

**Food choice, food liking, health and eating behavior
differs among low-income women**

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Abstract

Although the food and physical activity environment in low-income neighborhoods have been suggested as a major factor contributing to obesity and poor health outcomes among low-income women, many within this population are able to maintain a healthy weight. Therefore, the purpose of this project was to assess differences in individual-level personal, behavioral, and environmental factors, between overweight/obese and lean/normal weight, low-income women living in similar environments. Utilizing Social Cognitive Theory, qualitative (focus groups) and quantitative (taste tests, behavioral survey, 24-hour diet recall) methodologies were developed for this study to gain a broader understanding of the factors influencing health and eating behavior among low-income women. Results from this project demonstrate the influence of personal and behavioral factors on weight status and health, and offer insights for future research and health interventions with this population.

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Chapter 1:

Literature Review

INTRODUCTION

Although increases in overweight and obesity rates have been notable across all sociodemographic groups in recent decades (1), low-income and racial/ethnic minority women have been disproportionately affected by this trend (1-3). Conditions of excess weight are an important risk factor for a number of chronic diseases including noninsulin dependent diabetes and coronary artery disease, in addition to all-cause mortality (4,5). Furthermore, obesity may be compounded by other health-related inequalities experienced by low-income populations (6). Among health professionals, the relationship between obesity and poverty has rendered the term “hunger-obesity paradox,” as conditions of poverty have traditionally been associated with underweight (7). In the United States, food insecurity, occurring when “the availability of nutritionally adequate and safe, or the ability to obtain culturally acceptable foods in socially acceptable ways, is limited or uncertain” (8, p. 2), has been associated with increased BMI in women (9).

Many have implicated the food environment in health-related socioeconomic disparities (10-14) because of the barriers that exist to consuming a diet supportive of health and optimal weight (15-20). However, the current literature is lacking in an explanation as to how many women who are able to maintain a healthy weight despite living in environments associated with overweight and obesity, suggesting a variation in health-related behaviors among low-income women. Behavioral theories such as Social Cognitive Theory (SCT) have been used previously to understand the relative contributions of environmental, personal, and behavioral factors among low-income women (3, 21), but the individual-level personal factors influencing food choice behavior and weight status among women living in obesogenic food environments, are not well understood (21,22).

The proceeding paragraphs of this review briefly examines 1) the use of behavior theory in health research and SCT, 2) food choice, and the 2a) environmental, 2b) personal, 2c) and behavioral influences on food choice and eating behavior, along with associations between these factors and weight status. The literature review is concluded with the rationale for the research project, the purpose statement, research questions for each phase, and the overall study design and research methodologies. Following the

literature review are three chapters, which present papers that have been submitted for publication on the research topic investigated. These chapters are followed by an overall summary of results, and a conclusion and suggestions for future research.

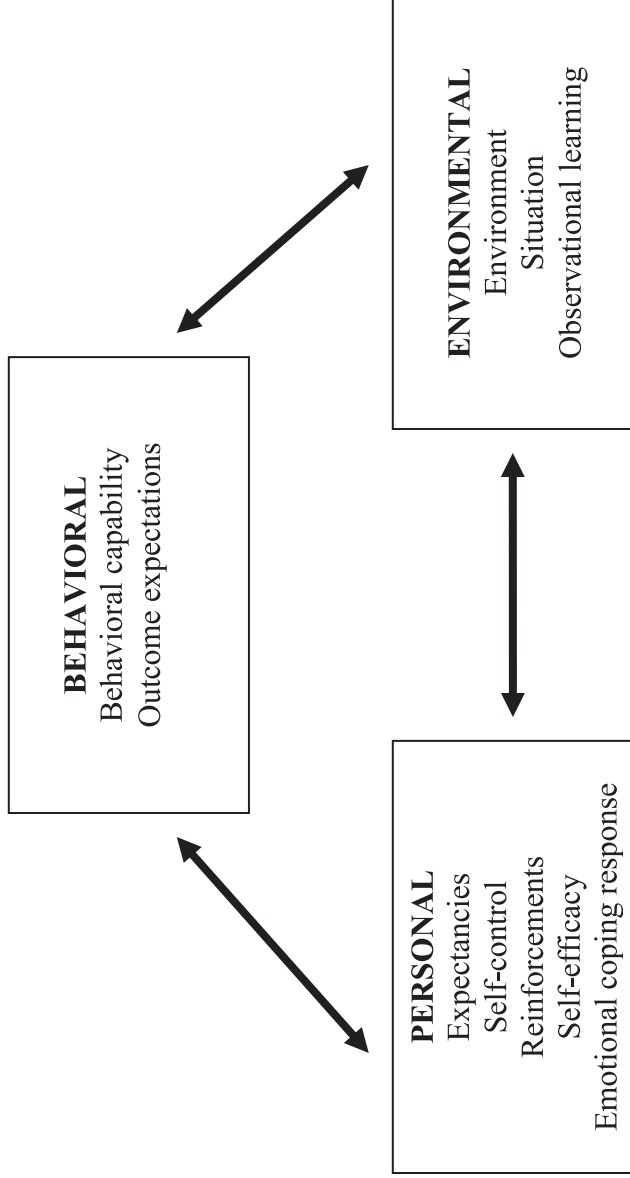
Role of theory in research and Social Cognitive Theory

Health behaviors contribute to an individual's weight status, and associated risk for chronic diseases and mortality (23). Hence, theoretical approaches to studying weight related behaviors are essential because they offer a contextual explanation for the intricacies of human actions, and provide frameworks for developing health promotions and interventions that focus on changing behaviors (24). Because behavioral theories propose that behavior is determined by both individual level and community level factors, interventions addressing behavior may be directed at personal determinants or macro-level determinants (24). Several review articles have examined the use of theory in regards to health research, with most concluding that research framed within a behavioral theory is more effective at understanding and changing health behavior (25-27).

This study employed Social Cognitive Theory (SCT), a theory that is widely used in health research and design of health interventions (28-33), to examine and explain behavioral factors related to weight of low-income women. According to SCT, an individual's behavior is determined by a reciprocal interaction of environmental, behavioral, and personal constructs (**Figure 1**) (34). Also illustrated in **Figure 1** are the main components of each of the three constructs (34). The environmental construct includes the physical environment and social support (environment), perception of the environment (situation), and observational learning. Included in the personal construct are value(s) the individual places on the effects of the behavior (expectancies); self-control aspects; reinforcements, or results of the behavior that either increase or decrease the chance of the behavior reoccurring; self-efficacy in performing the behavior; and emotional coping response (35). The behavioral construct includes relevant skills and knowledge (behavioral capability), and outcome expectations, which are the anticipated results of engaging in the behavior (35). If a modification occurs in any one of the constructs, an impact on behavior may be observed. (35). For example, increased access to healthy food (36), nutrition education (31), and interventions directed towards

emotional eating (37), have all been shown to influence behavior. Addressed in the following pages are components from each of the three main SCT constructs that are relevant to this research study.

