose superseding it (ANAD, 2021). Clearly, there is a great need for a shift in the way health, nutrition, diet and wellbeing are promoted and discussed among various platforms.

As a rebuttal to the negative influence of diet culture on individuals' physical and mental health, registered dietitians (RD) Evelyn Tribole and Elyse Resch made the idea of IE mainstream with their 1995 book, "Intuitive Eating: A Revolutionary Program that Works" (Tribole & Resch, 2012). They describe a non-diet approach to health and wellness that emphasizes focus on internal signals of the body, such as hunger and fullness cues, and breaking the cycle of chronic dieting to heal one's relationship with food. Examples of physical hunger cues include, but are not limited to, a growling stomach, increased saliva, fatigue, and irritability, while physical fullness cues can include pressure or tightness in the stomach, feeling sluggish, and lack of hunger (Tribole & Resch, 2012). The premise behind IE is that if body signals and internal cues are consistently felt, interpreted, and acted on, an individual will intrinsically know how much and what type of food to eat to satisfy both nutritional health and appropriate weight (Van Dyke, 2014). In fact, IE has been described as an adaptive behavior because it involves a connection with internal physiological needs such as hunger and fullness cues, and eating in response to these cues, instead of relying on external influence such as diet plans, emotional states, or environmental cues (Herbert et al., 2013). Within the IE approach, Tribole and Resch outlined ten principles including: 1) reject the diet mentality, 2) honor your hunger, 3) make peace with food, 4) challenge the food police, 5) discover the satisfaction factor, 6) feel your fullness, 7) cope with your emotions with kindness, 8) respect your body, 9) movement-feel the difference, and 10) honor your health-gentle nutrition. These principles are described in more detail in Appendix A.

Individuals who report eating intuitively have been shown to be less prone to allowing situational and emotional cues to guide consumption, and less likely to overindulge in food in the absence of hunger (Herbert, 2013). Interoceptive sensitivity (IS), or the ability to process and perceive one's bodily signals, has been associated with emotional processing and behavior regulation and is a significant predictor of level of IE. Herbert (2013) showed IS, measured by heartbeat perception task, was positively correlated with IE scores, and more specifically, the IE subscales of reliance on internal eating cues, eating for physical rather than emotional reasons,

and unconditional permission to eat when hungry. Interoceptive sensitivity was also negatively correlated with BMI (Herbert, 2013). This shows the importance of understanding one's hunger and satiety cues and supports the idea that IE, a practice that values IS, is related to positive health outcomes.

Intuitive eating principles are said to build trust with the body by increasing recognition and understanding of hunger and fullness cues, while decreasing emotional eating and food/weight-related shame. Craven and Fekete (2019) examined the relationship between guilt, shame, binge eating, and IE in 196 undergraduate women and found that weight-related guilt and shame was correlated to increased binge eating symptomatology, while IE reduced the relationship between weight-related shame and binge eating, although not guilt. While guilt focuses on judging a *behavior*, shame focuses on judging the *self*, and both are shown to activate the hypothalamic-pituitary-adrenal axis (HPA-axis) which is associated with binge eating (Craven & Fekete, 2019). The HPA-axis is also the main physiological regulator of the body's stress response (Smith & Vale, 2006). IE may be protective against negative emotional experiences such as weight-related shame and guilt because it promotes response to physical hunger and fullness cues rather than emotional cues, without denying specific foods (Craven & Fekete, 2019).

Similar to IE, HAES is an approach to public health that focuses on incorporating healthful behaviors, rather than relying on weight as an indicator of health. HAES principles encompass weight inclusivity, respect for body diversity, and critical awareness with the challenging of cultural assumptions. HAES teachings also include compassionate self-care such as finding joy in movement and eating in a flexible way that honors food preferences and hunger and fullness cues, while respecting social frameworks that affect food availability (Bacon, 2021). Both IE and HAES are considered weight-neutral approaches to health that challenge the prevailing paradigm within medicine that suggests weight management is a key determinant of health and chronic disease prevention (Mensinger et al., 2016). This paradigm guides clinical

recommendations for obese individuals to lose weight and encourages large-scale dieting, creating a need for additional and alternative health frameworks (Mensinger, 2016).

Data describing the obesity-disease relationship suggests that there is currently less disease in those with high BMIs than in prior decades (Mensinger, 2016). This has led to increased research around HAES, IE principles, and the obesity-disease relationship (Mensinger, 2016). Stokes and Preston (2015) analyzed a recent National Health and Nutrition Examination Survey (NHANES) that included a sample of over 3,000 patients with CVD. After adjusting for sex, race/ethnicity and educational attainment, results indicated that individuals who were previously classified as overweight or obese, but who had transitioned to the normal-weight category at the time of survey, had significantly higher mortality risks (HR=1.48, $p<0.001$) compared to individuals who remained in the normal weight category (HR=1.00) (Stokes & Preston, 2015). The surprising decrease in mortality rates among obese and overweight individuals is often cited as the “obese paradox”, as these results do not seem to agree with typical messages around weight and health (Stokes & Preston, 2015). Stokes argues these results may be explained by the fact that illness can often cause weight loss, contributing to the increased rates of mortality seen in individuals that shifted from the overweight/obese categories to the normal-weight category (Stokes & Preston, 2015). Additionally, individuals in the overweight/obese categories had a 26% lower death rate and an 11% lower hazard of dying rate compared to those in the normal-weight category (Stokes & Preston, 2015). However, when analysis was limited to individuals who had never smoked, mortality rates were attenuated, as 53% of the normal-weight CVD population were current smokers (Stokes & Preston, 2015). Stokes explains that smoking is more common in normal-weight individuals than in overweight and obese people, possibly because smoking tends to restrict weight gain (Stokes & Preston, 2015). In fact, only 25% of former smokers maintain a BMI in the normal range after smoking cessation (Lycett et al., 2011). Stokes’s study results emphasize the immense impact that cigarette smoking has on health above weight related variables. This study demonstrates how confounding

factors can lead to conflicting evidence around the obesity-disease relationship, emphasizing the need to evaluate more than just weight as an indicator of health and disease risk.

Tomiyama et al. (2013) completed a systematic analysis of 21 randomized controlled trials (RCT) involving a weight loss intervention with a minimum one-year follow-up and found a lack of consistency between weight loss and health improvement. Findings from large representative datasets also show no indication of cardiometabolic abnormalities in close to one-third of obese adults (Mensinger, 2016). Additionally, the experience of weight stigmatization increases mortality risk, and negative health impacts (such as increased psychological stress responses) have been associated with weight loss failures and the stigma of obesity (Mensinger, 2016). A study including nearly 19,000 participants showed weight discrimination was associated with close to a 60% increased mortality risk that was not accounted for by common psychological and physical risk factors (Sutin et al., 2015). This brings attention to the severe impact that unfair treatment because of body weight can have on mortality, in addition to increasing psychological stress.

Responses to weight stigmatization may also lead to unhealthy eating behaviors. In a study with over 2400 overweight and obese women belonging to a weight loss support organization, 79% reported coping with weight stigma by eating more food, and 75% reported coping by refusing to diet (Puhl & Brownell, 2006). In a sample of nearly 500 overweight and obese white and African-American women, 68% reported that they delayed seeking health care because of their weight, and 83% cited their weight as a barrier to getting appropriate health care (Amy et al., 2006). Alternative approaches to health that do not include a focus on weight loss have been developed in response to the inconsistent evidence for the traditional paradigm of weight loss for health improvement. These weight-neutral approaches are also in response to poor weight maintenance statistics and the need to decrease weight bias and weight stigma aimed at individuals with a high BMI.

The release of Tribole and Resch's book on IE, aimed at reducing weight cycling and stigma, combined with epidemiological data showing new trends in the relation between weight and health, have led to increases in publications about IE over the last 15 years (Van Dyke, 2014). A review paper by Van Dyke and colleagues (2014), examined 26 cross-sectional survey studies from 2005 to 2014, all showing that among women and university students, intuitive eaters have lower BMIs than non-intuitive eaters. The clinical studies in the review paper showed that IE supports weight maintenance, but not weight loss in overweight and obese Caucasian women (Van Dyke, 2014). While traditional dieting groups demonstrate that weight loss is ultimately followed by weight regain, evidence shows that IE programs may assist more in weight maintenance and a reduction in weight cycling (Van Dyke, 2014). However, the review points out that while the clinical studies assessed program completion rates, none reported program adherence information, making it difficult to evaluate the effectiveness of IE on weight and BMI (Van Dyke, 2014).

While IE has been associated with BMI, there are also significant positive associations between IE and psychological health outcomes. Among eight studies reviewed by Van Dyke (2014), IE has been positively associated with different combinations of self-esteem, positive body image, body acceptance, resisting others perceptions of one's body, body function (i.e. focusing on how one's body functions as opposed to its appearance), perceived social support, and satisfaction with life among university men and women, women aged 18-65 years, and university women athletes, both directly and indirectly (Van Dyke, 2014). These studies also showed IE was positively correlated with optimism, positive affect, proactive coping, general unconditional acceptance, unconditional self-regard, and social problem solving among the same groups (Van Dyke, 2014). The myriad of positive outcomes explored related to IE across these studies, specifically in university students, warrants further exploration of incorporating IE and other weight-neutral, non-diet teachings in college courses.

Humphrey and colleagues (2015) investigated the effectiveness of teaching college students a weight-neutral, HAES general education course on the outcomes of IE, body esteem, cognitive behavioral dieting scores and anti-fat attitudes (Humphrey et al., 2015). As college students are particularly vulnerable to the effects of mood and EDs, this study aimed to promote body acceptance, and shift the focus from weight to health. The study measured the intended outcomes by giving students a pre- and post-intervention survey in class at the beginning and end of the semester. This survey included the Intuitive Eating Scale-2 (IES-2), the Cognitive Behavioral Dieting Scale (CBDS), the Body-Esteem Scale (BES), and the Anti-fat Attitudes (AFA) questionnaire. The use of multiple validated pre- and post-surveys allowed researchers in the Humphrey (2015) study to explore a multitude of outcomes impacted by weight-neutral education, setting this research apart from similar studies.

