Understanding Eating Behaviors and Attitudes to Define Eating Styles

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GREEN MOUNTAIN
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WOMEN'S RETREAT FOR HEALTHY WEIGHT & WELL-BEING

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ABSTRACT

Background: Green Mountain at Fox Run (GMFR) is a non-diet, mindfulness-based wellness retreat for women who struggle with eating and weight. Part of the program is to help participants determine their "eating style(s)", which informs appropriate behavioral strategies that guide them towards a more health-supportive, "skillful" eating style. Currently, there are no standard eating style definitions nor is there a validated tool for their identification. The objective of the study was to evaluate eating behaviors and attitudes of participants to more accurately define eating styles and provide next steps for creating a validated assessment tool.

Methods: A literature review on eating types and patterns and GMFR's eating styles (skillful, chaotic, diet mentality, emotional, disconnected/habitual, and dazed and confused) were used to develop an initial survey that was emailed to 185 incoming participants enrolled in GMFR's program. Qualitative and quantitative analyses were used to observe trends among eating styles and evaluate the internal consistency and reliability of the survey, respectively.

Results: The skillful eating style was negatively correlated with the other five styles. Acceptable internal consistency was observed in all GMFR's eating styles except "chaotic" (Cronbach's alpha >0.6). The exploratory factor analysis revealed six distinct factors; three of those identified factors corresponded with the diet mentality, emotional and dazed and confused styles.

Conclusions: GMFR's definitions of diet mentality, emotional, and dazed and confused styles are clearly defined and demonstrated reliability. The remaining three styles require additional exploration. Further, larger sample sizes are needed to validate the initial eating styles survey.

INRODUCTION AND LITERATURE REVIEW

The persistent increase in "obesity" rates over multiple decades is well documented and acknowledged by medical professionals and community members across the globe. Research has demonstrated that a larger body size is associated with many other chronic diseases, such as high blood pressure, diabetes, cardiovascular disease, sleep apnea and cancer.[1] Eating patterns and other modifiable risk factors contribute to the prevalence of these chronic diseases and thus research around eating behaviors has grown immensely. Additionally, westernized societies are responding with an intense focus on weight loss to combat the growing "epidemic," but the research does not entirely defend the traditional approach to weight loss.[2] Data support the association that dietary restraint may result in future weight gain and disordered eating behaviors.[2–5] The complexity of eating behaviors and associated outcomes has contributed to the growing interest in this area of research.

For years, nutrition and psychology researchers have been analyzing eating behaviors, beliefs and attitudes to better understand characteristics of different types of eating styles and dietary patterns. "Eating styles" are groups of eating behaviors, attitudes and beliefs that tend to occur together in trends or categories. Practitioners have created their own lists and definitions of eating styles and or reference existing ones in practice. One purpose of identifying eating styles is to better understand potential causes of problematic eating behavior and inform behavioral interventions. Many practitioners have also developed questionnaires to measure these eating behaviors and attitudes in individuals and populations in an attempt to provide the link between eating behaviors and outcomes (refer to Table 1 for a list of authors

and facilities, definitions and questionnaires). Moreover, today there are a variety of eating theories and styles recognized by researchers and practitioners across many disciplines.

In the early years of this research, Strien and colleagues developed an assessment tool known as the Dutch Eating Behavior Questionnaire (DEBQ).[6] This tool was designed to enhance understanding of eating patterns among individuals with a larger body size. Using three specific psychology-based theories of eating behaviors as the foundation, three scales were created: emotional, external and restrained eating. Emotional eating or the psychosomatic theory was described as eating in response to emotions, such as anger, fear or anxiety, loss of appetite, when some individuals consumed large amounts of food in the form of a binge. The external eating phenomenon is eating in response to external stimuli regardless of hunger levels, such as presence or even smell of food. The restrained eating theory has similar qualities to the traditional weight loss approach and is characterized by dieting and restriction, which at intense levels can lead to external and emotional eating. Although dated, that study outlines three scales or eating theories that remain in many lists of eating styles today and presents the idea that characteristics of eating styles may overlap such as restrained eating theory.

Many other questionnaires have been developed using comparable constructs and theories to link eating behaviors with associated outcomes, primarily relationships between eating behaviors and body size, and to identify constructs that capture specific eating styles.[7] Multiple studies supported the causal relationship between dietary restraint and overeating and, thus, it became an important construct and behavior to explore.[8] Williamson and colleagues conducted a study to test the validity of multiple questionnaires that measure the dietary restraint construct, defined as "the intention to restrict food intake in order to control

body weight". Their research revealed that three of the four eating style questionnaires [the DEBQ, the Eating Inventory (EI)/Three-Factor Eating Questionnaire and the Current Dieting Questionnaire (CDQ)], were valid indicators of current dieting and weight suppression. However, it was concluded that the four questionnaires did not measure the same theoretical construct.[8] As the research grew, randomized controlled trials, factor analyses and other tests of validity revealed that questionnaires, which were intended to measure seemingly similar eating style constructs, were not interchangeable and did not exhibit construct validity. The fundamental conclusion from these studies is that measuring eating style constructs is an incredibly complex process. Nonetheless, these tools and questionnaires are the link between understanding the relationship between eating behavior and health outcomes. An understanding of eating styles and valid questionnaires are needed to begin providing the framework for standardized approaches at all levels, from policy to interpersonal interventions.

The Present Study

As noted previously, the response to the "obesity epidemic" in western societies has been a weight focused diet culture that was used as a framework for weight loss interventions. The traditional weight loss approach is characterized by altered eating behaviors, in the form of dieting, calorie counting and restriction, and increased exercise to achieve an ideal body weight and shape.[2,9] However, research demonstrates that the traditional approach has been unsuccessful in maintaining the goal of weight loss. For example, Pietilaninen et al. found that intentional weight loss attempts were independently correlated with future weight gain.[3] Furthermore, data strongly suggest that dietary restriction and overvaluation of weight and

body shape predicts binge eating.[4] This is evidence showing that the traditional approach to weight loss may lead to detrimental outcomes.