Figure 1: Social Cognitive Theory Model (34)



Food choice

Eating involves many aspects including the procurement of food to preparation and consumption, with a diverse array of factors influencing an individual's behavior throughout the multifaceted process (38). Eating decisions are often linked; therefore, deciding to consume food results in subsequent decisions about where to get the food how it should be prepared, and the amount that should be eaten (39). It has been estimated that individuals make over 200 decisions daily that are food-related (40), and many of those decisions involve other people as well, especially for women as they often are responsible for food-related decisions for the household (41). Adding to the complexity of food choice are the myriad of options consumers have to choose from and the decreased amount of time available for meal preparation and food consumption in today's post-industrial society (42).

The literature has found that low-income women make food choices that are generally regarded as unhealthy, with researchers showing lower intake of fruits, vegetables and whole grains, and higher intake of unhealthful fats, discretionary calories and high fat meats has in this population (28, 43-49). Although these dietary patterns have been implicated in the etiology of many chronic conditions (4,5), necessitating the need for greater understanding of the factors that influence the food choices of low-income women.

Environmental influences

Over the last several decades, the food system in the United States has undergone a drastic transformation. Fueled by a complex array of factors including societal trends, shifting cultural norms, and governmental policy (50), this transformation has resulted in a food supply that is abundant in energy-dense convenience foods and beverages, served in increasingly larger portion sizes (51, 52). Furthermore, the cost of many of these unhealthy items has declined relative to other food products, while the cost of fruits and vegetables has greatly increased compared to other consumer goods (53).

It has been suggested that the higher costs of more nutritious food creates economic barriers to healthy food choice for low-income women and encourages the consumption of the less costly, energy-dense products, contributing to their higher rate of

obesity (11,12,15, 26). Accessibility barriers within the neighborhood food environment have also been implicated in the poor food choices made by low-income women (15,54). The neighborhood food environment includes grocery stores and other food outlets within a community and the quality of food available in these establishments (55). Research has shown that lower income neighborhoods and ethnic neighborhoods are less likely than middle-class and white neighborhoods to have large supermarkets in close proximity that offer high-quality and affordable food (15,56-59), while convenience stores and fast food restaurants are more plentiful in disadvantaged neighborhoods (60,61). Aside from the community-level factors, characteristics of the household environment may also play a role in food choice. This was evident in a qualitative study with homeless Minnesotan women who expressed that shortcomings of the shelter environment including sparse cooking and food storage space, awkward meal times and undesirable meal options, constricted their food choices and led to alternative strategies to obtain food such as dumpster diving and stealing food (26). Additionally, low-income women shop less frequently (62) and tend to spend their resources on more energy-dense items like refined grains, meat, added sugars, and fat to stretch their food dollar (62-64), and less on foods that provide the RDA for key nutrients (62), which likely impacts food availability in the home and limits healthy food options in the immediate environment.

Despite the apparent inequities of the food environment, and the widely suggested influence this has on the higher risk for obesity among low-income, evidence for an environmental effect on food choice has not been consistent. For example, Rose and Richards reported an inverse relationship between fruit intake and distance to a supermarket, but vegetable consumption was not significantly related (65). Yet, another study found no relationship between either fruit or vegetable intake, and proximity to a supermarket (66). Although one study with adolescent males, did find fruit and vegetable intake to be significantly associated with greater distance from away a convenience store; having a preference for vegetables partially mediated the negative impact of being closer to a convenience store (67). An individual's perception also appears to have a mediating affect, with researchers finding a relationship between a more positive perception of the food environment and increased fruit and vegetable intake (68,69). Likewise, the

relationship between community food environments and BMI is less than conclusive. Although many have found an association between healthy neighborhood food availability and BMI (70), some have failed to find a correlation (13).

Personal influences: values, food liking, and emotional coping response

Individuals consider multiple food-related factors when making their food choices with taste, cost, convenience, nutrition, health, weight control, and tradition or familiarity most commonly taken into consideration (43,71). A *factor* refers to the specific information that is used when making food choices (72), and is influenced by an individual's values to motivate and guide behavior (38,43). Among the factors affecting food choice, taste, followed by cost, are the most salient for consumers (71,73). However, compared to higher income groups, cost and familiarity have been reported to be more important in the decision making process (71,73), while health considerations have been found to be of lesser importance for this group (74). Because values are often in conflict when making food choices (38,43), people develop personal food systems to manage and simplify the process, resulting in largely habitual and unconscious food choice decisions (75,76). Furst and colleagues described personal food systems as dynamic cognitive processes that involve development of values relating to food and health, categorizing of foods and eating situations, and developing strategies to negotiate and prioritize values in order to solve conflicts (75). For instance, an African American woman may value food-related cultural customs but limit consumption of traditional soul foods because of health reasons. However, in certain situations when traditional foods are served, culture may be prioritized over health. Sobal et al. further contextualized personal food systems as a component of a cyclical process model, wherein food-related self-identities and other personal factors are outcomes of food choice decisions, along with weight and nutritional status (38). In turn, self-identities are expressed in the individual's personal food system, thus influencing behavior (38, 77,78). This further strengthens the likelihood of the behavior being repeated overtime because food choices become a fundamental part of an individual's personal being (38). While food related self-identification and relationship to BMI has been examined in the general population, it has not in specific population groups such as low-income. Exploring the relationship between food-related self-identity

and BMI in low-income women may allow for an expanded comprehension of the unhealthy dietary behaviors exhibited by this group, and help shape interventions that target formation of self-identifications that are supportive of healthy behaviors.

Taste refers to the individual's hedonic response, or liking of a particular food, along with sensory perceptions, olfactory, and texture characteristics of that food (79). Although liking response for sweet and bitter is biological (80), the attenuation or strengthening of these innate responses, as well as the development of food likes in general, are largely a result of environmental factors such as social learning and repeated exposure (79, 81-83). The conditions of the exposure are also influential, as they may lead to positive or negative associations with a particular food (83), possibly resulting in food aversions. It has been suggested that the cultural and socioeconomic environment of an individual heavily influences the type of foods and frequency of food exposure, as well as the context in which the exposure occurs (83,84). However, research has not examined food liking specifically within the low-income population. In light of the nutritionally inferior diets that low-income populations have been documented to consume (28,47), understanding food liking in this population may help to explain low-income women's reported preference and taste for palatable, high-fat foods (64, 85,86).