The Humphrey (2015) study also differed from similar research by using a quasi-experimental design comparing 3 groups receiving various levels of health education. The control group consisted of 46 students who were educated on weight management according to the textbook. The intervention group consisted of 46 students enrolled in a HAES college course and the comparison group (n=66) included 3 lectures demonstrating concepts of a non-diet approach in place of the weight management curriculum. The HAES curriculum addressed the social, physical, psychological, and economic impact of the diet industry on individuals and society (also referred to as “diet culture”). Lectures included topics such as mindful eating, IE, EDs, bariatric surgery, the Satter Eating Competence Model, analysis of weight loss research, social justice, size discrimination, culture, and body image (Humphrey, 2015). This study is unique in that students in the HAES group participated in observational learning where they listened to multiple guest speakers discuss their struggles with negative body image and disordered eating and their journey to practicing IE. Students also learned to eat mindfully and practiced this as an activity in class. The outcomes of this study showed that the HAES group had significantly different pre- and post-test scores for every outcome except the IES-2 subscales (2)

and (4). The comparison group (basic nutrition class with some HAES content) showed statistically significant differences in pre- and post-test scores for the IES-2 subscales (1) and (3), the CBDS, and the AFA. The control group showed no statistically significant differences between pre- and post-test scores (Humphrey, 2015). This study demonstrates the effectiveness of college courses designated to HAES material and courses incorporating HAES information on the improvement of IE scores, body esteem, and the reduction of dieting behaviors and anti-fat bias. This supports the notion that weight-neutral teaching approaches to health are effective among college students.

Anderson and colleagues (2016) explored outcomes related to the weight-neutral practice of IE among 125 undergraduate participants who consumed a taste-test meal of pasta and tomato sauce. Individuals were asked to fast for 4-hours prior to eating the provided meal, then completed surveys related to eating behaviors, eating attitudes, and demographics. Participants rated their level of hunger prior to the meal and the amount of food eaten was recorded in ounces using a food scale. Various surveys were used to measure the eating-related constructs, including the original Intuitive Eating Scale (IES). Hunger rating before the meal was a significant covariate to the amount of food eaten, where greater hunger led to increased food consumption (Anderson, 2016). Results also showed that elevated IE was associated with decreased BMI and disordered eating, while elevated restraint was associated with increased BMI and disordered eating. Mindful eating showed no significant associations with the outcome variables (Anderson, 2016). These results refute diet culture mentality (that low calorie equals low BMI) by illustrating that restricting food intake does not necessarily correlate to weight loss or a lower BMI. In fact, it suggests that restricting food intake may be counterproductive to healthy lifestyle practices. Various studies have shown the impact of IE programs on weight maintenance and lower BMI supporting the idea that teaching IE principles may be a beneficial way to approach implementing positive health outcomes (Van Dyke, 2014; Anderson, 2016).

Mensinger (2016) completed a RCT that compared the effectiveness of weight-neutral to weight loss programs on health promotion in 80 obese (BMI \geq 30) women ages 30-45 years. Participants were randomized to either a 6-month weight loss, or weight-neutral approach with facilitator-guided weekly group meetings. Measurements were taken at baseline, post-intervention, and 24-months follow-up and included blood pressure, blood glucose, lipid panel, BMI, weight, waist and hip circumference, distress, quality of life, self-esteem, dietary risk, IE, fruit and vegetable intake, and physical activity (Mensinger, 2016). Results showed greater reductions in LDL cholesterol and more improvement in IE in the weight-neutral program, whereas the weight loss program had larger reductions in weight and BMI. Both groups saw significant improvement in physical activity, total cholesterol, waist-to-hip-ratio, fruit and vegetable intake, self-esteem, and quality of life (Mensinger, 2016). This study demonstrates the ability for numerous health benefits to be achieved and sustained long-term in the absence of weight loss, using a weight-neutral approach that emphasizes IE and size acceptance. While this study indicates that weight loss methods can also provide positive health outcomes, the findings highlight the efficacy of a weight-neutral approach to provide health benefits, without the risk of contributing to weight stigma, or adding to dieting pressures.

Intuitive eating approaches are associated with better body image and lower levels of depression, especially among women; however, assumptions must be made when implementing this approach, such as that individuals have control over what and when they eat (Van Dyke, 2014). While this may not always be the case, it is important to recognize other factors that may influence a person's cues to eat outside of their physical body signals. For instance, cultural messaging and feedback from family and friends may influence how much and when a person eats, specifically if those messages equate weight loss and dieting with beauty (Van Dyke, 2014). Additionally, appropriate levels of hunger and fullness may be defined culturally, or by previous eating habits, rather than strictly internal (Van Dyke, 2014). Outside of biological cues, economic factors such as income and cost of food can dictate food choice and portion size, as well as

determinants such as education, knowledge of cooking, time, and attitudes about food (Wansink, 2004). Environmental cues such as plate size, lighting and packaging can also contribute to food and eating choices (Wansink, 2004). Additionally, IE may not be appropriate or applicable for everyone, including individuals with Prader Willi syndrome which involves appetite dysregulation, or individuals with brain injuries that lead to hypothalamic dysfunction resulting in hyperinsulinemia, leptin resistance, and obesity (Saleigh, 2017; Roth, 2015).

While research around IE is increasing, there are still gaps to be filled by future research. Future studies should include a variety of gender identities, education levels, varying ranges of socioeconomic status, ages, and occupations. Most studies have follow-up periods under two years, therefore longer follow-up periods would be helpful to see if the outcomes of IE are sustainable in the longer-term. Random sampling and randomized clinical trials would be helpful in contributing to causality over correlation regarding the effect of IE on health outcomes (Van Dyke, 2014).

Findings in previous research supports the efficacy of weight-neutral, non-diet teaching approaches to health, such as IE, to increase psychological and physiological factors of health (Herbert, 2013). The lack of consistent education around weight-neutral approaches and their impact on health behaviors, especially in areas where fundamental health and nutrition are discussed, led us to explore the impact of incorporating IE teachings in a college level introductory nutrition course on IE behaviors.

Chapter 3

METHODS

3.1 Study Design

This study was a pilot intervention using pre- and post-test surveys. The study was approved by the International Review Board at California Polytechnic State University in San Luis Obispo (Cal Poly) and California Polytechnic State University in Humboldt (Cal Poly Humboldt). All volunteer participants provided a signed informed consent form before participating in this project.

3.2 Participants

Participants were a non-randomized sample of kinesiology and non-kinesiology major students recruited from a Cal Poly Humboldt introductory online nutrition course. Inclusion criteria limited volunteers to students of at least 18 years of age who were enrolled in the Basic Human Nutrition course at Cal Poly Humboldt in the Fall term of 2021. Figure 1 shows the study design and participant flow. Participant characteristics including sex, year in college, and major can be seen in Table 1.

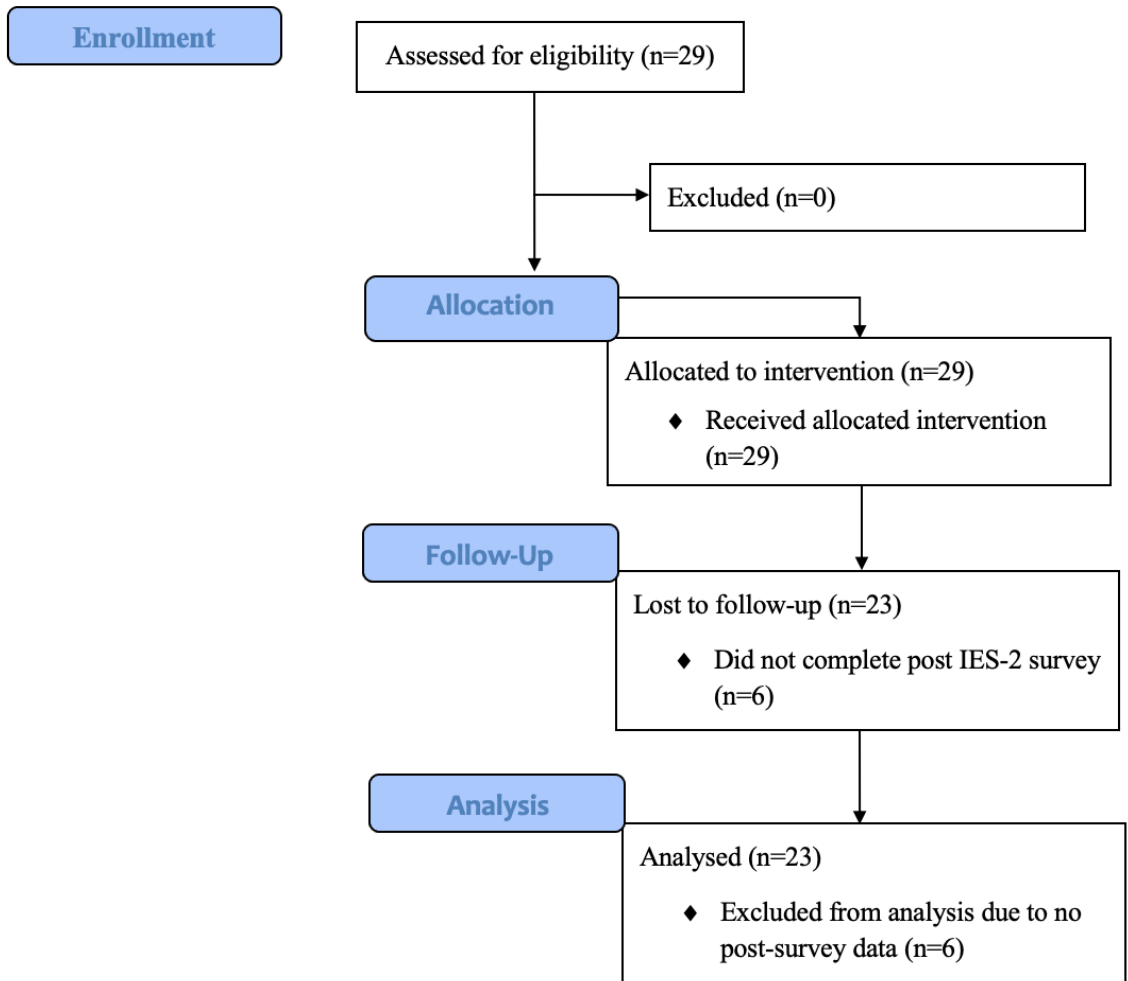


Figure 1

Participant Flow Chart and Study Design

Table 1

Characteristics of Participants Enrolled and Analyzed in an Online Introductory Nutrition Course in Fall Term 2021