Individuals with a large body size have become subject to a negative weight bias in clinical and community settings.[10] Experiences of weight bias or internalized weight stigma increase an individual's risk for impaired overall psychological health (anxiety, depression, low self-esteem, body dissatisfaction) and is associated with disordered and unhealthy eating behaviors, such as increased intake and lower motivation for exercise. Moreover, there has been a rise in rates of eating disorders over the past two decades.[11]

Research explaining the negative physiological and psychological effects of dieting, restriction and intentional weight loss has opened doors for new treatment approaches, such as the non-diet approach. The non-diet approach may be superior to traditional weight loss practices in achieving long term behavior change related to dietary habits and physical activity.[2] As defined by Clifford et al., the non-diet approach encompasses several overlapping perspectives of health promotion, including *Health at Every Size* (HAES), the Satter Eating Competence Model (ecSatter), Intuitive Eating and Mindful Eating Practices. The HAES paradigm promotes weight inclusivity, adoption of health promoting behaviors for health rather than weight, and encourages people to eat for reasons including but not limited to hunger, nutritional purposes and pleasure.[2,12] EcSatter, derived from the spectrum of eating attitudes and behaviors, is grounded in the principle that using internal cues, hunger, appetite and satiety to guide food choices will result in an appropriate body weight. Eating competence, as defined by ecSatter, incorporates four principles: attitudes, food acceptance skills, internal regulation skills and contextual skills (ie. planning, acquiring and preparing food).[2,13]

Additionally, the Intuitive and Mindful Eating Practices have many features that overlap, yet are recognized individually by some practitioners. Intuitive Eating is allowing oneself to eat when hungry with no restriction of food choices, eating to fuel the body for physical reasons and using internal cues to guide when and how much to eat.[2,9,14] Comparatively, Mindful Eating is the "nonjudgmental awareness of physical and emotional sensations while eating" by using one's senses and learning to be aware of hunger and satiety cues to guide food choices and eating behavior.[15,16,17]

As a result of the ongoing failure of traditional weight loss programs, many practitioners and facilities have adopted a non-diet approach. In the process, attempts have been made to define relevant eating styles. For example, Green Mountain at Fox Run (GMFR), a non-traditional wellness retreat located in southern Vermont, has been using the non-diet approach since 1997 to help women who struggle with weight, eating and body image.[18] Their multi-pronged program consists of wellness assessments; workshops and educational groups; courses such as Self-care & Compassion, Redefining Healthy Eating, Mindful Eating, etc.; fitness and recreational classes and activities; culinary demonstrations; and much more.[18] Based on many years of work with women who struggle with weight and their relationship with food, the GMFR practitioners established a list of eating styles and definitions (see *Appendix B* for GMFR's list of eating styles). From these definitions, a "Guide to Eating Styles Checklist" was created and is used in one of the program's classes, "Identifying Your Eating Style". The class aims to help participants determine their eating style. The identified eating style guides the strategies used by a registered dietitian (RD) to facilitate behavior change towards a more health

supportive "skillful" eating style, which encourages a health promoting relationship with food, body and mind.

While understanding eating behaviors and attitudes is important for overall health and well-being, there is currently no reliable measurement tool. The current set of tools attempt to provide a link between eating behaviors and outcomes and guide people towards a non-diet approach to health and eating. Although these tools are valuable, the absence of universally acceptable, validated definitions is preventing the area of research and practice from further development. Many of the tools focus on one specific eating style, which helps to recognize certain characteristics in an individual's eating pattern, such as ability to recognize hunger and satiety cues. For example, the Intuitive Eating Scale created by Tylka only intends to measure Intuitive Eating behaviors and attitudes. Similarly the Mindful Eating Questionnaires aim to measure a few constructs or factors, such as awareness, external cues and emotional response.[14,19] Then there are some tools that incorporate a variety of eating styles, or cycles, such as the "Am I Hungry?" Eating Cycle Assessment.[20] This tool identifies four eating styles or constructs (Instinctive, Overeating, Restrictive and the Eat-Repent-Repeat cycle); yet other practitioners have identified styles beyond these.

Many of the eating style definitions and questionnaires used in practice, such as GMFR's Eating Styles Checklist, are not validated. There are no standard definitions for eating styles nor is there a validated tool for their identification. The practice of identifying eating styles has made large strides, however, the need for further research is universally documented.

Clear, validated standard definitions of eating styles are needed so that professionals can help clients understand beliefs and attitudes that contribute to their eating behaviors.

Professionals also need to create practical strategies to help individuals overcome problematic behaviors around eating and facilitate lasting changes. GMFR's long-term goal is to create a user-friendly questionnaire that is based on validated terminology. The questionnaire will encompass all eating styles, and be used to develop standardized approaches and strategies to work with clients. Further, such a tool will help other practitioners and facilities adopt similar effective approaches and interventions.

The first step towards GMFR's long term goal of a validated measure is to clearly define eating styles used in their program. The purpose of the present study was to evaluate eating behaviors and attitudes of participants to more accurately define eating styles and provide insight into next steps for creating a validated assessment tool. The aims of the project were to investigate trends in behaviors and attitudes related to eating; and to identify any eating characteristics or behaviors that are missing from the current list of GMFR's eating styles. Additionally, the study sought to collect preliminary data on the reliability and validation of a survey tool. The information obtained from the present study will be used to determine if the behaviors and attitudes attached to each eating style corresponded correctly to the eating style in which it was listed. The results of the analysis will be used to inform a revision of current GMFR's Eating Styles Checklist, which is used as the basis for a class that seeks to increase participant awareness of their personal eating styles, and inform best practice for coaching these individuals to achieve more Mindful and Intuitive Eating styles.