In addition to the value that a person may place on taste, food is a powerful reinforcement factor that motivates people to eat (87) and it has been surmised in the literature that deriving greater pleasure from foods may contribute to overeating and conditions of excess weight (83, 88,89). Several researchers have tested this prevailing hypothesis through measuring differences in liking between lean and obese subjects (83, 89-92). However, results have not always been supportive of the theory, possibly because of weaknesses in study designs (89). Specifically, previous research has mostly used either visual analogue scales or the 9-point hedonic scale (89, 93). Both scales have potential limitations including unequal label intervals and reduced sensitivity in detecting extremely liked or extremely disliked foods (89,93,94). Labeled magnitude scales are a better alternative because intervals are according to magnitude estimation and they include additional labels, allowing for greater discrimination between highly liked/disliked foods (89,93). Measuring food liking between lean and overweight/obese

individuals among a population with a high prevalence of obesity, using a labeled magnitude scale, would not only add to the food hedonics literature, but may contribute novel information to the obesity-hunger research.

Another major personal factor that influences food choice and eating behavior includes psychological aspects of an individual such as emotional coping response (97). In fact, experimental psychologists purported an individual's propensity for emotional eating to be the most important variable in food consumption (96). Although acute emotional arousal triggers a hormonal response that produces a physiological state similar to satiety (96), experimental studies have shown acute distress paradoxically leads to excessive food intake in some women (96, 97). Contrarily, others exhibit normal physiology during times of emotional arousal, decreasing their food intake, while some lack a response, neither decreasing nor increasing food intake (97,98). Food preference has also been found to differ between types of emotional responders in the laboratory, with emotional eaters choosing high fat and sugar foods during times of stress, as compared to non-emotional eaters (99). Evidence from cross-sectional studies has also linked reports of chronic daily life stress to increased consumption of foods high in fat and sugar (100,101). Moreover, a positive relationship between emotional eating and binge eating has been observed (102,103); thereby, both type and overall amount of food eaten may differ between emotional and non-emotional eaters.

Numerous hypotheses have been tested in the psychology literature to understand the underlying mechanisms that promote increased food intake in response to adverse emotions in some individuals. Among these has been restraint theory, which proposes attempts to control intake through dieting leads to obsessing about food, and in weakened emotional states, triggers overeating behavior (96,104,105). The externality theory posits that emotional eaters have a heightened sensitivity to the external environment and are less responsive to internal physiological factors like hunger and satiety (96,106). Also emphasizing the environment, escape theory postulates that emotional eaters focus on the immediate environment (i.e. available foods) as a means of diverting awareness away from aversive and unpleasant situations (96, 107). Furthermore, researchers have suggested some personalities may focus on aversive stimuli more than others, (97,108),

increasing the likelihood of these individuals using food as way to cope with negative situations. Over time, emotional eating becomes a reinforced behavior in those who are susceptible, because they learn that it lessens adverse states (108).

Illustrating this reinforcement effect, overweight/obese low-income participants in a qualitative study described using food to cope with negative emotions in adulthood because they associated food with feelings of comfort they had felt after bingeing on food as food-deprived children. This prompted the authors to propose that the emotional eating tendencies influenced by conditions of poverty may be a mediating factor in obesity in low-income women. Others have also found a relationship between emotional eating and excess weight among low-income women (44,85, 109-112), although some have not found emotional eating to be a factor in low-income women's overweight status (113). Few researches have examined emotional eating in both low-income healthy weight and overweight/obese women. In one study that did assess this behavioral influence, the authors found postpartum overweight/obese women to have a higher emotional eating score than normal weight women (85). In a qualitative study, most overweight/obese women discussed eating as a result of emotions, but normal weight women typically did not describe these tendencies; however, this study was not guided by a behavior theory and the sample size was small with only 21 women participating (110). Considering these limitations and the paucity of research, additional examination of emotional eating among low-income women of all body weights would help to enhance the understanding of the link between emotional eating and weight in low-income women.

Behavioral influences: behavioral capability and outcome expectations

It is well established that educational attainment, in addition to nutrition knowledge, is lower in disadvantaged populations (114), which may impede their ability to seek out or comprehend nutrition advice. Poor knowledge of healthful cooking techniques have also been found (115), however few studies have examined cooking skills and abilities among low-income populations. In the general population, a high level of nutrition knowledge has been associated with meeting the recommendations for vegetable, fruit and fat intake (116), but nutrition knowledge does not appear to be linked to BMI (117). Very few have researched nutrition knowledge in relation to weight status

of low-income women, which may add insight into the dietary behaviors of this population. However, results from a study that examined nutrition knowledge following an educational and behavioral intervention specifically with low-income mothers found that those with greater knowledge had lost more weight than those who did not, suggesting that knowledge does impact behavior, and subsequent weight (30). Another study with low-income African-American mothers found that perceived benefits of fruits and vegetables was linked to greater consumption, also suggesting a possible knowledge-based influence on eating food choice (118).

However, a lack of awareness of the connection between diet and health in low-income has been documented (43, 119), with Lin and colleagues linking the belief of genetics as the cause of obesity to women with higher BMIs, rather than lifestyle (119). Nevertheless, motivators for healthy eating and physical activity, such as desiring to fit into clothes and play with their children without tiring, were found to exist among a group of overweight and obese low-income mothers (109). Although these women reported that barriers made it difficult to eat healthy and exercise, this suggests that some low-income women are cognizant of, and motivated by, the positive outcomes that can result from engaging in healthy behavior.

Rationale for research based on literature review

Upon review of the literature it is evident that numerous variables may impact food choice and eating behavior of women living in low-income environments. Some have suggested that the food environment in economically disadvantaged neighborhoods creates barriers to consuming a healthy diet, and is the primary reason for poor diets and socioeconomic weight disparities. Alternatively, others have shown individual level personal and behavioral factors, such as self-identity, food liking, and emotional coping response to be related to an individual's weight status. However, food related self-identity and food liking has not been investigated specifically within the low-income demographic and limited research has examined emotional eating and the relationship to weight status in this group. Furthermore, among those who have examined behavioral determinants of weight in this population, they have generally described factors related

exclusively to overweight and obesity, and have examined a narrow range of variables. Therefore, the research is lacking at present in a comprehensive understanding of the factors that are associated with both overweight and obesity, as well a normal weight, among women living in low-income environments.

Knowledge of other personal and behavioral characteristics impacting food choice and eating behavior, is necessary to more thoroughly understand the hunger-obesity paradox and to develop effective interventions that target modifiable behaviors. Expanding the current literature to include more factors that are known to impact behavior would provide greater explanation into why some low-income women choose to eat they way they do, which may be the first step in more effectively tackling the obesity epidemic in this population.