	Participants Enrolled		Participant Analyzed	
	n (29)	%	n (23)	%
Sex				
Male	5	17	3	13
Female	24	83	20	87
Year in College				
Freshman	4	14	3	13
Sophomore	5	17	4	17
Junior	11	38	9	39
Senior	9	31	7	30
Major				
Psychology	4	14	3	13
Kinesiology	16	55	15	65
Undeclared	1	3	-	-
Sociology	1	3	1	4
Art	1	3	-	-
Environmental Science and Management	1	3	1	4
Critical Race, Gender & Sexuality	1	3	1	4
Biology	1	3	1	4
Business Administration	2	7	1	4
Course Match UGRD (undergrad)	1	3	-	-

3.3 Intervention

Participants meeting the inclusion criteria with signed consent completed the baseline IES-2 survey on the online teaching platform, Canvas. The same IES-2 survey is in Appendix B. It was estimated the survey would take each student under 15-minutes to complete. All students enrolled in the course completed the same coursework throughout the semester regardless of study participation. Students participated in typical nutrition coursework throughout the semester with the addition of information on evidence-based IE principles, including one guest lecture by a certified intuitive eating counselor that covered all IE principles. A course syllabus is in Appendix C detailing weekly topics discussed, learning outcomes, expectations, and modes of evaluation.

Throughout the 16-week course, all ten IE principles were discussed and evaluated in the forms of one or more of the following: lecture presentations, discussion prompts, and assignments. An outline of which principles were taught in each course module, and the method of discussion and/or evaluation can be seen in Appendix D. Examples of discussion prompts are as follows: “Describe what *physical* hunger and fullness feel like. Consider what pleasant or comfortable hunger and satiety feel like compared to hangry or stuffed. What role do you think emotions play in changing how you or others interpret hunger and fullness?” and “What are your thoughts on intuitive eating?” More discussion prompts and assignment descriptions can be seen in Appendix E. In addition to students interacting with each other and the instructor via discussion boards, homework assignments such as a 3-day mindful eating food log (Appendix F) also promoted understanding and implementation of IE. This assignment prompted students to notice and document their hunger and fullness cues, emotional state, and environment during meals, in addition to recording what and how much they ate. The students also referenced this food log assignment during a project that involved creating a new diet and writing a reflection on how they felt through this process. The study ended upon completion of the 16-week semester-long course with participants taking the IES-2 survey again on the last day of class.

Final grades, information from the entrance and exit surveys, and targeted assignments were used for data collection.

Grades and outcomes of the IES-2 survey were used to check for correlation between the two (i.e. do students who have higher grade outcomes show greater improvements in IES-2 scores?). Course outcome data was stored on the Canvas teaching platform and the secure computer of the instructor. Student survey responses and grades were de-identified and participants were referenced using a unique code assigned for anonymity, confidentiality, and unbiased data analysis.

3.4 Measures

The IES-2 is a validated 23-item assessment of participants' eating habits and use of IE using a 5-point Likert scale (1=strongly disagree, 5=strongly agree). It includes four subscales including unconditional permission to eat (UPE), eating for physical rather than emotional reasons (EPR), reliance on internal hunger/satiety cues (RHC), and body-food choice congruence (BFC) (Humphrey, 2015). The total IES-2 score is calculated by averaging all items, and each of the four subscales are scored by averaging a different subset of questions pertaining to that subscale. The average total and subscale IES-2 scores range from one to five, where higher scores indicate a higher level of intuitive eating practices. The IES-2 was used for the pre- and post-test surveys and has been deemed a valid and reliable tool to assess IE outcomes among undergraduate men and women (Tylka et al., 2013).

3.5 Statistical analyses

Data consisted of quantitative data derived from pre- and post-IES-2 surveys following validated protocols. When calculating scores from the IES-2, items 1, 2, 3, 7, 8, and 9 were reverse scored items. Total IES-2 scores were then calculated by adding together all survey items and dividing them by 23 to get an average score. The UPE subscale score was calculated by adding items 1 through 6 together, then dividing by 6 to get an average. The EPR subscale score was calculated by adding together items 7 to 14, then dividing by 8 to get the average. The third

subscale, RHC, was calculated by adding items 15 through 20 and dividing by 6 for the average score. Lastly, the BFC subscale was calculated by adding items 21, 22 and 23 together and dividing by 3 to create the average score. Total and subscale mean scores were calculated for pre-intervention and post-intervention surveys to get a score from one to five, where higher levels of IE practices were depicted with scores closer to five.

Paired upper tailed *t*-tests were performed to analyze differences between mean pre- and post-survey total and subscale scores. Chi-square analysis tests, highlighting results from the Fisher's exact test, were utilized to analyze associations between student grades and the changes in total and subscale IES-2 scores. Participants who received an 'A' grade in the course, defined as 93-100%, were compared to students who did not receive an 'A' grade. The level of statistical significance was set at $p \leq 0.05$ and data was analyzed with IBM SPSS Statistics (version 28, California, USA).

Chapter 4

RESULTS

4.1 Participants

A sample of 29 participants consented to participate in the study and completed the baseline IES-2 survey. The majority enrolled were female (83%), juniors in college (38%), and kinesiology majors (55%) (Table 1). By the end of the 16-week intervention, six participants failed to complete the follow-up IES-2 survey and were excluded (Figure 1). Twenty-three participants completed both pre- and post-IES-2 surveys and were analyzed. Table 1 depicts characteristics of the enrolled and analyzed populations.

4.2 Mean IES-2 Pre- and Post-Test Scores

A positive correlation between each participant's pre- and post-scores is shown in Figure 2, as well as an overall increase in scores. On average, participants who scored higher on the baseline survey also scored higher on the post-survey. Table 2 depicts the pre- and post-intervention means of all participants and the changes between the means. Means for the total IES-2 score and all subscale scores increased, indicating that on average, participants scored higher on the post-survey compared to the pre-survey. However, only the increase in mean for the total IES-2 score (0.19) was statistically significant ($p=0.022$). The UPE and EPR means increased by 0.17 and 0.13 respectively, but were not statistically significant ($p=0.098$, $p=0.143$) and the RHC and BFC means also increased by 0.3 and 0.14 respectively, but showed no statistical significance ($p=0.055$, $p=0.202$).

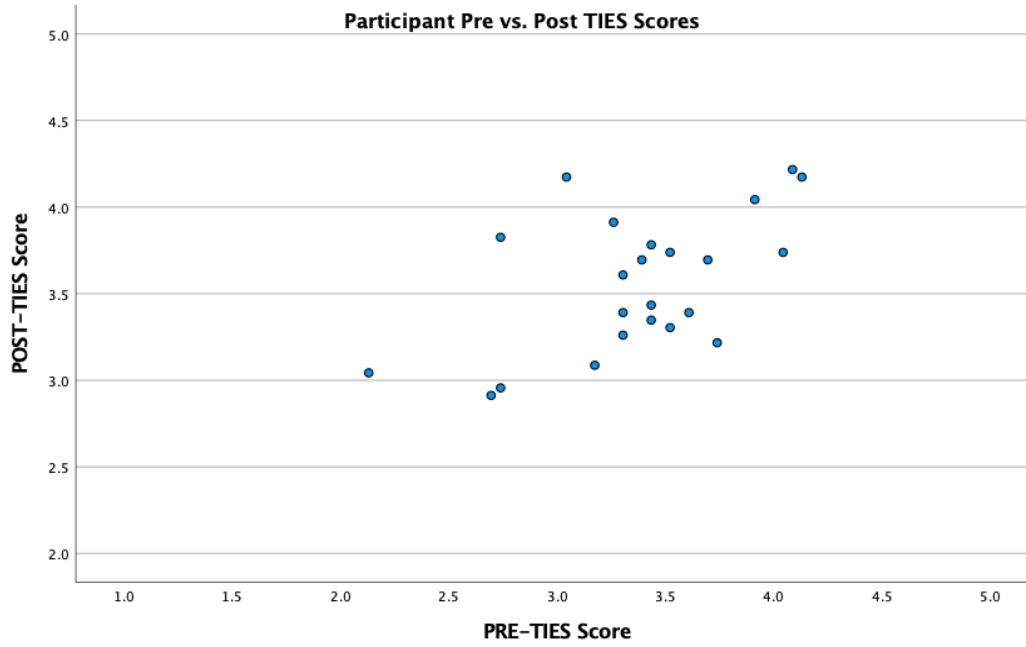
Figure 3 depicts the 95% confidence intervals (CI) for the differences between pre- and post-survey means for the total IES-2 score and each of the four subscale scores. Only the CI for the total IES-2 score contained a completely positive interval (0.01-0.37), indicating that it is expected at least 95% of participants would increase their mean total IES-2 score by a value that falls within this range, due to the intervention and not by chance. As IES-2 scores only range from 1-5, a small increase in score can have large implications. Changes in mean scores for all of

the subscales had CI that contained a negative number indicating there is no guarantee that student scores would increase post-intervention.