METHODS

Literature Review and Questionnaire Development

In the form of a descriptive survey research design, the first step of the present study was a literature review to learn about types and patterns of eating styles described by other professionals. GMFR's original list of eating styles was compared against a collection of published definitions and corresponding questionnaires to identify the common constructs and gaps in behaviors and attitudes. That informed the development of the eating styles survey, which was tested to a sample population of GMFR's participants in the present study.

The statements below describe the definitions and questionnaires gleaned from the literature that were primarily considered to describe each eating style construct. However, all definitions, scales, questionnaires, models and constructs were reviewed comprehensively for similarities and differences to inform the creation of the survey developed and tested in the present study (see Appendix C for the GMFR Eating Styles Survey). For example, to develop questions that capture the skillful eating style construct, the investigator considered similar constructs described by Tribole (Intuitive Eater definition); Tylka [the Intuitive Eating Scale (IES)]; May (the Instinctive and Mindful Eating Cycles); and ecSatter model.[9,13,14,21] Similarly, the diet mentality construct was compared to each of the dieting personality subtypes described by Tribole, the Careful Eater and Professional Dieter, and the Restrictive and Eat-Repent-Repeat Cycles by May.[9,21] Additionally, a total of five constructs and one questionnaire were used to form the questions for the emotional eating style construct in the Eating Styles Survey [1. Emotional Unconscious subtype by Tribole; 2-4. the Binge Eating, Overeating and Eat-Repent-Repeat Cycles by May; 5. the Emotional Response construct in the Mindful Eating Questionnaire

(MEQ); and the 6. Emotional Eating Scale (EES)].[5,9,19,21–23] Lastly, GMFR's chaotic, disconnected/habitual and dazed and confused eating styles were widely analyzed against all of Tribole's subtypes of the Unconscious Eater personality (Emotional, Chaotic, Waste-Not, and Refuse-Not), many of the eating cycles by May, the habitual eating definition by Tylka, the MEQ, and the Mindful Eating Scale (MES).[5,9,14,21,22]

After that comprehensive analysis, the investigators agreed that GMFR's original six eating styles were inclusive and captured the essence of a wide continuum of eating behaviors and attitudes. Next, three objective questions for each construct were developed and reviewed by the authors, including; skillful, diet mentality, chaotic, emotional, disconnected or habitual, and dazed and confused. The objective questions, numbers 2-19, were developed using a 5-point Likert scale (1-5; when 1= strongly disagree, 2= disagree, 3= neither agree nor disagree, 4= agree and 5= strongly agree). Additionally, three subjective questions were developed to elicit feedback on any eating characteristics, behaviors or attitudes that may not have been captured or represented in the objective questions (questions 1, 20-21).

Participants and Recruitment

The nontraditional weight management program at GMFR targets women in the United States aged 18+ who struggle with weight, body image and their relationship with food. Subjects were recruited from the population of new and returning participants who enrolled in program at GMFR between November 7, 2016 and February 15, 2017 (3-months). Participants in the study were women aged 19-75 years old (average= 50 years of age). Upon registration for a program at GMFR, incoming participants received a link to the survey and a corresponding research information sheet via email. The act of clicking on the survey link was taken as implied

consent. The research information sheet provided details about the purpose, procedures and potential risks versus benefits for participating in the research, measures taken to ensure participants' confidentiality and contact information for follow up (See Research Information Sheet in Appendix D). Participation in the survey was voluntary and subjects were notified that they could withdraw at any time. The study was approved by the University of Vermont's Institutional Review Board (IRB) Committee on Human Research in the Behavioral and Social Sciences (CHRBSS).

The Eating Style Survey was administered using the electronic survey software program, Salesforce. Over the course of the 3-month data collection period, the survey was distributed to 185 individuals and completed by 62 women. Upon completion of the survey, responses were sent anonymously to administrative personnel at GMFR, compiled into an electronic file and then analyzed by the investigators.

Qualitative and quantitative analyses were performed to achieve the stated goals and aims of the project. The qualitative analysis attempted to identify any gaps in behaviors and attitudes by compiling general observations from the responses to the subjective questions.

Statistical Analysis

Quantitative analyses were performed using IBM SPSS Statistics, Version 24. Descriptive data were recorded as means and percentages. The mean score for each objective question on the survey (questions 2-19) was recorded to inform the average response to each question among the sample population. For example, all responses to question number two were used to determine how on average the sample population responded to that question. Additionally, the frequency of responses for each item on the Likert scale were computed as percentages for

each question. Pearson's correlations were also computed to examine relationships between the eating style constructs.

Cronbach's alpha was computed to assess the reliability and or internal consistency for each construct's set of questions (ie. Questions 5-7 for chaotic).[24] More specifically, it tests whether the set of survey questions for each construct were consistent in measuring the same eating style construct, given that a reliable measure contains little to no amount of measurement error.[25] The strength of the consistency was computed as an alpha coefficient, which ranges from 0-1 (0= no correlation, 1= all items have high co-variances). In the literature, there are varied reports on the acceptable values of the alpha coefficient, ranging from 0.60 – 0.95; the alpha coefficients computed in the present study were considered acceptable values between the range of 0.60 – 0.90.[25,26]

Exploratory factor analysis was used to identify the underlying relationships between the variables (characteristics, behaviors and attitudes of eating) and thus determine the main constructs of eating styles.[27] A principle component analysis extraction method was used to condense the matrix of correlations and explain the variances of that matrix. Additionally, the correlation matrix was rotated using the Quartimax method. A minimum loading factor of 0.5 was used to determine which variables had strong correlations with the underlying factors.

The percentage of survey responders who identify with each eating style was determined. "Identify" was defined as a sum of >12 for the questions for each construct. On a scale of 3-15, a sum of 12 or above indicated a "high" or "close" identification with an eating style construct. Among the participants who identified with a given style, crosstabulation was then used to determine the percentage of subjects who identified with each of the other styles. For example,

this method was used to determine the percentage of emotional eaters who also identified with the diet mentality construct. Lastly, the subjective responses to question 20 were qualitatively coded for themes about major challenges to food selection, preparation and eating. Trends between the themes and identification with any eating style constructs were computed using crosstabulation.