PURPOSE STATEMENT

The purpose of this research project was to examine personal, environmental and behavioral constructs, in relation to weight status of low-income women, with SCT providing the theoretical framework. This study was conducted in two separate phases. To answer the research questions for each phase, as outlined below, data were collected from both lean/normal and overweight/obese low-income women, and were analyzed comparatively for phase 1a (focus groups) and phase 1b (taste testing). The formative data from phase 1a was used to develop a survey (phase 2), and survey data and 24-hour recalls were collected from lean/normal and overweight/obese low-income. In this phase, SCT survey variables were examined in relation to BMI as a continuous variable, and dietary intake was examined comparatively between lean/normal and overweight/obese women.

RESEARCH QUESTIONS

Phase 1a: Focus Groups (Chapters 2 and 3)

- How do low-income women access the food environment — where do they purchase food, and do purchasing practices vary between lean/normal and overweight/obese?
- What factors influence low-income women's food choices and preparation practices within the context of the food environment, and do factors influencing choice vary between lean/normal overweight/obese women?
- Have they experienced food insecurity and does this vary between lean/normal and overweight/obese women? How does this impact food choice?
- Do low-income women use food to cope with emotions, and does coping response vary between lean/normal and overweight/obese women?
- What factors do they believe influences their body weight — Do they perceive body weight as being more related to genetics, or lifestyle factors, and do beliefs vary between overweight/obese women?

Phase 1b: Food taste testing (Chapter 3)

- What is low-income women's liking of fats, sweets, snacks, beverages, and food groups and does liking vary between lean/normal and overweight/obese women?
- What factors influence food choice within the foods tested, and does this vary between lean/normal and overweight/obese women?

Phase 2: Survey and 24-hour recall (Chapter 4)

- How are environmental, personal, and behavioral factors, and self-identity related low-income women's BMI?
- Which SCT construct is most predictive of BMI?
- How does dietary intake differ between low-income lean/normal and overweight/obese women?
- What is the relationship between food-related self-identity and BMI?
- What is the relationship between SCT predictors of BMI and dietary intake?

SUMMARY OF RESEARCH STUDY DESIGN AND METHODOLOGY:

This project was completed in two phases, using a combination of quantitative and qualitative research methodologies. In phase 1a, lean/normal and overweight/obese low-income women living in the Greater Minneapolis/Saint Paul metropolitan area participated in focus groups. Women were eligible to participate if they were aged between 18 and 65 years, non-pregnant, and qualified for a food and nutrition assistance program, which served as the classification for low-income. Low-income women were selected as the study group because they are the segment of the population affected by the obesity-hunger paradox (1-3). Questions for focus groups were developed after conducting a review of the literature (Appendix), and built upon previous research of my adviser, Dr. Chery Smith (2,3,9,16,28,44,45,64). Focus group questions were framed within the context of Social Cognitive Theory (SCT). This theoretical model is often used in health related research (29,30) because it can help predict behavior, and therefore, guide future research. While focus group data is more subjective, it follows a methodical process, and is appropriate for small sample sizes (120). Sample size for focus groups was determined to be adequate, because no novel information was obtained towards end of data collection, otherwise known as saturation point (121).

One week following focus groups, the same participants attended a taste testing (phase 1b). Common foods were selected for taste testing sessions, and were grouped into categories (Appendix). Individual foods and food categories were chosen for the design, because the consumption and liking of certain foods has been associated with weight (122-124), and low-income groups have been reported to prefer and consume less healthy foods (47,48). Additionally, categories of some of the foods included items that are considered to be healthier (lower fat, sodium, sugar, calories, whole grain) and some that are considered to be less healthy (higher fat, sodium, sugar, calories, refined grain) food items because similar nutritional qualities have been linked to weight (125). At tasting sessions, participants were instructed to taste each food item and indicate degree of liking on Labeled Affective Magnitude (LAM) scale (Cardello & Schultz). Participants also recorded the importance of factors that would influence their food choice for each category of food.

Phase 2 of this research was quantitative and was accomplished by developing, validating, and administering a survey tool (Appendix) to lean/normal and overweight/obese low-income women. Eligibility criteria for participation were the same as in phase 1. Survey questions were developed based on focus group data, along with a review of the literature, and questions were framed within each SCT construct and component. The three main SCT constructs from the piloted survey data were evaluated for internal consistency using Cronbach Alpha coefficients (126). This phase of the research also included measurement of dietary intake via one 24-hour recall, food-related self-identity, and height and weight measurements. Self-identity questions were informed by focus group discussions, as well.

The same researcher measured height and weight during both phases, following a standard protocol (127). The maximum height and the average of the two weights were entered into a formula to calculate BMI (kg/m^2) (128). Using these values, women were categorized as either lean/normal ($\text{BMI} < 25 \text{ kg/m}^2$) or overweight/obese ($\text{BMI} \geq 25 \text{ kg/m}^2$). In both phases, participants completed a sociodemographic form (Appendix). Participants in phase 1 completed an additional lifestyle questionnaire (Appendix).

Detailed description of the study design and data analysis for phase 1a and 1b, and phase 2 are presented in individual papers, contained in chapters two through four. All participants provided written informed consent (Appendix) and were given monetary compensation for their time. The University of Minnesota's Institutional Review Board approved this study.

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Chapter 2:

Health and eating behavior differs between lean/normal and overweight/obese low-income women living in food insecure environments.

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CHAPTER SUMMARY

Purpose: To explore differences and similarities in environmental, personal and behavioral factors influencing eating behavior among low-income women of varying weight status.

Design: Focus groups (n = 16) were used to collect qualitative data. Quantitative data collected included demographic, lifestyle, and anthropometric (heights and weights).

Setting: Community centers, libraries and homeless shelters, in low-income neighborhoods.

Participants: Of the 83 participants, 58% were African American, 28% were white, and the remainder were American Indian, Hispanic, or mixed race. Thirty-five percent of participants were lean/normal (BMI < 25 kg/m²) and 65% were overweight/obese (BMI ≥ 25 kg/m²).

Methods: Focus group methodology was used to collect data on 83 participants. Social Cognitive Theory (SCT) provided the theoretical basis. Transcripts were analyzed using the open-coding method and comments between lean/normal and overweight/obese women were systematically compared.

Results: Focus group themes were food environment, aberrant eating behavior, health values and beliefs. Differences in personal and behavioral factors were apparent between overweight/obese and lean/normal women, with the former group frequently discussing emotional eating, overeating, and stashing food, and the latter group communicating greater nutrition knowledge, and describing regular physical activity. Both groups similarly expressed experiences with food insecurity and lived in low-income environments.

Conclusion: For low-income women, personal and behavioral factors may modify the influence of their obesogenic food environment. Further research, within the context of SCT, should examine differences between lean/normal and overweight/obese women living in the same environment.