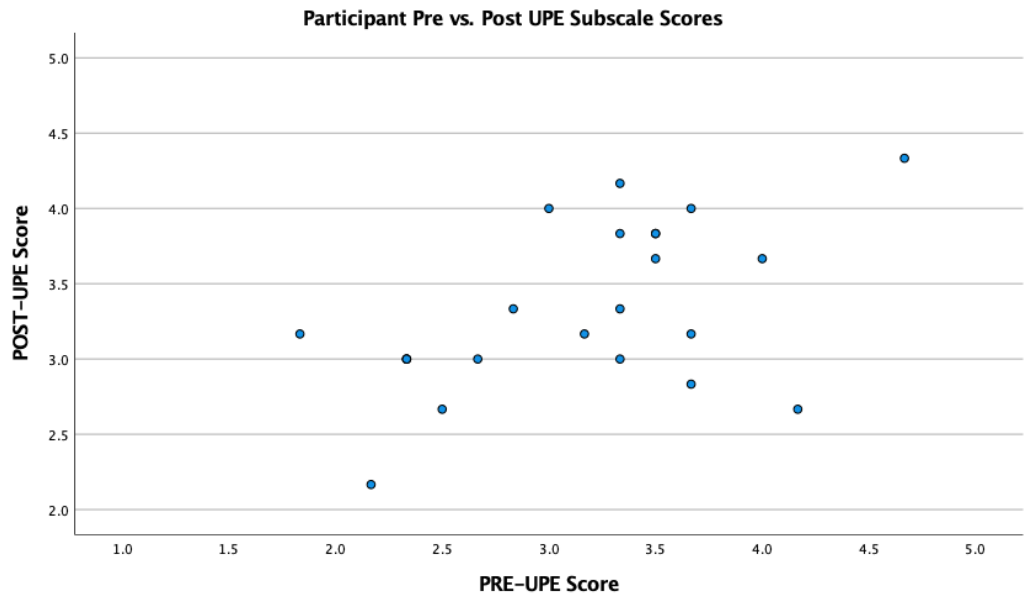
4.3 Grades and Changes in IES-2 Scores

Of the 23 participants included in analyses, 12 students received an 'A' grade in the class. Results indicated that students who received an 'A' as the final grade in the course were significantly more likely to experience a positive change in the total IES-2 score ($p=0.029$). Similarly, a statistically significant positive association was seen between students who attained an 'A' grade in the nutrition course and score increases for the UPE ($p=0.029$) and EPR subscales ($p=0.026$). No significant association was seen between student grades and the RHC or BFC subscale scores. There were no significant associations between other grades and IES-2 scores.

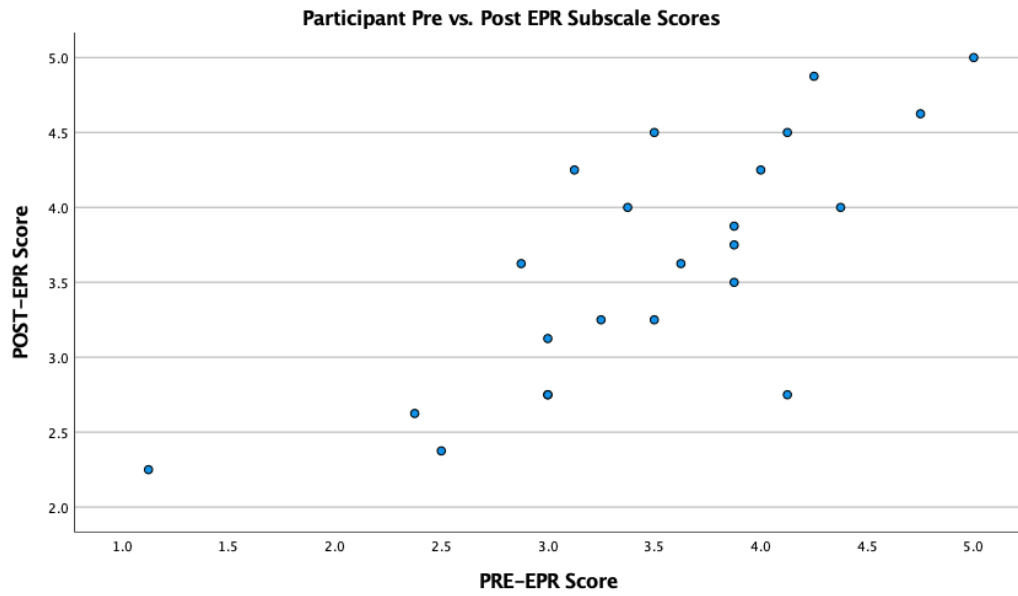
A.



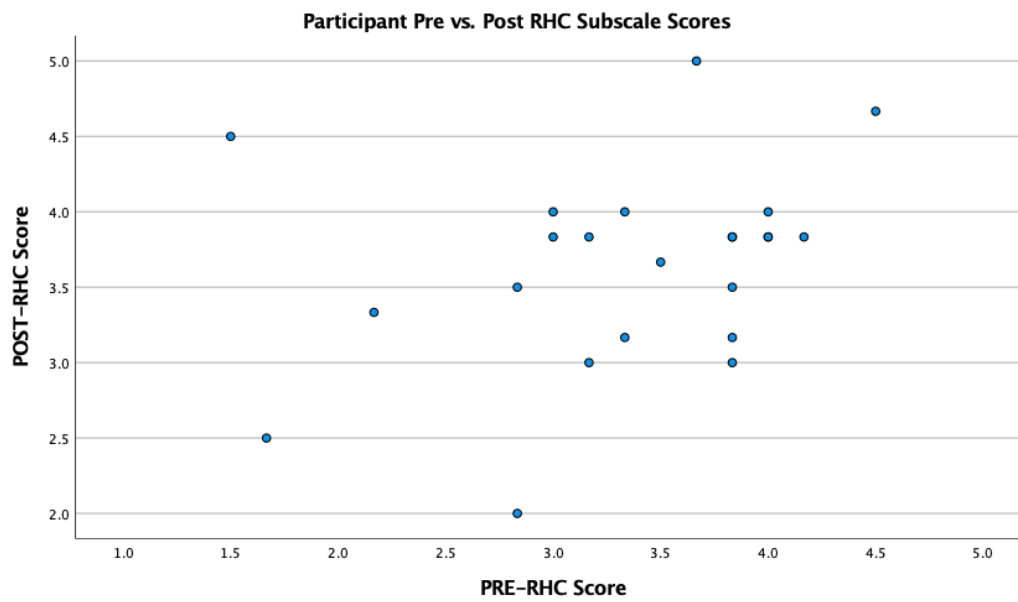
B.



C.



D.



E.

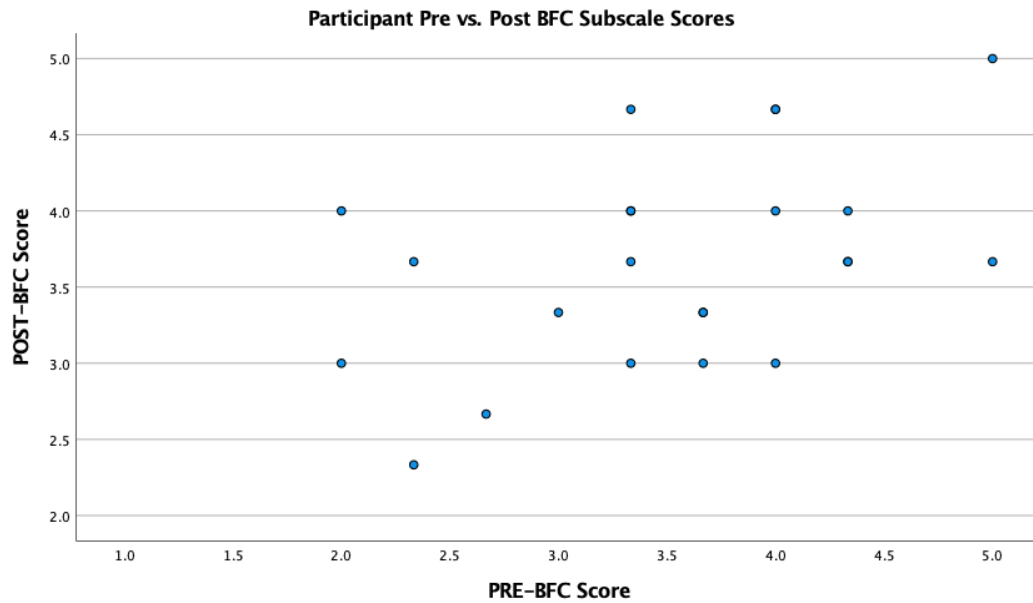


Figure 2

Mean Pre- vs. Post-IES-2 Scale and Subscale Scores for Each Individual Participant

Note. A positive correlation is shown with an average increase in scores from baseline to follow-up. Plot A. depicts each participant's mean pre- vs. post- total-IES-2 scale (TIES) scores. Plot B. shows each subjects mean pre- vs. post-IES-2 scores for the first subscale, unconditional permission to eat (UPE). Plot C. depicts each individual's mean pre- vs. post-IES-2 scores for the second subscale, eating for physical rather than emotional reasons (EPR). Plot D. shows each participant's mean pre- vs. post-IES-2 scores for the third subscale, reliance on internal hunger/satiety cues (RHC). Plot E. depicts each subject's mean pre- vs. post-IES-2 scores for the fourth subscale, body-food choice congruence (BFC).

Table 2*IES-2 Mean Scores and Paired Upper Tailed t-test Results*

IES-2 Scales	Pre-Survey (n=23)	Post-Survey (n=23)	Change	95% CI	P Value
TIES	3.38 (0.48)	3.56 (0.39)	0.19 (0.42)	[0.01-0.37]	0.022*
UPE	3.17 (0.7)	3.34 (0.55)	0.17 (0.63)	[-0.1-0.44]	0.098
EPR	3.5 (0.85)	3.63 (0.81)	0.13 (0.57)	[-0.12-0.38]	0.143
RHC	3.35 (0.77)	3.64 (0.66)	0.3 (0.85)	[-0.07-0.67]	0.055
BFC	3.52 (0.85)	3.67 (0.68)	0.14 (0.82)	[-0.21-0.5]	0.202

Note. The IES-2 total and subscale scores are averaged based on a 5-point Likert scale ranging from 1=strongly disagree to 5=strongly agree. Average scores range from one to five where higher scores relate to greater implementation of intuitive eating practices. Data are presented as mean (SD). * $p \leq 0.05$. *IES-2= Intuitive Eating Scale-2, TIES= Total IES-2 scale, UPE= unconditional permission to eat subscale, EPR= eating for physical rather than emotional reasons subscale, RHC= reliance on internal hunger/satiety cues subscale, BFC= body-food choice congruence subscale, CI= Confidence Interval.*