RESULTS

With 185 surveys sent out to incoming participants at GMFR, 62 surveys were completed and returned for a response rate of 33.5%. Study participants were all females ranging in age from 19-75 years with an average age of 50 years. Descriptive statistics from the objective survey responses may be found in *Appendix E, Table 2 and Table 3.*

Statistical Analysis

The Cronbach's alpha test revealed that all constructs demonstrated internal consistency, or reliability, except for the "chaotic" eating style (acceptable values 0.60-0.90; see *Appendix E, Table 3*). The skillful construct's alpha coefficient was 0.625, chaotic 0.456, diet mentality 0.668, emotional 0.791, disconnected/habitual 0.609 and dazed and confused 0.678. Acceptable values indicated that the survey questions for each construct were consistent in measuring the same eating style construct. The second part of the Cronbach's alpha test was to determine the alpha coefficients of the constructs (indicative of internal consistency) when a question or "item" was deleted from the survey. There were three noteworthy results from this portion of the test. For the emotional construct, the alpha coefficient increased to 0.868 (by 0.77) if question 13 was deleted, and for the disconnected/habitual eating style construct, the alpha coefficient increased to 0.691 (by 0.082) if question fourteen was deleted. Similarly, when question seventeen was deleted, the dazed and confused alpha coefficient increased to 0.758 (by 0.08).

The exploratory factor analysis revealed six factors, or strong underlying relationships between variables (eating style constructs), indicated by an initial eigenvalue of 1.0 or greater. A 0.5 loading factor was used to determine a strong correlation between a variable and an

underlying factor. Values 0.5 and above are highlighted in yellow or light blue in *Table 4 in Appendix E* on the rotation component matrix. Three of the identified factors corresponded with the diet mentality (Q8-10), emotional and dazed and confused (Q17-19) eating styles. Questions 8-10 correlated strongly with the fourth factor and is representative of the diet mentality construct. Questions 11-13 correlated strongly with first factor on the rotation component matrix, which suggests that the first underlying factor is the emotional eating style. Additionally, questions 17-19 correlated strongly with the third factor, which is representative of the dazed and confused construct. The remaining factors (2, 5 and 6) did not correspond with the other three eating styles: skillful, chaotic and disconnected/habitual. The second factor on the rotation component matrix was strongly correlated with questions two, six, fifteen and sixteen. Factor five correlated with two of the three questions related to the skillful construct (2 and 3), but has a strong correlation with question seven from the chaotic style (and not question four from the skillful construct). The sixth factor was strongly correlated with four questions: #5, #7, #14 and #17. Lastly, there were two questions that correlated with more than one factor, questions seven (correlated with factor five and six) and seventeen (correlated with factor three and six).

The relationships between eating style constructs evaluated by Pearson's correlations are found in *Appendix E, Table 5.* The skillful eating style has a negative correlation with the other five eating styles, chaotic, diet mentality, emotional, disconnected/habitual and dazed and confused. All constructs were significantly correlated with skillful eating style at a 0.01 level except for dazed and confused. This suggests that as skillful behaviors increase, the other variables or behaviors of the other eating styles decrease. Additionally, the dazed and confused

eating style was not significantly correlated four of the five other eating styles. Dazed and confused was significantly correlated with the chaotic eating style at the 0.01 level and diet mentality at the 0.05 level, but was not significantly correlated with the skillful, emotional and disconnected/habitual styles. Thus, if someone becomes less confused by food, nutrition and diet information, they will not necessarily become more skillful eaters.

Participant Identification with Eating Styles

The percent of subjects who identified with each eating style was computed to describe the sample population; 31% of subjects identified with the emotional eating style, 21% with disconnected/habitual, 18% with diet mentality, 18% with chaotic, 8% with dazed and confused, and 4% with skillful (see *Appendix E, Figure 1*).

Crosstabulation was used to determine trends among identification with multiple eating styles. When participants identified with two eating styles, the most common trend was identification with the emotional and disconnected/habitual styles (90% of emotional eaters also identified with disconnected/habitual). The second and third most common trends were identification with dazed and confused and emotional (72.7% of the dazed and confused eaters also identified with emotional); and dazed and confused and chaotic styles (72.7% of the dazed and confused eaters also identified with chaotic).

Additional trends were observed among the eating styles. For chaotic, 53.3% of the disconnected/habitual eaters; 52.0% of diet mentality eaters; and 40.9% of emotional eaters also identified with chaotic. Trends among the diet mentality are as follows: 54.5% of dazed and confused, 50% of disconnected/habitual, and 45.5% of the emotional eaters also identified with

diet mentality. Lastly, 54.5% of the dazed and confused eaters also identified with the disconnected eating style.

Major Challenges to Food Selection, Preparation and Eating

When analyzing the subjective responses to question 20, challenges to food selection, preparation and or eating described by the subjects were coded into trends. Of 49 responses to question 20, the top three challenges were "meal planning" (n=15; 30.6%), "time" (n=9; 18.4%), "cravings" (n=8; 10.8%) and other (n=17; 35%). Meal planning challenges included difficulties shopping and preparing food, and feeling overwhelmed by the process of meal planning. For example, one subject reported that "having to prepare food for multiple people (husband, 2 kids, me) makes it difficult to eat what I want or when I want" (meal planning category). The time challenges were related to busy schedules and reports of not enough time in the day to plan and prepare adequate food. Experiences mentioned in the cravings category included feelings of intense cravings, loss of control over food choices, or highly palatable or trigger foods. For example, "when I am in the middle of a craving, all my reasoning quickly flies out the window. All of it. And there's no retrieving it. Before I know it, I'm eating ravenously."