PURPOSE

Obesity continues to be a leading public health problem, particularly among low-income women (1-3). Food insecurity, characterized by inadequate access to food that supports a healthy, active lifestyle, has been paradoxically linked to a higher prevalence of overweight and related complications in low-income women (3-5). Moreover, participation in the Supplemental Nutrition Assistance Program (SNAP) has been associated with increased weight (6,7), with research suggesting that the feast and famine of the food stamp cycle contributes to overweight by altering metabolism to promote weight gain (7). Further implicating the food environment, low-income individuals have easier access to cheap, energy dense foods than healthier, more expensive alternatives.⁸ In addition, several barriers related to healthy food choice, such as cost, have been found to exist among low-income women (2,9).

Despite the obesity-promoting food and economic environments in which women of low socioeconomic status (SES) live, there are many who are able to maintain a normal weight. Although factors like genetics, energy expenditure, and personal food preference (2,10-13) may partly explain weight variation, many underlying questions remain as to how it is possible for some low-income women to maintain a healthy weight, while others do not. To design more effective preventive and treatment programs, researchers need to learn how personal and behavioral factors protect low-income women from overweight and obesity, while living in obesogenic environments. Therefore, the purpose of this study was to qualitatively investigate differences and commonalities in food-related environmental, personal, and behavioral factors influencing eating behavior among low-income women of varying weight status.

METHODS

Participants and Design

Sixteen heterogeneous focus groups ($n = 83$) were conducted with lean/normal and overweight/obese low-income, SNAP-eligible women (≤ 185 percent poverty level), aged 18-64 years, in poor areas in the Twin Cities. Recruitment occurred at food pantries, soup kitchens, homeless shelters, neighborhood centers, libraries, the Special Supplemental Nutrition Program for Women, Infants and Children (WIC), and by word-

of-mouth. During the recruitment process, women were asked their height and weight, and were tentatively categorized as lean/normal or overweight/obese, and were actually weighed and measured for height when they came to the focus groups. Because of the high prevalence of overweight/obesity among low-income women, lean/normal women were purposefully recruited towards the latter half of recruitment, in order to achieve desired variation in body weights. Participants provided written consent and received monetary reimbursement for their time. The University's Institutional Review Board approved this study.

Focus group questions were developed using Bandura's Social Cognitive Theory (SCT) (12) as the theoretical framework. Questions were selected based on the PIs experience with low-income populations, an extensive review of the literature to identify what questions remain unanswered in the literature regarding the hunger-obesity paradigm, and were then reviewed by two outside researchers with experience and training in focus group methodology prior to conducting the groups. SCT, commonly used in nutrition research (2,15,16), describes individual human behavior as a complex, reciprocal interaction among environmental, personal and behavioral constructs (14). Because of the qualitative nature of focus groups, the main SCT constructs were incorporated into the design of the open-end questions and related prompts in order to elicit in-depth discussion regarding impact of personal and environmental determinants on weight related behaviors. For example, to assess the impact of the situation component of the environmental construct we asked, "Do you ever worry about running out of food?" This was followed by a prompt, such as: "Can you tell us more about that?" For the personal coping response component of the personal construct we asked, "Do you ever eat because you are feeling happy, sad, or stressed out?". This was followed by a prompt, such as: "Could you tell us more about that?" Lastly, to elicit information regarding the outcome expectations component of the behavioral construct we asked, "How do you decide what to eat?" This was followed by a prompt, such as: "Do health conditions influence your choices, how so?" While not all components of each construct were incorporated into questions due to time constraints in keeping focus groups a reasonable length, some components of all main constructs were included. At the

beginning of each focus group, participants were asked to name a favorite food, as a way to create a comfortable environment, and to open the discussion on food and dietary practices. Focus groups were small in size, ranging from 3 to 7 women, to enable all women to adequately express their thoughts. Sessions lasting approximately 90 minutes were audio-recorded and then transcribed verbatim by two researchers trained in focus group methodology.

Anthropometric and Demographic Data Collection

At focus group sessions, participants' heights and weights were measured by the same researcher using a standard protocol (17). Then measurements were used to calculate body mass index (BMI) (kg/m^2). Women were categorized as lean/normal ($\text{BMI} < 25 \text{ kg}/\text{m}^2$), and overweight/obese ($\text{BMI} \geq 25 \text{ kg}/\text{m}^2$). Demographic and lifestyle information were collected for each participant. Lifestyle questions included cigarette smoking and perception of diet and health. Further, women recorded perceptions of their health and diet on a 5-point Likert scale, ranging from 1 (poor diet or health) to 5 (excellent diet or health).

Data analysis

Focus group transcripts were independently read and coded by researchers using the open coding method for qualitative data (18, 19). When no novel information emerged from focus group transcripts, the sample size was determined to be adequate because saturation point had been achieved (20). Following independent analysis, the researchers met and discussed discrepancies between coding, reconciled differences, and organized participants' comments into identified themes and subthemes (18,19). Within the identified themes and subthemes, comments made by lean/normal women and overweight/obese women were systematically separated by organizing comments into spreadsheets, allowing for examination of emerging patterns between weight groups (19). This was a systematic process, and is an acceptable method of examining the variations in comments between focus group participants (19). Demographic and lifestyle questions were analyzed using PASW Statistics 17.0, 2009.

RESULTS

Quantitative

Sample characteristics of the participants are provided (Table 1). Within the overweight/obese group, 33% were classified as overweight and 66% were obese. Three women in the lean/normal group were underweight. Demographic information, including the number of children and employment status, were similar between weight groups. Approximately half of the sample reported smoking, with no significant difference in smoking between lean/normal and overweight/obese women (Table 1). Perceptions of diets revealed that lean/normal women perceived their diet as being healthier than overweight/obese women (p -value = .001) (Table 1).

Qualitative

Major themes that emerged from the opening-coding transcript analysis include: (1) aberrant eating behavior, (2) health beliefs and values, and (3) food environment. The results are reported according to themes and subthemes identified using the open-coding method (18,19). Components of the various SCT constructs emerged from discussions as data were analyzed and existed within themes, including situation for the environmental construct; emotional coping response, self-control, reinforcements, and expectancies for the personal construct; and behavioral capability and outcome expectations for the behavioral construct; thus underscoring the reciprocal basis of SCT within the focus group discussion.

Aberrant eating behavior

Topics within this theme included emotions influence eating behavior, stashing or hoarding of food, and overeating behavior. Overweight/obese women in the sample described engaging in weight-promoting, aberrant eating behavior, while lean/normal women did not commonly express these tendencies.