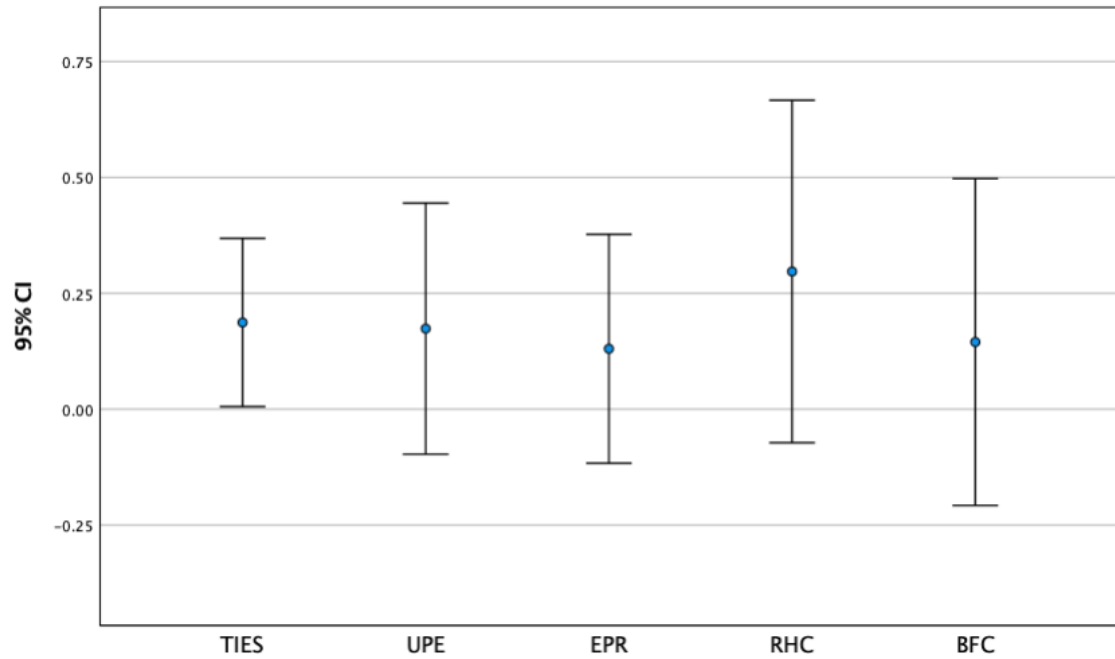


Figure 3

95% CI for the Differences Between Pre- and Post-IES-2 Survey Means

Note. Mean total IES-2 scores (TIES) significantly increased from baseline to follow-up ($p=0.022$). No significant changes in subscale scores occurred.

Chapter 5

DISCUSSION

The present pilot study examined how the incorporation of evidence-based IE principles into the curricula of a 16-week online introductory college nutrition course impacted the eating behaviors of students. Associations between final student grades in the course and changes in student eating behaviors were explored as a secondary outcome. Outcomes were examined by comparing mean baseline and post-treatment IES-2 survey scores.

The results of the study showed a statistically significant increase in mean total IES-2 scores over the 16-week course, suggesting that students' use of IE practices increased after receiving education on IE principles. However, no significant results were detected for any of the four subscales measured, indicating that these areas may be important to highlight more intensely in future curricula and research. It is possible that the total IES-2 scores increased significantly, while the subscales did not because the intervention was implemented in an introductory course introducing IE alongside other nutrition principles, rather than deeply examining and exploring each IE subscale topic in depth. It is positive to observe the mean total IES-2 scores significantly increase indicating students were able to grasp the concepts of IE enough to implement some eating behaviors related to IE principles. Based on the lack of significance found in changes between mean subscale scores, there is room for improvement in course education to focus more on principles related to these subscales. It may also be beneficial for future research to explore the effectiveness of classes dedicated specifically to education of IE, where each subscale would be discussed in detail.

Results of secondary analyses in the present study showed a significant association between student grades and changes in their total IES-2, UPE and EPR scores, although no significant correlation with the RHC and BFC subscales. More specifically, the secondary outcome results demonstrated that students who attained an 'A' grade, or $\geq 93\%$, at the end of the course were significantly more likely to practice IE behaviors compared to students who did not

receive an 'A'. As grades are reflective of course participation and assignment completion, this likely indicates that a greater understanding of IE lectures and assignment completion lead to greater changes in eating practices. The IE principles were discussed in lecture, but students who also completed more assignments, which included assignments targeted at IE, had more opportunity for IE principles to be instilled and put into practice compared to students who did not participate in assignments and/or lecture and therefore received lower grades in the course. This relates to the assumption that more course interaction and participation is measured by an increase in course grade, and higher grades were significantly correlated to greater use of IE practices. It is also possible that some of the lectures and/or assignments had more information related to the UPE and EPR subscales causing these scores to show a significant association to course grades, compared to the RHC and BFC subscales. This may indicate a need to examine lectures, discussion prompts and assignments more closely, and to alter them to ensure information related to all subscales are covered equally.

Results of the present study are important because previous research shows that IE avoids promotion of weight stigmatization and weight bias, without perpetuating disordered eating behaviors, negative body image, anxiety, and depression, all of which impact health (Van Dyke, 2014). This is especially important for college students enrolled in introductory health courses, many of whom are in healthcare related studies and will continue on to become healthcare professionals. Many kinesiology majors, for instance, who made up 65% of the analyzed population in the present study, go on to work in healthcare professions as physical therapists, occupational therapists, registered dietitians, medical doctors, physicians assistants, personal trainers and more. There is a likelihood of increasing their ability to recognize weight bias and decrease their risk of instigating it by educating these future healthcare professionals about weight-neutral approaches to health such as IE. The increase in mean total IES-2 scores in the present study indicates that participants increased IE behaviors, which is beneficial because IE

behaviors have been correlated to important factors related to health (Van Dyke, 2014; Tribole, 2019; Christoph, 2021).

A systematic review of 18 articles by Clifford (2014) similarly examined the effect of non-diet, weight neutral interventions and analyzed outcomes including biochemical measures, weight, body image, mental health, and food and activity behavior. Populations examined in the review included women with disordered eating behaviors ages 18-65 years, overweight and obese females, overweight and obese binge-eating females, premenopausal overweight and obese females, worksite wellness males and females, college males and females, and overweight and obese males and females ages 35-65 years with T2DM. Articles included in the review involved college settings, individual counseling and online education, and group classes in community and worksite settings. All studies evaluated non-diet interventions that included but were not limited to, IE, HAES, and mindful eating, with quasi-experimental or randomized study designs, and a comparison or a control group. The majority of the studies reviewed (88%) incorporated interventions involving a series of group classes ranging from 50-minutes to 18-months, with most lasting 8-16-weeks. The present study was similar to the studies reviewed by Clifford (2014) in that education of IE principles occurred in multiple group sessions held over a 16-week course. However, only one study reviewed in the Clifford (2014) article, by Greene and colleagues (2011), utilized an online intervention similar to the present study, with all other studies reviewed engaging in face-to-face interventions.

Clifford (2014) notes that the various weight-neutral interventions led to statistically significant improvements in self-esteem, depression, and disordered eating, while none of them resulted in significant weight gain, or worsening of blood glucose, cholesterol, or blood pressure. Some of the tools used to evaluate these outcomes included, but were not limited to, the Body Satisfaction Scale (BSS), Body Image Avoidance Questionnaire (BIA-Q), Center for Epidemiologic Studies Depression Scale (CES-D), Dichotomous Thinking Scale (BTS), Binge Eating Scale (BESc), Eating Disorder Inventory (EDI), Restrained Eating Scale (RES), General

Health Questionnaire (GHQ), Intuitive Eating Scale (IES), and the Exercise Thoughts Questionnaire (ETQ). These results are important as they add to evidence suggesting IE improves health behaviors and psychological well-being, while aiding in weight maintenance, although not necessarily weight loss (Van Dyke, 2014).

A study similar to the present study also found increases in total IES-2 scores after implementing HAES weight-neutral teachings into a basic nutrition course (Humphrey, 2015). Humphrey (2015) examined college students whose average ages were between 19-23 years, with the majority of participants being female, freshman and sophomores in college, and with BMIs between 23 and 25. The present study also contained a majority of females; however, most students were juniors and seniors in contrast to the Humphrey (2015) study. Humphrey (2015) compared IE outcomes in a HAES class versus both a control and a comparison group. Teachings in the HAES class incorporated similar topics to the present study, such as IE, mindful eating, analysis of weight loss research, size discrimination, diet culture, HAES, eating competence, and body image. However, Humphrey (2015) also addressed bariatric surgery and the economic impact of the diet industry on individuals, where the present study did not. Results of the Humphrey (2015) study showed significant increases in total IES-2 scores and in the EPR and BFC subscale scores, while results in the present study showed no significant changes among any subscale scores. This may be related to differences between the two studies, such as Humphrey (2015) using a larger sample size (n=149) and having a face-to-face mode of education. It is possible the larger sample size created greater power to achieve significant results compared to the present study which analyzed a sample size 85% smaller (n=23). Humphrey (2015) also utilized a control and comparison group and reported that the total IES-2, UPE, and EPR scores in the HAES group increased significantly compared to the two other groups. The present study did not use a control group for comparison, therefore it is not known how scores in the present study would compare to a group that did not receive the same intervention.

Humphrey (2015) used additional survey tools including the Cognitive Behavioral Dieting Scale (CBDS), the Body-Esteem Scale (BES) and the Anti-fat Attitudes (AFA) questionnaire to examine current dieting behaviors, components of body esteem, and anti-fat prejudice respectively. The present study did not use other survey tools to explore outcomes outside of IE. Students in the HAES class of the Humphrey (2015) study showed significant decreases in pre- to post-CBDS scores and in scores compared to the control and comparison groups, meaning dieting behaviors significantly decreased. Additionally, the HAES class experienced significant increases in BES scores from pre- to post-tests and compared to the control and comparison groups, meaning body-esteem significantly increased. Lastly, the students AFA scores in the HAES class significantly decreased compared to the control and comparison groups, and from pre-to post-tests, indicating a significant decrease in anti-fat prejudice. The additional surveys used in the Humphrey (2015) study enabled the examination of other valuable topics that are typically discussed in weight-neutral approaches to health. The present study is a pilot study and only used the IES-2 survey for assessment, however, research is continuing and may benefit from incorporation of these additional assessment tools to broaden the applicability of results.