The "other" category included a variety of challenges described less frequently by subjects. For example, a few subjects described challenges to food selection, preparation or eating that included health or a medical condition, such as menopause. Others described what may be categorized as "habitual eating", where "I have the knowledge of what is healthy to fix but I have gotten into a habit of fixing the same types of meals for my husband that I think he expects now. I have cooked healthy for him in the past when I've been on a healthier eating kick and I don't remember him complaining but somehow I've gotten into a rut of looking and

shopping for more "comfort" meals that tend to be more fattening. I get stuck on bad eating habits." Other challenges included preoccupation with food, food preferences (ie. picky eater), cost, need for convenience food, access to healthy foods, navigating restaurants, external cues to eating (presence of food around the house) and lack of cooking skills.

The research attempted to identify trends between challenges and eating styles using crosstabulation methods. The dazed and confused eating style was highly correlated with the "meal planning" challenges (62.5% of dazed and confused eater mentioned meal planning). Among the chaotic eaters, 55% mentioned meal planning as a challenge. The time barrier was highly correlated with the disconnected/habitual and dazed and confused eating styles, reported by 25% of the these types of eaters. Lastly, the subjects who identified with the disconnected/habitual eating style were more likely to experience "cravings" compared to any other eating style (20.8% of disconnected/habitual eater mentioned cravings). Similarly, 19.4% of the emotional eaters also mentioned cravings.

Gaps in Eating Behaviors and Attitudes

General observations were gathered from the subjective responses to identify any eating behaviors and attitudes not captured by the initial survey. Multiple subjects mentioned or described a noteworthy preoccupation with food. For example, "I just want to stop obsessing about it and lead a normal life." Other behaviors reported in the subjective responses included eating in secrecy and eating out of boredom. Lastly, multiple subjects mentioned eating at a faster pace related to concern that there would not be enough for a second serving, "just as when I was a kid with several siblings, when I am sharing with my husband, I am eating fast to get my share."

DISCUSSION

This study presented the development of an initial eating style survey derived from years of experience working with women who struggle with eating and weight and pooled items from existing questionnaires regarding eating behaviors and attitudes. The results provided insight into GMFR's participant eating behaviors and attitudes, and a baseline overview of the reliability, validity and comprehensiveness of the survey tool. By surveying the participants using quantitative and qualitative questions, trends between eating styles and gaps in behaviors and attitudes not initially captured by the survey were identified. To the researchers' knowledge, the survey developed in this study is the first assessment tool created that incorporates a comprehensive list of eating behaviors and attitudes, and aims to help people identify their individual eating style. Although the identified eating style constructs and corresponding survey are at an early stage of development, the results provide insight into next steps for creating a validated eating styles assessment tool.

The observed negative relationship between the skillful eating style and the remaining five styles was expected. Given GMFR's aim to guide individuals towards a "skillful" eating style, it is reassuring to know that when someone becomes a more skillful eater, problematic eating behaviors in the diet mentality, emotional, chaotic, and disconnected/habitual categories are likely minimized. This is consistent with other literature that confirms intuitive eating is negatively related to eating disorder symptomatology, and mindfulness is associated with decreased emotional and external eating.[14,28] The dazed and confused style was not significantly correlated with the skillful, diet mentality, emotional or disconnected/habitual styles. This suggests that specific targeted intervention strategies may be required to improve

understanding of food and nutrition information, or increase confidence in planning and preparing meals; these characteristics will not be improved simply by increasing skillful behaviors or attitudes.

The results demonstrated that the diet mentality, emotional and dazed and confused eating styles are the most reliable and clearly defined constructs. There is overlap between these factors and other assessment tools that include multiple constructs. Similarly, the "Am I Hungry?" assessment tool and the DEBQ incorporate constructs or scales that have parallels with the diet mentality, such as the restrictive eating cycle and the restraint scale.[6,20] The emotional eating style overlaps with the emotional eating scale on the DEBQ. The overlap with the "Am I Hungry?" cycles and the emotional style is less straightforward given the complex structure of eating cycles. The DEBQ and the "Am I Hungry?" questionnaires do not overlap with the dazed and confused eating style, however, it is similar to the contextual skills described by the ecSatter model ("skills and resources to procure adequate amounts of rewarding food").[13] The results and this comparison strongly suggest that the diet mentality, emotional and dazed and confused styles are distinct constructs and should remain as individual eating styles in the survey.

As expected, additional eating style characteristics emerged that were not included on the initial survey. Eating out of boredom was mentioned a frequently by participants in relation to the question, "once I start eating, I often find it difficult to stop", which was developed under the emotional eating construct. Emotional eating is a complex construct since it considers a variety of emotions and external stimuli that influence eating, such as stress, anger, loneliness, boredom, etc. There is question whether eating in response to boredom categorizes as a

component of emotional or external eating.[23] Koball et al.'s research suggests that boredom is an important and independent dimension, or subscale, of emotional eating. Therefore, adding "eating out of boredom" to the eating style assessment tool must be carefully considered. Lastly, future research investigating how to best categorize boredom would further inform the development of a useful assessment tool.

Limitations

There are several limitations to this study that may have impacted the outcomes and ability to draw conclusions. First, with only 62 responses, repeat measures of the statistical analyses are needed. More specifically, researchers usually recommend a sample size of 100 participants or more to make conclusions from an exploratory factor analysis.[27] However, in this study the exploratory factor analysis was intentionally preliminary and provided a preview of the underlying factors. Additionally, the sample population limits the generalizability of the results because GMFR participants are not only a unique population of females who struggle with eating and weight, they are also an affluent population. As a pilot study, the purpose of the research was to provide insight about eating styles and ways to categorize eating characteristics and behaviors. Identification and validation of eating styles may be useful for other practitioners working with clients who experience disordered eating and issues with body image. Therefore, incorporating other populations who do not have the same financial resources is necessary before the assessment tool could be validated for use with other populations and practices.