Emotions influence eating behavior

Most overweight/obese individuals talked about eating more as a result of emotions like depression, stress, and boredom, while lean/normal women reported that they ate less or that emotions had no effect on their eating patterns. Overweight/obese participants frequently described struggling with emotional disorders and the subsequent

effects that this had on appetite and food intake. As one woman said, “I get depressed with not having a job or income. Like me being young and being by myself taking care of my kids, I go straight to foods that comfort me” (BMI: 36.7). However, many commented that their tendency to eat or to not eat was the same regardless of the specific emotion they were experiencing as one woman reflected, “I’m an extremely emotional eater and it doesn’t matter which emotion it is, I want to eat” (BMI: 40.5). Conversely, comments by lean/normal participants were similar to what one woman shared, “I just eat to eat but I be hungry for it. I would cry before I’d pick up food for depression” (BMI: 22.5), demonstrating more self-control, a component of the personal construct. Eating to satisfy hunger instead of emotions was a comment heard from several lean/normal women.

Emotional eating was also discussed within the context of situational influences, with many overweight/obese participants mentioning boredom as a major impetus for eating. Being alone and unemployed were both mentioned as contributors to tedium. For instance, one woman shared her experiences with emotional eating, saying, “I’m used to taking care of other people and have other people living with me... now that it’s just me it’s like I’m lost...so I just like feed myself” (BMI: 56.7). For several others, watching television was a trigger for eating, as one woman mentioned, “I will do the mindless eating thing.., I will eat and then like 5 minutes later if I’m watching T.V. a commercial will come, and I’ll be like hmm I’m hungry again” (BMI: 36.4). Additionally, some women discussed watching television frequently, because of boredom.

Several women from both weight groups talked about other emotional coping mechanisms that they turned to instead of eating, such as cigarette smoking. Others chose more healthful outlets, as one woman who had previously been an emotional eater described, “When I used to be sad or angry or depressed I wanted to munch, munch, munch. I don’t do that anymore. Now I pray, I go outside and walk, you know to try to get the endorphins going, get some sweat going, that’s good for me” (BMI: 22.3), demonstrating more self-control. Healthful coping strategies like walking or eating fruit instead of sweets or high fat foods, were also shared by several other lean/normal women.

Stashing or hoarding food

Keeping a stash of food was a practice reported by many overweight/obese participants, but only by a few lean/normal weight women. Most described their stashes as consisting of high calorie snack foods. For instance, one woman described her stash as: "...cheetos, honey buns, hostess chocolate donuts, junk food" (BMI:36.3). Others did not report keeping a stash per se, but would consume junk food and hide it from their children. As one woman said, "I like Twizzlers and Hershey's bars with almonds and I buy them and I eat them in the car, eat them all up before I pick up my kids from school usually... Hide the wrappers and clean up any evidence" (BMI: 36.4).

Overeating behavior

Overweight/obese participants talked about their tendencies to overeat, especially when eating at buffet restaurants, thus demonstrating the reciprocal associations among environmental, personal, and behavioral constructs of SCT. Most reported that they typically consumed 3-4 plates of food, although one participant stated that she normally ate 6 plates of food while at the buffet (BMI: 41.9). In contrast, many lean women reported that they did not like to go to buffets because as one woman said, "I don't eat my money's worth" (BMI: 18.8). Self-control was also an issue overweight/obese women had when eating meals at home. One woman recognized this but explained her difficulty in managing this behavior, stating, "...it's like if I cook, which I tried before, portion control, to have portion control, I'm ticked off that I didn't fix more. It's like I gotta go find me something else or a hot pocket or something." Further describing her behavior she said, "It's not that I'm still hungry, it's the taste of food. It's just so good. I just want to keep eating" (BMI: 33.4). Although there were some lean/normal women who talked about overeating on occasion, most expressed behavior that is summarized by the following participant's comment: "I just eat until I'm full and then after I'm full I stop, I don't just eat all the food cause it's on the plate" (BMI: 19.3).

Health beliefs and values

Subthemes within health beliefs and values include nutrition knowledge, importance of exercise and influencers of body weight. Lean/normal women exhibited nutrition knowledge and discussed being more active than overweight/obese women.

Women in both groups felt that body weight was more related to genetics than to exercise and diet alone. In this subtheme both personal and behavioral constructs interact.

Nutrition knowledge

Many lean/normal women demonstrated basic nutrition knowledge, suggesting they may have had greater behavioral capability to make healthier food choices. Several even referred to specific nutrients such as one woman said, “I’ve always tried to eat healthy but I guess I’m more aware of it you know saturated fats, and sodium and really eating the fruits” (BMI: 21.4). Another woman shared, “...when I was pregnant with my kids I used to read a lot of nutrition books so that’s why I always try to balance out healthy stuff because that’s always in my head” (BMI: 22.5), which illustrates the impact that her knowledge had on her behavior. Whereas more of the overweight/obese women indicated indifference like one participant who said, “Oh, I really don’t pay attention to the food pyramid”(BMI: 36.4). Others demonstrated a lack of knowledge, as the comment by one woman suggested. “Coffee’s got calories in it point blank, just plain coffee, it’s got a lot of calories, it’s got a lot of caffeine in it so it’s a lot of fat too” (BMI: 25.9). However, there were a few overweight/obese participants who did exhibit basic nutrition knowledge that they had learned as a result of dealing with their own or a family member’s health condition, like diabetes or high blood pressure.

Importance of exercise

Beliefs and values surrounding physical activity were also discussed, with many of the lean/normal women describing the positive expectation that exercise helps to maintain a healthy weight. Here, personal values intertwine with behavior and many lean/normal women discussed the importance of using physical activity as a means to maintain weight, while overweight/obese women rarely discussed being physically active. Comments from lean/normal women included: “I work out four times a week” (BMI: 21.58); “I like to go for my jogs when I don’t have the kids with me” (BMI: 22.7); and “I’ll walk all the way downtown...and I do this every day, sometimes twice a day. I love to walk” (BMI: 22.69). Other lean/normal women said that while they did not engage in regular, planned physical activity, they “move around a lot”, “fidget”, “keep busy” or “walk to the store.”

Other influencers on body weight

Although lean/normal women reported that eating healthy and exercising positively impacted health, most believed that weight status and the onset of disease were controlled by genetics. Overweight/obese women also expressed this sentiment, but when speaking personally about their weight, many cited previous pregnancies and an inability to lose the weight after as a major contributor. Furthermore, many believed that metabolism influenced weight as shown in the following statement: “It’s their [lean women] metabolism. If their [lean women] metabolism breaks down food faster, you know that’s what it consists of and you now see some people their metabolism don’t eat it down fast enough, so it gets builds on and holds on to it” (BMI: 47.2). Others had more unconventional beliefs, like one woman who shared, “...one side of my stomach is bigger than the other one because of what side I lay on after I eat ...because that meat or whatever, especially meat, anything soupy you know goes right through you but meat, it will stick” (BMI: 33.4).

Food Environment

Within food environment the subthemes included food insecurity, grocery shopping, food preparation, and restaurant foods. This theme contained components of all constructs of SCT (personal, behavioral, and environmental factors). Women in both weight groups expressed similar sentiments when talking about the food environment; however, lean/normal women cited health as being influential when purchasing groceries.