Research related to weight-neutral approaches to health often cite health improvement; however, few studies have directly compared this to weight-loss approaches. Mensinger and colleagues (2016) completed a RCT in eighty, obese (BMI 30-45), physically inactive women, ages 30-45 years, comparing 6-month, group-based, weight-neutral to weight-loss approaches to health education. Each cohort met for 90-minute sessions, once weekly on a weekday evening. As in the present study, Mensinger (2016) measured IE using the IES survey, although the original, 21-item IES developed by Tylka in 2006 was used, whereas the present study made use of the revised, 23-item IES-2 developed by Tylka and Van Deist in 2013. Additional outcomes analyzed by Mensinger (2016) that differed from the present study included BMI, weight, blood glucose, blood pressure, lipid panels, waist and hip circumference, distress, self-esteem, quality of life,

dietary risk, fruit and vegetable intake, and physical activity. Data collection methods in the Mensinger (2016) study assessed blood samples, the Rosenberg Self Esteem Scale (RSE), the Depression Anxiety Stress Scale (DASS-21), the Quality of Life (QOL) questionnaire, and the Dietary Risk Assessment (DRA). Similar to the present study, the weight-neutral group emphasized eating for wellbeing and pleasure, size acceptance, and engagement in physical activity for personal enjoyment, with education promoting strategies to recognize and respond to internal hunger and fullness cues to determine food intake. The weight-loss cohort focused on diet and lifestyle changes to overcome weight-loss barriers and included food intake recommendations focused on external prescriptions and caloric restriction with weight-loss as an explicit goal (Mensinger, 2016).

Results of the Mensinger (2016) RCT demonstrated that the weight-neutral group had greater reductions in LDL-cholesterol and more improvement in IE, while the weight-loss group experienced greater reductions in weight and BMI. Both groups demonstrated positive health changes in total cholesterol, physical activity, fruit and vegetable intake, self-esteem, quality of life, and waist-to-hip ratio, adding to the support of weight-neutral approaches in promoting positive health outcomes, in addition to the typically practiced weight-loss approaches. Mensinger (2016) demonstrated that focused health education groups are effective methods of promoting positive health behaviors using weight-neutral approaches, in addition to the college setting in the present study that also showed improvement in IE. Data related to weight and BMI in the present study were not analyzed, therefore it is unknown whether the present study's participants were of comparable weights to those in the Mensinger (2016) study. The additional information collected by Mensinger (2016) enables readers to critically think about other health parameters impacted by weight-neutral and weight-loss approaches to health and therefore may be valuable to include as ongoing data collection continues building on the present pilot study. Mensinger (2016) examined all obese individuals raising questions as to the degree of effectiveness of weight-neutral approaches among individuals with BMIs in other categories who may experience varying levels

of weight stigma and other previously described physiological and psychological differences compared to those in the obese weight category.

One such study by Denny et al. (2013) explored IE according to BMI categories, drawing data from a population-based study called Project EAT-III, including over 2200 participants with both males (45.2%) and females (54.9%) and a mean age of 25.3 years. Unlike the present study, IE was assessed with the original IES (Tylka, 2006) and BMI was calculated from self-reported height and weight data. No significant differences occurred in IE by age, gender, or socioeconomic status; however, IE was more common in individuals with BMIs in the normal or underweight categories and trended down as BMI increased. The Denny (2013) study would suggest that IE is more prevalent in lower-weight individuals despite no intentional education related to the topic, therefore it is possible higher-weight individuals may gain more benefit from intentional education related to weight-neutral approaches to health. The relationship between BMI and IE observed by Denny (2013) highlights a positive reason for collecting data related to weight, despite analyzing approaches to health that do not emphasize weight, as in the present study. As the present study continues, data should be collected related to participants' baseline physical and psychological characteristics to expand analysis to potential relationships between IE and those data.

Another study exploring IE outcomes by Craven et al. (2019) examined the relationship between weight-related shame and guilt and binge eating symptomatology, and investigated whether IE was a protective factor in the relationship. Participants were all female college students with a mean age of 20 years, and the majority identified as non-Hispanic white, full-time students. Most participants were also freshman and sophomores, with BMIs in the normal range. Demographics in the Craven (2019) study were similar to the present study in that both involved undergraduate college students made up of mainly, or all females. The Weight-and-Body-Related Shame and Guilt Scale was used in the Craven (2019) study to examine weight-related shame and guilt, and binge eating symptomatology was measured using the Binge Eating Scale (BESc).

Similar to the present study, Craven (2019) used the IES-2 survey to evaluate IE practices. After controlling for BMI, year in school, annual income, and living arrangement, Craven (2019) found that weight-related shame and guilt was associated with greater binge eating symptomatology, and that higher total IES-2 scores were correlated with more IE practices, which attenuated binge eating and weight-related shame. This shows that IE may have a protective effect for women who experience weight-related shame, and for binge eating behaviors that may result from that shame. The Craven (2019) study is crucial because its evidence connects IE to reductions in ED and disordered eating behaviors. While the present study did not examine the relationship between IE behaviors and ED symptoms, both studies' results are important because they involve the college population who are at an increased risk for mental health and disordered eating problems, which IE has been shown to attenuate (Craven & Fekete, 2019).

A recent study by Wilson et al. (2020) also explored the effects of IE behaviors in university students and was designed to help participants reject unhealthy dieting behaviors, and increase body acceptance and healthy eating. Participants consisted of 94 university women, ages 18-30 years, with a mean BMI of 23.8. Wilson (2020) analyzed rates of dieting, IE, body image, eating concerns, dietary intake, anti-fat attitudes, and mental health related quality of life at baseline, post-treatment, and one-month follow-up. Tools used to measure these outcomes included the Weight Loss Behavior Scale (WLBS), the original IES, the Body Shape Questionnaire (BSQ), the Eating Attitudes Test-26 (EAT-26), the PrimeScreen (PS), the Anti-Fat Attitudes Questionnaire (AFA), and the Short-Form-12 (SF-12) respectively. The Wilson (2020) study consisted of an intervention group that received two 90-120-minute group sessions where participants were taught IE skills, and healthy eating was introduced as an alternative to unhealthy dieting. Similar to the present study, participants also learned to create and modify balanced meals using the USDA MyPlate guidelines along with how to use hunger signals to guide eating. The control group received an educational brochure on body image and on the USDA MyPlate guidelines which were intended to mimic typical nutrition guidelines reflected to college students.

The Wilson (2020) study incorporated fewer education sessions than the present study, however, results in the Wilson (2020) study showed that compared to the control group, the intervention group demonstrated significant improvements in IE that were maintained at the one-month follow-up. This indicates that various ranges of IE education frequency and duration may be effective at improving IE behaviors. Additional significant improvements observed and maintained at the one-month follow up in the Wilson (2020) intervention group compared to the control group included measures of body image dissatisfaction, dieting intention, eating concerns and anti-fat attitudes. Both groups saw improvements in dietary intake and mental health-related quality of life across conditions suggesting the use of educational brochures for the control group may also impact health behaviors. Wilson (2020) suggests that improvement in IE is one of many health parameters that can be improved with education on non-diet, weight-neutral approaches to health. Similar to the present study, Wilson (2020) observed an improvement in IE practices after educating participants on IE principles and having them complete assignments that incorporated those principles.

The present study examined changes in IE behaviors with the implementation of education of IE principles with the intention of relating results to changes in health behaviors. A study by Christoph and colleagues (2021) connected increased IE practices with the well known health behavior of increased fruit and vegetable intake. Data in the Christoph (2021) study was collected from a longitudinal cohort called Project Eating and Activity in Teens and Young Adults, that followed male and female adolescents into adulthood, and included over 1800 participants with a mean age of 31 years. Intuitive eating was assessed using a 7-item scale adapted from the IES and IES-2 surveys, unlike the present study which used the entirety of the IES-2. Dietary intake data was recorded via a semiquantitative food frequency questionnaire (FFQ) with one-half cup defining a daily serving for fruits and vegetables individually. Results demonstrated that women in the top quartile of IE consumed 0.4 servings more vegetables and 0.6 servings more fruit compared to those in the bottom quartile, and men in the top IE quartile

consumed 0.6 servings more vegetables and 0.3 servings more fruit compared to the bottom quartile. No significant associations were observed between IE quartiles for males or females related to the mean daily intake of dairy, protein, total fat, saturated fat, calories, or sugar-sweetened beverages. Men in the top IE quartile also consumed significantly fewer whole grains (0.6 servings) compared to the bottom quartile; however, no significant difference in whole grain intake was observed for the women between quartiles. Fruit and vegetable intake is considered a health behavior as it relates to increased consumption of necessary vitamins and minerals; therefore, findings that increased IE is significantly related to increased fruit and vegetable intake supports the idea that IE promotes health behaviors (Christoph, 2021). These findings relate to the present study which examined changes in IE behaviors and supports the notion that an increase in IE behaviors relates to increases in health behaviors.

The present study contained limitations inherent to most pilot studies, including a small sample size, with the intervention being disseminated during one semester, across one cohort of students. However, data collection is ongoing, therefore these issues will be remedied with time. The intervention was also completed during a global pandemic, which could have had a large impact on online learning engagement and creates a confounding factor when analyzing the efficacy of online versus in-person learning. Continued data collection will provide more information that compares learning in pandemic vs. non-pandemic conditions, with the addition of comparisons between face-to-face and online education modalities. Another limitation of the present study involved the majority of participants being female college students, which hinders the ability of the results to be generalizable to broader populations. This research also lacked a control group for comparison which would be helpful in the future to explore differences in outcomes of IE understanding and implementation. Additionally, the present study focused solely on IE outcomes and therefore only used one validated measurement tool to compare pre- and post-outcomes. Future research should include comparisons of multiple defined non-diet,

weight-neutral approaches, with the use of respective validated and reliable measurement tools to explore differences in the efficacy of approaches.

In this particular pilot study, no information was collected regarding quality of life or mental health status in an attempt to reduce the time burden on participants and to avoid potential increases in psychological stress by asking students to divulge sensitive information. Although dietary intake, physical activity, weight and data related to emotions and environments around eating was collected, it was not analyzed for the present study due to time constraints.