The survey method was adequate for providing preliminary information about observable trends among eating styles and investigating gaps in the definitions. However, the sample size

and the survey method limited the ability to draw concrete conclusions about trends among eating styles and where new characteristics should be categorized. For example, the results are not clear enough to make conclusions about which barriers should be listed under each eating style because there were so few responses in each category. Organized focused groups are the next logical steps to truly evaluate the eating behaviors and attitudes of participants.

Lastly, a few of the results were based on the inference that a participant "identified" with an eating style, indicated by a sum of 12 or greater, on a scale of 3-15. This requires a considerable amount of evidence and assessment to ensure that the cutoff point validly captures a reasonable point of identifying with that eating style, which was not done to determine this indicator. In such early stages of research, the cutoff point of 12 or greater is reasonable because it reflects an individual who primarily answered agree or strongly agree to the three questions regarding that eating style. However, further research investigating an appropriate scale and cutoff point for determining identification with an eating style is needed.

CONCLUSION

Overall, the present study accomplished the development of an initial survey, provided insight on GMFR's participants' eating behaviors and attitudes, a baseline assessment of trends among eating styles, and an evaluation of the survey's reliability. Most importantly, as skillful eating behaviors and attitudes increase, then other problematic eating behaviors are likely to decrease, except for dazed and confused characteristics. Although the results identified additional characteristics to include on the assessment tool, further research is needed to gather insight on behaviors and attitudes that align with the six eating styles. Specifically, the chaotic eating style appears to be the weakest construct and the emotional,

disconnected/habitual and dazed and confused styles need to be revisited to improve internal consistency. The study provided GMFR with a starting place on the most common barriers their population faces. Lastly, the results will inform GMFR's next steps towards creating a validated eating styles assessment tool and standardized behavioral strategies to guide individuals to become more "skillful" eaters.

Citations

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Appendix A.

Table 1. Overview of eating style definitions and assessment tools.		
Creator of Definitions	**Types or Categories of Eating "Styles"**	
Green Mountain at Fox Run (GMFR)[29]	Eating Styles	Skillful, Chaotic, Diet Mentality, Emotional, Disconnected or Habitual, Dazed & Confused *Measure:* Eating Styles Checklist
Michelle May, MD[21]	Eating Cycles	Instinctive, Overeating, Mindful, Restrictive, Binge, Eat-Repent-Repeat *Measure:* "Am I Hungry?"
Evelyn Tribole, MS, RD[9]	Eating Personalities & Styles	Intuitive Eater Careful Eater, Professional Dieter, Unconscious Eater (Chaotic, Refuse-Not, Waste-Not, Emotional *Measure:* None
Ellyn Satter, MS, RD, LCSW, BCD[13]	Eating Competence Model	Eating Attitudes, Food Acceptance Skills, Internal Regulation Skills and Contextual Skills *Measure:* Eating Competence Questionnaire

Appendix B.

Green Mountain at Fox Run Eating Styles Definitions[29]

Skillful
In general, a skillful eater listens to and trusts her body, to tell her what, when, and how much to eat. Food decisions are not dictated by external controls but driven by individual needs and preferences in a given moment. She uses food to fuel and nourish her body and does not feel guilty about her choices, even if she is choosing to eat a particular food purely for pleasure. She enjoys her food, savoring each bite, and selects from a wide variety of foods.

Chaotic
Diet lacks routine and structure. Eating times may be sporadic and inconsistent. Individual is often less attuned to hunger cues, not responding until they feel very hungry, which leads to consumption of less nutritionally balanced and more convenience/highly-processed foods. It also often leads to eating beyond the point of comfortable satisfaction before recognizing feelings of fullness.

A person who eats chaotically often reports lack of time as a barrier to health-supportive eating. Food selection and preparation takes a back seat to other perceived higher priorities. As a result, the individual often eats while multitasking and/or in a rushed manner.

Diet may also lack variety due to time constraints and low prioritization of food selection.

Diet Mentality
Characterized by rigid rules-focused eating behaviors. Individuals often, but do not always, have a long history of following specific diet programs (Weight Watchers, Atkins, South Beach, Nutrisystem, etc.). If not following a specific diet, they have internalized the diet messages that are so pervasive in our society – viewing food as good and bad; viewing exercise as a way to earn, or pay penance for, certain food decisions; hyper-focused on controlling portion sizes and calorie intake; and very strict about what, when, and how much they will eat.

They feel shame and guilt over eating certain foods and don't trust themselves to make decisions about what, when, and how much to eat, often relying on external controls.

Emotional
Food is being used as a major coping mechanism and, in some cases, is the only coping mechanism for managing challenging emotions. The decision to eat, as well as the type and amount of food, is influenced by mood and emotions rather than physical hunger and satiety cues and nutrient needs. Individuals might feel out of control and as if they are unable to stop eating once they begin.

Disconnected/Habitual

This is best described as eating on autopilot. Individuals are less aware during the food selection or eating process, not responding to physiological needs but rather environmental cues and triggers. They tend to choose the same foods over and over again, because they are not attuned to their bodies' needs or even personal preferences. They may even begin to eat certain foods without giving much thought to whether or not they even want to be eating. They are often distracted while eating and are less able to recognize cues of fullness; as a result they generally rely on external factors to dictate the end point in the eating occasion (e.g., when the bag is empty, the plate is clean).

Dazed & Confused

Individuals feel completely overwhelmed by the amount of nutrition information they read and hear and are completely confused about how to eat healthfully. Additionally, they may feel uncomfortable in the kitchen having limited cooking skills and are unaware of how to create good-tasting, health-supportive meals. They may not know where to begin when it comes to meal planning, shopping, and preparing meals, and although they may have a desire to prepare more meals themselves, they feel overwhelmed by the process. Alternatively, they may have little desire to prepare their own meals and are unsure how to go about procuring health-supportive meals prepared outside of the home.

Appendix C.

Eating Styles Survey

Please answer the following questions to the best of your ability. You may skip any question you prefer to not answer and still remain in the study.