Food insecurity

Both lean/normal and overweight/obese women described experiences involving inadequate food, suggesting that all of the women lived in a food insecure environment. When talking about their experiences with food insecurity, many of them shared their struggles with not having enough to eat growing up. One participant recalled difficult times, saying, “We were hungry a lot as kids and my mom was a welfare mom and she would blow the whole first month’s check on cereal you know and TV dinners, and then you’d be kinda hungry for about two weeks” (BMI: 20.9). A few participants further described the lasting impact of these experiences, as one woman said, “...the way my

husband and I were raised if there ain't that much food we feed our kids and we'll go hungry" (BMI: 29.5).

Much of the conversation regarding food insecurity revolved around coping mechanisms during periods when adequate food was not available, with many reporting that this was often the case the week before they got their food stamps. This meant eating whatever was available within the household environment, as one woman said, "I'm always worried about food...a lot of times we get creative, we eat a lot of stuff we may not want to eat but we eat it any way, we like it cause we have no choice, and the kids are not picky...you hungry, you got to eat" (BMI: 49.6). Several also relied on simple meals that would last, as one participant commented, "...when you're at your low, low, low, you gotta keep you a bag of beans,... some cornbread and make you a big old pot and that should last you at least 2-3 days before stamps" (BMI: 22.5). Safety nets were also described, and for one woman these included, "...borrow some money or go to a nice friend or relative's house and grab something, or I'll go to a food pantry" (BMI: 29.6).

Restaurants

Both lean/normal and overweight/obese women said they regularly consumed fast food, with some mentioning that they went more frequently towards the end of the month when food stamps and funds were low. However, there were a few women within both weight groups who said they preferred to eat meals prepared at home because of the cost of eating out and for health reasons. Among those that did eat out frequently, limited cooking capabilities and a dislike of cooking were commonly mentioned as reasons. One woman mentioned that her living situation greatly influenced her consumption of fast food, saying, "...you know like when I was down at the Dorothy Day, at the shelter, all I would do is eat junk food, cause we always went to McDonalds or Burger King or whatever 'cause I wasn't eating their foods" (BMI: 56.7).

Grocery shopping

All participants reported shopping for food at a variety of places, including supermarkets, discount stores, meat markets and convenience stores, with supermarkets and discount stores mentioned the most. Cost was most influential when shopping at supermarkets or chain discount stores, especially among overweight/obese women, as

illustrated by the statement: “First and foremost for me, well if I’m shopping for food it’s costs, and then taste. What can I make that’s cheap and tastes good” (BMI: 40.4).

Although for some, personal preference and taste superseded cost, as reflected by one participant who commented, “I go by brand, as far as the taste and what not, I just won’t get anything, or whatever’s available, or what’s in stock, or what’s cheap or whatever. I like to get a certain brand. I gotta have good quality taste” (BMI: 41.9). Several participants reported that their child’s preference greatly dictated what they purchased and cooked, otherwise, “...that’s going to be a waste of money so I buy things that I know she will eat” (BMI: 40.5).

Lean/normal women commonly discussed that purchasing healthy foods, such as fruits and vegetables, was their top priority while grocery shopping. They discussed this within the context of achieving positive health outcomes. For example, one woman discussed that she purchased a lot of fruits and vegetables to maintain health because she had a heart condition. Another participant said that she ate healthy to set a good example for her children. One woman simply said, “I try to watch what I eat just for my own weight” (BMI:22.7). While a few overweight/obese women said that health was influential in the food choices they made, many of these women expressed frustration that they had to compromise on their preferences for healthful foods because of the costs, like one participant who said, “Yeah, fruits and vegetables within my budget, I can’t afford to buy a lot. I can buy some but I can’t purchase everything that I would like to purchase cause it’s expensive” (BMI: 49.6). Although lean/normal women acknowledged cost as a barrier, they voiced greater confidence in their abilities to purchase healthier foods, as one woman concisely stated, “I will sacrifice other things to get the good, healthy foods” (BMI: 21.4).

Food preparation

Some women reported limited cooking skills or a dislike of cooking and a preference for ready-made foods, like frozen dinners or fast food. This impacted what they fed their children, as one woman expressed, “I do not like to cook ... for lunch they’ll eat sandwiches and chips or something or otherwise I’ll buy some lunchables... for dinner I’ll buy chicken nuggets and fries or something like that” (BMI: 23.5).

Comments regarding a liking or disliking of cooking were heard in both weight groups, although several overweight/obese participants were very descriptive when talking about food preparation, and seemed to derive a lot of pleasure from cooking. This was apparent in one woman who excitedly said, “I stay in my kitchen. I stay creative, different dishes.... I’m adventurous in the kitchen, very adventurous...I cook every day, trust me” (BMI: 33.4).

DISCUSSION

Social Cognitive Theory guided this qualitative study to examine the relationship between environmental, personal, and behavioral constructs and weight status among a group of low-income women. While both lean/normal and overweight/obese participants lived in similar food environments, the results suggest that personal and behavioral factors differed between weight groups. Overweight/obese focus group participants more often reported keeping a stash of food, overeating, and overwhelmingly described themselves as emotional eaters. Lean/normal women commonly expressed nutrition knowledge, reported regular exercise, and more often cited health as a priority when grocery shopping.

Findings that overweight/obese women tended to engage in aberrant eating behavior may imply that experiences with food insecurity did vary between weight groups, because emotional eating, binge eating, and hoarding food have all been associated with food insecurity (21-23). Furthermore, the literature has suggested that psychological attachments to food that develop from childhood food insecurity persist into adulthood (21, 22). However, it may be that the eating behaviors described by overweight/obese women in this study have other origins, as research has linked eating for psychological reasons in obese individuals across all socioeconomic groups (24-26). Thereby, experiences with food insecurity may only exacerbate undesirable eating behaviors in certain women. Concurrent with the behaviors described by overweight/obese participants in this study, research has reported that obese individuals are unable to distinguish between emotional cues and hunger cues, thereby increasing the likelihood of eating because of emotional disturbances (26). Obese women living in low-income environments may be especially vulnerable to emotional eating (27, 28) because

research has found that this demographic suffers from a higher prevalence of depression and a greater occurrence of stress (3, 29, 30) Considering this well-established link between negative emotional states and poverty (3, 29, 30), the interaction between emotional coping responses and the low-income environment, should be further investigated with this population.