Additionally, due to time and funding limitations, the present study lacked biochemical data such as blood samples that could have provided supplementary information related to health, diet and stress from a biological perspective. Future research should incorporate this information which could provide a better understanding as to if and how the increases in IE practices impacted physiological and psychological aspects of participants' lives. Validated survey tools, such as those listed in the Wilson (2020) study, would be good additions to incorporate that information.

Despite these limitations, the benefits of increased IE practices are clearly defined in the literature and this study demonstrated that incorporating these principles into an introductory nutrition class is an effective way to improve the implementation of IE in college students. Information related to biochemical data, dietary intake, physical activity, stress level, and body image would improve upon the current findings and collection of such information is encouraged for future research.

Chapter 6

CONCLUSION

The present study focused on providing education about a weight-neutral, non-diet approach to health which allowed for improvement in IE practices and eating competence among undergraduate college students. IE is considered a health behavior and has been shown to improve other health behaviors; therefore, the results of the present study are important as they indicate that health education explaining IE principles can improve IE practices and therefore improve the health behaviors of individuals (Clifford, 2014).

Previous research suggests that adopting IE practices can improve psychological (i.e. emotional health, self-esteem, body satisfaction, body image) and behavioral (i.e. binge eating, disordered eating, ED) factors (Clifford, 2014; Wilson, 2020). The present study and similar studies highlight the benefits of incorporating weight-neutral, non-diet perspectives to health education compared to focusing exclusively on weight management (Humphrey, 2015; Mensinger, 2016). While weight can be one feature of health status, there are many aspects that play a role in the overall health of an individual. It is important to shift focus toward healthy lifestyle behaviors and disease prevention, rather than focusing exclusively on weight which promotes dieting and caloric restriction and increases risk for disordered eating and EDs (Bombback, 2014; Hunger et al., 2015; Tribole, 2019).

The results of the present study suggest that adding education regarding evidence-based IE principles to an online introductory nutrition course is an effective way to significantly increase total IE habits within a college student population. While future research is warranted, college health education courses are a good platform to continue teaching non-diet, weight-neutral approaches to health, including IE, for the improvement of health behaviors.

Chapter 7

AUTHOR CONTRIBUTIONS

Kira Minot contributed to the conception of the work, participated in study design, analyzed data, and wrote the manuscript. Taylor Bloedon contributed to the conception of the work, participated in study design, and implemented the intervention. Kari Pilolla contributed to the conception of the work, study design, and critically revised the manuscript. Cindy Heiss contributed to revisions of the manuscript. All authors contributed to the article and approved the submitted version. Chelsea Campbell retrieved permission to use the tool, set the coding for the survey, and provided a guest lecture covering all IE principles to participants. Heather Smith contributed to the statistical analyses.

Chapter 8

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Chapter 9

CONFLICT OF INTEREST

The author has no conflict of interest to disclose.

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APPENDIX A

IE Principles

IE Principle	Description
1. Reject the Diet Mentality	Let go of the messages that promote weight loss and lead to feelings of failure when the diet stops working and/or weight is regained. Holding on to the idea that the next new diet will work better will prevent freedom to discover IE (McKayla, 2018; Tribole & Resch, 2019).
2. Honor Your Hunger	Keep your body nourished with appropriate energy and carbohydrates. Restriction can lead to increased hunger and a drive to overeat. Learning to honor the first physical signal of hunger helps to rebuild trust with your body, it's signals and food (Tribole, 2012; Tribole & Resch, 2019)
3. Make Peace with Food	Practice unconditional permission to eat. Restricting a food, or telling yourself you can't, or shouldn't have it, can lead to feelings of deprivation and increased desire for that food. This can lead to overeating the forbidden food due to fear there will not be permission in the future (Mann, 2001; Tribole & Resch, 2019).
4. Challenge the Food Police	The food police monitor unreasonable rules created by diet culture. Challenge thoughts that define your identity as a good or bad person based on the food choices you make (Spear, 2006; Tribole & Resch, 2019).
5. Discover the Satisfaction Factor	Eating is more than fuel in vs. fuel out. It relates to culture, experience, connection, and more. Eating what you really want, in an inviting environment increases satisfaction. This experience allows for the ability to notice when comfortably satiated (Satter, 2007; Tribole & Resch, 2019).
6. Feel Your Fullness	Listen to the body signals that tell you your body is both satisfied and satiated. Notice what comfortable fullness feels like and honor that feeling with the foods you desire. Pause while eating to ask yourself how the food tastes and what your level of hunger and fullness is (Schaefer, 2014; Tribole & Resch, 2019).
7. Cope with Your Emotions with Kindness	Physical and mental food restriction can trigger loss of control and feel like emotional eating. Find kind ways to nurture, comfort, and make peace with your issues. Negative emotions are a normal part of life. Food will not fix these feelings, or solve the source of the problem. Ultimately, you will have to face the source of the emotion

	directly (Pullmer, 2019; Tribole & Resch, 2019).
8. Respect Your Body	Accept your genetic blueprint. It is hard to reject the diet mentality while overly criticizing your body and having unrealistic expectations. Just as a person with a size 8 shoe size would not expect to fit into a size 6 shoe, it is equally uncomfortable and futile to have a similar expectation about body size (Cohen, 2019; Tribole & Resch, 2019).
9. Movement- Feel the Difference	Get active and feel the difference between joyful movement and forced movement. Notice how exercise feels in your body, rather than its calorie-burning effect. Notice when you feel uplifted and energized compared to depleted. Forget militant exercise and start enjoying how you feel when you are moving (Saeed, 2019; Tribole & Resch, 2019).
10. Honor Your Health- Gentle Nutrition	Make food choices that honor your taste buds and health while allowing you to feel good. There is no perfect diet and you don't have to eat perfectly to be healthy. One snack, one meal, or one day of eating will not cause a nutrient deficiency or make you unhealthy. Instead, it is what you eat over time that counts, so strive for progress, not perfection (Van Dyke, 2014; Tribole & Resch, 2019).

APPENDIX B

Intuitive Eating Scale-2 (IES-2)

Directions for participants: For each item, please check the answer that best characterizes your attitudes or behaviors.

1. **I try to avoid certain foods high in fat, carbohydrates, or calories.**

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

2. **I have forbidden foods that I don't allow myself to eat.**

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

3. **I get mad at myself for eating something unhealthy.**

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

4. **If I am craving a certain food, I allow myself to have it.**

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

5. **I allow myself to eat what food I desire at the moment.**

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

6. **I do NOT follow eating rules or dieting plans that dictate what, when, and/or how much to eat.**

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

7. **I find myself eating when I'm feeling emotional (e.g., anxious, depressed, sad), even when I'm not physically hungry.**

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

8. **I find myself eating when I am lonely, even when I'm not physically hungry.**

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

9. **I use food to help me soothe my negative emotions.**

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

10. **I find myself eating when I am stressed out, even when I'm not physically hungry.**

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

11. **I am able to cope with my negative emotions (e.g., anxiety, sadness) without turning to**

food for comfort.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

12. When I am bored, I do NOT eat just for something to do.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

13. When I am lonely, I do NOT turn to food for comfort.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

14. I find other ways to cope with stress and anxiety than by eating.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

15. I trust my body to tell me when to eat.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

16. I trust my body to tell me what to eat.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

17. I trust my body to tell me how much to eat.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

18. I rely on my hunger signals to tell me when to eat.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

19. I rely on my fullness (satiety) signals to tell me when to stop eating.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

20. I trust my body to tell me when to stop eating.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

21. Most of the time, I desire to eat nutritious foods.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

22. I mostly eat foods that make my body perform efficiently (well).

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

23. I mostly eat foods that give my body energy and stamina.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

APPENDIX C

Course Syllabus

Cal Poly Humboldt
College of Professional Studies
Department of Kinesiology and Recreation Administration
HED 231: Basic Nutrition, 3 units, Online

Instructor: Taylor Bloedon, PhD., RD., CSSD

Phone Number: 826-5967

Email: tkb95@humboldt.edu

Office Hours: By Appointment

Office Location: KA 326

Course Description- Catalog

Nutrient requirements for healthy living. Analyze food sources, the function of nutrients, chemical processing, and food absorption.

Required Material

MyDietAnalysis software package purchase. Make sure to select “Buy Access”. You DO NOT need a course code if you purchase through this site. The program is \$30 and you do need it to pass the class.

Strongly Recommended Text

Textbook: Blake (2017) From Science to You, 4th Edition Benjamin-Cummings Publishing Company. [e-text available](#)

- You can also use the new version Blake (2015), Nutrition: From Science to You, 3rd Edition Benjamin-Cummings Publishing Company

Prerequisites

None. Chemistry 107 or 1A is beneficial.

Student Learning Outcomes

The Cal Poly Humboldt curriculum has Institutional Learning Outcomes (ILOs) that ensure that all graduating students will achieve competence in the seven areas of concentration which can be found [here](#). Additionally, the Kinesiology Program Learning Outcomes (PLOs) ensure that Kinesiology students will achieve competence in the four areas of concentration that can be found [here](#). The ILOs and PLOs this course will meet are outlined below.

HED 231 Course Student Learning Outcomes (SLOs)

Upon completion of this course, students will be able to:	Discussions	Quizzes	Diet Analysis Project	ILOs and PLOs met
SLO #1: Identify, compare, and use different guidelines, patterns, and plans for assessing and ensuring nutritional adequacy for optimal health for self and others.	X	X	X	PLO4, ILO4, ILO7

SLO #2: Describe the physiological and metabolic signals that determine and regulate food intake, metabolism, and function in the body and the organs supporting such processes from the initial thought of food to evacuation.	X	X	X	PLO2, PLO4,
SLO #3: Apply the principles of nutrition to daily food selection throughout the lifecycle for yourself and to those under your care.	X	X	X	PLO2, PLO4, ILO4
SLO #4: Evaluate food fads, trends, and resources for accuracy, reliability, validity, and identify potential harm using a sound scientific rationale.	X	X	X	PLO2, PLO4, ILO4, ILO5
SLO #5: Identify major nationwide and worldwide concerns and trends related to nutritional well-being, including food safety and sustainability.	X	X		PLO2, ILO2, ILO4

Class Policies

*** Given the sensitive nature of some of the material discussed in this course, it is important that we embrace an open, accepting, and inclusive atmosphere where we are encouraged to be true and honest to our beliefs, emotions, and viewpoints, while maintaining respect and holding space for other beliefs, emotions, and viewpoints, without fear of ridicule or retaliation. All are welcome! ***

1. Students are required to check Canvas for class announcements and are responsible for any information and/or assignments posted on Canvas. **NO EXCEPTIONS!**
2. All assignments must be completed in the format outlined, professionally written unless otherwise specified. Points will be deducted for format, spelling and grammatical errors, when specified, discussions will not be graded for grammar.
3. Learning through collaboration (defined as working with or receiving assistance from another) is an effective tool used in this class and in your future employment. When I expect you to collaborate, I will make it very clear in the assignment instructions. All other work in this class is to be done independently.
4. If you have an emergency, please notify me immediately if this affects your coursework or attendance. I will consider late work in an equitable way. Please note that you may be deducted full or partial points for late work.