1. What would you like to change about your eating behaviors and/or thoughts about food?

For questions 2 – 19, please select the response that best describes your behaviors or attitudes. When prompted, please provide more details about your experiences.

1=strongly disagree | 2=disagree | 3=neither agree nor disagree | 4=agree | 5=strongly agree

2. I usually trust my body to tell me *what, when and how much to eat.*
   1   2   3   4   5

3. Usually, I savor my food when I eat.
   1   2   3   4   5

4. I am usually *flexible* with food choices (for example, my food choices are not dictated by a set of rules; I feel comfortable eating a variety of different foods based on the circumstances or my food preferences in the moment, etc.).
   1   2   3   4   5

5. I am often very hungry when I start eating and then often uncomfortably full when I stop.
   1   2   3   4   5

6. My eating routine usually lacks *structure, and is sporadic and unpredictable*.
   1   2   3   4   5

7. I usually eat very quickly.
   1   2   3   4   5
   If you rated 3, 4, or 5, please describe the factors that affect the speed at which you eat.

8. I categorize most foods as being "good" or "bad" based on their *calorie content and/or nutritional value.*
   1   2   3   4   5

9. I often feel guilty or shameful after eating certain foods.
   1   2   3   4   5

10. I usually feel the need to control my food intake by counting calories, controlling portion sizes, and/*or following strict diet plans.*
    1   2   3   4   5

11. I often eat when I'm feeling *unpleasant or uncomfortable emotions.*
    1   2   3   4   5

12. Food often provides me comfort and distraction from what is going on in my life.
    1   2   3   4   5

13. Once I start eating, I often find it difficult to stop.
    1   2   3   4   5
    If you rated 3, 4, or 5, please describe when this is most likely to happen and what may trigger this.

14. I often eat while distracted *or* engaged in other activities.
    1   2   3   4   5

15. I often eat out of habit without giving much thought to what or how much I am eating.
    1   2   3   4   5

16. I usually rely on external cues to decide when I will stop eating (for example, the package is empty, my plate is clean, the food is gone, my TV show is over, etc.).
    1   2   3   4   5

17. I often feel overwhelmed by the amount of food, nutrition, and diet information I hear.
    1   2   3   4   5

18. I often don't know what food to eat that will support my health.
    1   2   3   4   5

19. I often lack confidence in my ability to plan and prepare meals that are nourishing and enjoyable.
    1   2   3   4   5

20. Please describe any other major challenges when it comes to food selection, preparation, and/or eating that were not captured in this survey?

21. Is there anything else you would like to share about your eating behaviors or experiences?

Appendix D.
Research Information Sheet

Title of Study: Understanding Eating Behaviors and Attitudes to Define Eating Styles

Principal Investigator (PI): Christine Albertelli

Faculty Sponsor: Amy Nickerson, MS, RDN, CD

Funder: University of Vermont, Department of Nutrition and Food Sciences & Green Mountain at Fox Run

Introduction
You are being invited to take part in this research study because you are an incoming participant at Green Mountain at Fox Run (GMFR). This study is being conducted by Christine Albertelli, a candidate in the Master of Science in Dietetics Program at the University of Vermont.

Purpose
This study is being conducted to gather information about and discern patterns within individual eating behaviors and attitudes to better define different types of eating styles.

Study Procedures
If you take part in the study, you will be asked to complete an anonymous, online survey. The survey will consist of several open-ended and Likert-scale based questions regarding your current eating behaviors and attitudes. You may skip any question you prefer not to answer and still remain in the study. The survey must be completed in one sitting and will take between 15-20 minutes to complete, depending on the detail of your responses.

Benefits
As a participant in this research study, there may not be any direct benefit for you, other than gaining insight into your current eating behaviors and attitudes prior to your arrival at Green Mountain at Fox Run; however, information from this study may benefit other people now or in the future by helping to better inform programming and curriculum development at Green Mountain at Fox Run. This study may also contribute to the field at large by providing information that will help practitioners assess eating styles in clients and thus, better inform intervention approaches.

Risks
We will take measures to fully protect the information we collect from you during this study. We will not collect any information that will identify you to protect your confidentiality and avoid any potential risk for an accidental breach of confidentiality.

Costs
There will be no costs to you for participation in this research study.

Compensation
You will not be paid for taking part in this study.

Confidentiality
All information collected about you during the course of this study will be stored without any identifiers (anonymous). No one will be able to match you to your answers.

Survey responses will be kept in a secure electronic data file, on password protected computers, managed by Green Mountain at Fox Run. Anonymous survey responses will be compiled and provided to the PI via an electronic data file to be analyzed.

Voluntary Participation/Withdrawal
Taking part in this study is voluntary. You are free to not answer any questions or withdraw at any time. You may choose not to take part in this study, or if you decide to take part, you can change your mind later and withdraw from the study.

Questions
If you have any questions about this study now or in the future, you may contact me *Christine Albertelli* at the following phone number *(314) 610-5597* or *Dana Notte, Nutrition Lead at Green Mountain at Fox Run,* at *(802) 228-8885 ext. 255.* If you have questions or concerns about your rights as a research participant, you may contact the Director of the Research Protections Office at (802) 656-5040.

Participation
Your participation is voluntary, and you may refuse to participate without penalty or discrimination at any time.

Please print this information sheet for your records before continuing.

Appendix E. Results.

Descriptive Statistics

Table 2. Mean responses to objective questions.

	Mean	Std. Deviation	N
Q2	2.14	.973	59
Q3	2.69	1.021	59
Q4	3.56	1.303	59
Q1	3.29	1.260	59
Q2	3.41	1.315	59
Q3	3.86	1.196	59
Q8	3.78	1.233	59
Q9	4.08	1.134	59
Q10	2.92	1.343	59
Q11	4.39	.983	59
Q12	4.27	1.048	59
Q13	3.78	1.340	59
Q14	3.76	1.208	59
Q15	3.61	1.017	59
Q16	3.97	1.144	59
Q17	3.42	1.499	59
Q18	2.14	1.306	59
Q19	2.80	1.448	59

Table 3. Frequencies of responses on the Likert scale for each question.