Expectations of the Instructor

If we all live up to our academic responsibilities, this course will be meaningful for all who participate. Please feel free to discuss these points with me at any time during the course this semester.

1. I will prepare and review course materials to be as current and accurate as possible.
2. I will be available to answer questions or issues that may arise for you during this course. Expect an email response within 48 hrs. Monday through Friday.
3. I will try to the best of my ability to prepare you for the exams and other assessments in this course.
4. I will utilize fair and honest evaluation techniques for each assignment required for this

- course.
5. To the best of my ability, make this a valid and worthwhile learning experience.
 6. I will do my best to address the needs of a diverse range of learning styles in this course.
 7. I will make every effort to follow QLT (Quality Learning and Teaching) best practices.
 8. I will only share your student information per FERPA guidelines.

Expectations of the Student

1. **Take ownership of your learning!** Attending college is a choice. Make the most of your choice and realize you are expected to study and put work into the course outside of standard course hours.
2. Log onto the Canvas every Monday.
3. Expect to log onto the course a minimum of 3 days/week.
4. Read/watch the course material and schedule time to work on material as if we are meeting in person
5. Complete initial Discussion post by Wednesday and at least 2 follow-up posts by Sunday each week.
6. Set notifications in profile for course updates (see [Preparing for Successful Online Learning](#) for instructions)
7. Read Course Announcements
8. Prepare to the best of your ability for every aspect of this course.
9. Take the opportunity to learn how to write your own thoughts; do not plagiarize. Be sure to give credit where credit is due and cite your sources or use footnotes or endnotes.
10. Exhibit mature conduct (refer to [Discussion](#) and [Netiquette Guidelines](#)) on Canvas

****Additional policies and resources found on Canvas under the Resources tab.****

OTHER IMPORTANT UNIVERSITY POLICIES AND SERVICES

1. Please review [Cal Poly Humboldt Campus Policies, Services, and Resources](#)
2. Please familiarize yourself with [Cal Poly Humboldt Academic Honesty Policy](#) . While working collaboratively can be helpful in the learning process and is encouraged, most of the work in this course should be done independently. Please submit your own work and refrain from sharing the online quiz material on any online platform or other answers from assignments as it is considered a form of academic dishonesty. I do not anticipate any issues with academic dishonesty, though if any concerns do arise, I will follow outlined procedures for academic dishonesty.
3. Students will be expected to complete an instructor/course evaluation form. This is a course requirement and students are expected to complete this requirement in a timely fashion. More information will be provided later in the semester.

***If you are having difficulty affording groceries, accessing sufficient food to eat every day, or lack a safe place to sleep at night, and believe this may affect your performance in this course, then I urge you to notify me if you are comfortable in doing so. This will enable me to provide you with resources. You may also contact the [Campus Assistance Response and Engagement \(CARE\)](#) , [Oh SNAP! Student Food Programs](#)*

*** This course was built with accessibility in mind. However, if you discover something in the course that is not as accessible as it could be, please alert your instructor as soon as possible.*

Evaluation, and Grades

You will be able to track your grade throughout the course using the "Grades" link in the course navigation on the left side. If you have any questions about your grade, contact the instructor promptly. Please read the [Grading Policy](#) page for additional information. If you have any questions about your grade, contact the instructor promptly.

Grading Scale

Letter Grade	Overall Course Percentage
A	93-100%
A-	90-92.9%
B+	87-89.9%
B	83-86.9%
B-	80-82.9%
C+	77-79.9%
C	73-76.9%
F	72.9% and below

Additional information about assignments and course expectations is available on Canvas

Tentative Semester Calendar

Week	Reading/Topic
1	Introduction Chapter 1: Nutrition Basics
2	Chapter 1: Nutrition Basics Chapter 2: Tools for Healthy Eating
3	Chapter 3: Digestion, Absorption, and Transport
4	Chapter 4: Carbohydrates
5	Chapter 5: Lipids
6	Chapter 6: Proteins
7	Chapter 7: Alcohol

8	Chapter 8: Energy Metabolism
9	Chapter 9: Fat-Soluble Vitamins
10	Chapter 10: Water-Soluble Vitamins
11	Chapter 11: Water
12	Chapter 12: Minerals Chapter 13: Trace Minerals
13	Chapter 14: Energy Balance and Body Composition
13	Chapter 15: Weight Management
14	Chapters: 17, 18,19: Lifecycle Nutrition
15	Chapter 20: Food Safety

APPENDIX D

IE Principles Discussed by Week

Weekly Topic	IE Principles Covered	Method of Discussion/Evaluation
Nutrition Basics	None	N/A
Tools for Healthy Eating	1, 8	Discussion
Digestion, Absorption and Transport	2, 6	Lecture Assignment: Mindful Eating
Carbohydrates	3, 4	Lecture
Lipids	2, 6, 7, 10	Lecture Discussion Assignment: 3-Day Mindful Eating Food Log
Protein	None	N/A
Alcohol	7, 8, 10	Lecture Discussion
Energy Metabolism	4, 5, 9	Lecture Project: 3-Day Food Log + Diet Analysis
Fat Soluble Vitamins	None	N/A
Water Soluble Vitamins	None	N/A
Water	2, 6	Lecture Discussion
Major and Trace Minerals	None	N/A
Energy Balance and Body Composition & Weight Management	1-10	Guest Lecture by Chelsea Campbell, RN and Certified Intuitive Eating Counselor
Lifecycle Nutrition	9	Project Due
Winter Break	None	N/A
Food Safety	None	N/A

APPENDIX E

IE Coursework Examples

Tools for Healthy Eating- Discussion Prompt:

Discuss *any two* of the following questions in your initial post.

1. Describe what *physical* hunger and fullness feel like. Consider what pleasant or comfortable hunger and satiety feel like compared to hangry or stuffed. What role do you think emotions play in changing how you or others interpret hunger and fullness?

2. What tools (internal or external) do you use to help you know you are eating well and what barriers do you face when trying to eat based on your body's signals compared with external signals (i.e. how much a friend is eating, how much you think you *should* eat, what foods diet culture tells you are good/bad, etc.)

Digestion, Absorption and Transport- Assignment:

Without Judgment, choose 1 full day or three meals this week and do the following:

- Notice how you feel before, during, and after you eat. Are you tired, bored, happy, sad, stressed, content...
- Pause before you eat to see if you can rate your hunger on a scale of 1-10
- While you are eating, really take the time to be present with your meal. Eat slowly and use all 5 senses when you eat, how does your food; look, taste, feel, smell, sound. What is your body telling you?
- Pay attention to cues to keep eating or what makes you stop eating
- If you are with others, pay attention to the atmosphere, and how it may impact what and how you eat
- When you stop eating see if you can rate your level of satiety on a scale of 1-10
- You do not have to record what you eat

What to Submit

Write a 1-page reflection or record a 2-4 min video reflection and discuss what you would like about this assignment and process. You may consider talking about what you noticed, was it hard, easy, anything surprising, whatever you want to discuss.

Lipids- Discussion Prompts:

Sometimes someone else posted pretty much what you wanted to so realize you can discuss something else that flows with this discussion, such as diet culture in general.

Lipids- Assignment:

3-Day Mindful Eating Food Log (See Appendix C)

Alcohol- Discussion Prompt:

Drinking alcohol in college has become a social norm or even an expectation for various reasons which we will discuss here but another thing to consider is how alcohol influences the consumption of food. As we learned this week, alcohol can serve as an appetite stimulant until we move into chronic heavy consumption where consumption of alcohol inhibits appetite. We also learned that alcohol lowers inhibitions and when we relate that to food intake, it can lead to excessive food consumption and likely for certain types of foods, which can vary from person to person depending on what those foods are. Often what we eat and how much we eat during this time can be a message that you may have a restrictive mindset around those foods.

Discuss what you have observed regarding eating behavior in relation to alcohol consumption.

Energy Metabolism- Assignment

Reflect on 3-day mindful eating food log and begin diet analysis. Notice how nutrient intake and needs align or don't align with your body signals.

Water- Discussion Prompt:

Discuss how dehydration, euhydration, and hyperhydration affect the experience of hunger and fullness. During this experiment did you notice changes in hunger/satiety or have you in the past?

Energy Balance and Body Composition & Weight Management- Discussion Prompt

What are your thoughts on Intuitive Eating?

APPENDIX F

3-Day Mindful Eating Food Log Date: _____ Day: M Tu W Th F Sa Su

Please measure and weigh (if possible) all food and beverages you eat throughout the day and write them down as you eat them. Remember to give as many details as possible, keep the food label if you think it will help describe the food better than you are able to. Providing us with recipes for homemade foods is helpful for us, too. Please list any vitamin or mineral supplements or any other supplements taken on the backside of this form and attach these labels if possible. It's best to be as descriptive as possible!

Time	Hunger Rating		Food/Beverage Item	Brand/Source	Type of Preparation	Amount/Weight	Thoughts & Feelings
When did you eat?	Rate your hunger from 1-10, with 1= starving 10= very full		What did you eat?	Manufacturer	(bake, boil, fry, etc.)	(cups, ounces, grams, tsp, TBS, fluid ounces)	How did you feel before, during and after eating? (happy, stressed, bored, etc)
	Before eating	After eating					

List vitamin/mineral/other supplements: _____

Daily Reflection