		1	2	3	4	5
Q2	Count	19	22	15	6	0
	Row Valid N %	**30.6%**	**35.5%**	24.2%	9.7%	0.0%
Q3	Count	6	20	27	4	5
	Row Valid N %	9.7%	**32.3%**	**43.5%**	6.5%	8.1%
Q4	Count	6	7	11	19	19
	Row Valid N %	9.7%	11.3%	17.7%	**30.6%**	**30.6%**
Q5	Count	7	10	14	21	10
	Row Valid N %	11.3%	16.1%	22.6%	**33.9%**	16.1%
Q6	Count	7	8	12	19	16
	Row Valid N %	11.3%	12.9%	19.4%	**30.6%**	25.8%
Q7	Count	2	9	10	17	24
	Row Valid N %	3.2%	14.5%	16.1%	27.4%	**38.7%**
Q8	Count	5	5	13	15	22
	Row Valid N %	8.3%	8.3%	21.7%	25.0%	**36.7%**
Q9	Count	3	3	8	18	28
	Row Valid N %	5.0%	5.0%	13.3%	**30.0%**	**46.7%**
Q10	Count	11	12	17	9	10
	Row Valid N %	18.6%	20.3%	28.8%	15.3%	16.9%
Q11	Count	2	2	3	16	37
	Row Valid N %	3.3%	3.3%	5.0%	26.7%	**61.7%**
Q12	Count	0	6	8	9	37
	Row Valid N %	0.0%	10.0%	13.3%	15.0%	**61.7%**
Q13	Count	5	7	10	13	25
	Row Valid N %	8.3%	11.7%	16.7%	21.7%	**41.7%**
Q14	Count	4	6	12	18	20
	Row Valid N %	6.7%	10.0%	20.0%	**30.0%**	33.3%
Q15	Count	2	5	19	21	13
	Row Valid N %	3.3%	8.3%	**31.7%**	**35.0%**	21.7%
Q16	Count	4	3	6	24	23
	Row Valid N %	6.7%	5.0%	10.0%	**40.0%**	**38.3%**
Q17	Count	9	12	8	9	22
	Row Valid N %	15.0%	20.0%	13.3%	15.0%	**36.7%**
Q18	Count	28	10	9	10	3
	Row Valid N %	**46.7%**	16.7%	15.0%	16.7%	5.0%
Q19	Count	16	13	10	11	10
	Row Valid N %	26.7%	21.7%	16.7%	18.3%	16.7%
KEY: Percentages			30-40%	>41-50%	>51-60%	

Table 3. Internal consistency of eating style constructs.

Construct	Cronbach's alpha (a)	Questions	Cronbach's Alpha if item deleted
Skillful	**0.625***	Q2	0.595
		Q3	0.386
		Q4	0.594
Chaotic	**0.456**	Q5	0.250
		Q6	0.457
		Q7	0.362
Diet Mentality	**0.668***	Q8	0.519
		Q9	0.626
		Q10	0.566
Emotional	**0.791***	Q11	0.620
		Q12	0.681
		Q13	**0.868****
Disconnected/ Habitual	**0.609***	**Q14**	**0.691****
		Q15	0.433
		Q16	0.390
Dazed & Confused	**0.678***	**Q17**	**0.758****
		Q18	0.455
		Q19	0.522

*Acceptable values indicative of internal consistency/reliability= 0.60-0.90.
**Internal consistency increases when the question is deleted from the construct.

Table 4. Identification of underlying factors among eating behaviors and attitudes (factor analysis: rotated component matrix).

	Component (Factors)					
	1	2	3	4	5	6
Q2	-.126	**-.629**	-.244	-.168	.393	-.244
Q3	-.307	-.175	-.128	.101	**.777**	-.034
Q4	.051	.128	.081	-.441	**.751**	-.045
Q5	.130	.269	.435	.375	.217	**.502**
Q6	-.014	**.772**	.051	.000	.114	.104
Q7	.065	.223	.014	.169	**-.545**	**.523**
Q8	.316	.181	.084	**.659**	-.029	.032
Q9	.309	.238	.178	**.565**	-.191	-.231
Q10	-.003	.153	.140	**.801**	-.106	.318
Q11	**.815**	.254	.048	.294	-.082	.155
Q12	**.910**	-.004	.010	.036	-.015	.190
Q13	**.616**	.455	.016	.151	-.207	-.119
Q14	.185	.272	-.081	.069	-.220	**.724**
Q15	.219	**.722**	-.164	.202	-.032	.058
Q16	.413	**.542**	.166	.312	-.187	.067
Q17	.153	-.049	**.552**	.034	.070	**.513**
Q18	-.003	.045	**.911**	.095	.014	-.051
Q19	.014	.030	**.811**	.118	-.130	-.006

Extraction Method: Principal Component Analysis. Rotation Method: Quartimax.
KEY: Factor loading: >0.5 (yellow or blue highlights; see written report for further explanation).

Table 5. Relationships between eating styles evaluated by Pearson's Correlations.					
	Chaotic	**Diet Mentality**	**Emotional**	**Disconnected/ Habitual**	**Dazed & Confused**
Skillful	**-.369****	**-.459****	**-.366****	**-.437****	-.188
Chaotic		**.485****	**.369****	**.588****	**.337****
Diet Mentality			**.455****	**.468****	.305*
Emotional				**.594****	.122
Disconnected/ Habitual					.140
*Correlation is significant at the 0.05 level (2-tailed).					
**Correlation is significant at the 0.01 level (2-tailed).					

FIGURE 1. PERCENT OF SUBJECTS WHO "IDENTIFIED" WITH EACH EATING STYLE