Conversely, most lean/normal women in the present study described eating for hunger, rather than for emotional reasons. Generally, they reported coping in more healthful ways, such as walking or eating fruit instead. Cigarette smoking was also mentioned as a coping mechanism, although this was a remark heard by women in both weight groups. Additionally, quantitative results revealed that smoking was similar between both weight groups, suggesting that smoking was not a modifying factor when examining emotional eating between the lean/normal and overweight/obese women. Consistent with findings of this study, Nuss et al (31) reported that normal weight, low-income, post-partum women were more responsive to physiological aspects of eating, such as hunger and cravings, whereas overweight/obese women were more influenced by psychological factors, like emotions. In a study with both women and men, researchers found that subjects with a lower BMI were less likely to eat during negative emotional states (24). Lack of an eating response to negative emotions may provide a protective effect on low-income women living in stressful, low-income, food-insecure environments.

For most overweight/obese women in this study, price was the primary concern when deciding what foods to buy. Previous research has reported price tends to exceed other factors for food purchasing decisions among low-income women (2, 3, 8, 32); however, these researchers grouped all women together, not specifying differences in practices between normal weight women and obese women. By examining weight groups separately, results indicate that lean/ normal weight women place a greater emphasis on health when purchasing food for their household. This suggests that these lean/normal women may value promoting and maintaining health more strongly than overweight/obese women. Although this may be influential in their purchasing decisions, behavioral capability may also be a factor because lean/normal women exhibited more

nutrition knowledge. Additionally, these findings may explain why they were able to avoid the food insecurity-obesity link, as nutrition education improves food security (33) and research has shown that increasing nutrition knowledge leads to improvements in diet and weight loss (34,35) While not quantitatively measured in this study, self-efficacy may be involved in the food purchasing decisions of these women, as normal weight women have been shown to have a higher baseline self-efficacy than obese women (36) Furthermore, others have found that African American women with greater self-efficacy report increased fruit and vegetable intake and decreased fat intake (37) Additional research examining food purchasing practices among lean/normal low-income women is necessary to elucidate which SCT constructs, such as self-efficacy, are most influential in their decisions.

Congruent to their described food purchasing behavior, perceived diet healthfulness was significantly greater among lean/normal women in quantitative results of this study. Supporting this, research has reported normal weight individuals are more likely to consider themselves to be a health conscious consumer, and consider their weight when making food choices (38, 39). However, it is uncertain whether this intention impacts actual behavior; Chang et al. (38) found similar fat intake between normal weight and obese WIC mothers. Because of the paucity of research, studies examining differences in food intake motivators and food intake behavior between normal weight and overweight/obese low-income women are warranted.

Many lean/normal women in this study reported a tendency to engage in regular exercise, while overweight/obese women did not. Here too, lean/normal women have behavioral attributes found to be inversely related to weight status, (40,41) unlike their heavier counterparts living in the same environment. MacFarlane et al. (42) found that healthy weight status in low-income women was associated with women reporting an ability to make time for physical activity. Differences in non-exercise activity thermogenesis (NEAT) between lean and obese individuals (43) may also offer a partial explanation for why some of the lean/normal women in the present study were able to maintain a healthy weight, because many of them said they were generally active by "moving around," even if they did not engage in regular, planned physical activity.

Exercise programs that include NEAT increasing activities, such as walking, have shown to be effective with low-income populations (44). Although lean/normal women voiced the importance of physical activity in maintaining weight, women in both weight groups expressed similar sentiments that weight and diseases, such as high blood pressure and diabetes, were mostly a result of genetics, rather than lifestyle factors. In contrast, previous research with low-income women found that those who believed weight to be genetically predetermined had higher BMIs (13). Present results suggest that both normal weight and overweight/obese women may not be completely receptive to preventative and treatment efforts, if the role of diet and other lifestyle factors are not emphasized by the health professional.

Comments regarding fast food intake were comparable between weight groups, with both lean/normal and overweight/obese women describing frequent consumption. Research has found an association between weight status and fast food consumption in women of higher socioeconomic status, but no relationship exists between fast food consumption and weight status among low-income women (13). However, neither type of fast food nor amount eaten was measured in the research by Lin et al. (13), or in the current study. It may be that lean low-income women eat fast food as frequently as their overweight counterparts but choose lower calorie options and eat smaller portion sizes.

Conclusion and Limitations

To our knowledge, this research is the first to qualitatively examine variation in environmental, personal, and behavioral factors between lean/normal and overweight/obese women living in obesity-promoting, low-income environments. While similarities existed between women in this study, there were notable differences in participants' comments regarding emotional eating, nutrition knowledge and physical activity. These results suggest that personal and behavioral factors, in part, may modify the influence of the food environment, protecting some women from overweight and obesity. However, genetic differences may have contributed to the weight variation in this sample but evaluation of such factors was beyond the scope of this study. Although the results of this study contribute to the literature examining the food insecurity-obesity paradox, results are limited by the generalizability of the sample because regional

variation can occur. Furthermore, while focus groups can elicit rich conversation that would not be possible in a structured setting or through surveys, participants' responses may be subject to bias within a group setting. Recognizing these limitations, focus group methodology remains suitable for collecting formative data and filling in knowledge gaps in the literature, thus providing a basis for additional research.

So What?

What is already known on this topic?

The food insecurity-obesity paradox among low-income women has been well established; however, questions remain as to how some women are able to maintain a healthy weight while living in a food insecure, low-income environment.

What does this article add?

This study provides insight into how personal and behavioral factors differ in low-income women of varying weight status, possibly altering the influence of the food environment on eating behavior and health.

What are the implications for health promotion practice or research?

Qualitative results from this study provide a foundation for further investigation into environmental, personal and behavioral factors that influence health and eating behavior in lean/normal versus overweight/obese women.

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Table 1. Participant characteristics for lean/normal and overweight/obese low-income women

Characteristics	Total Frequency (%)	Frequency by BMI Status(%)	
	n=83	BMI < 25 n=29	BMI ≥ 25 n=54
Race			
Caucasian	23 (27.7)	9 (31.0)	14 (25.9)
African American	48 (57.8)	16 (55.2)	32 (59.3)
American Indian	5 (6.0)	1(3.4)	4 (7.4)
Hispanic	2 (2.4)	--	2 (3.7)
Other	5 (6.0)	3(10.3)	2 (3.7)
Annual income^a			
<\$5,000	38 (45.8)	16 (55.2)	22 (40.7)
\$5,000-\$9,999	27 (32.5)	8 (27.6)	19 (35.2)
\$10,000-\$19,999	12 (14.5)	1(3.4)	11 (20.4)
\$20,000-\$39,999	4 (4.8)	3 (10.3)	1 (1.9)
>\$40,000	1 (1.2)	1 (3.4)	--
Education^b			
Eighth grade or less	3 (3.6)	2 (6.9)	1 (1.9)
Some high school	14 (16.9)	7 (24.1)	7 (13.0)
High school graduate/GED/equivalent	28 (33.7)	8 (27.6)	20 (37.0)
Some college/tech/vocational school	25 (30.1)	9 (31.0)	16 (29.6)
Completed college/tech/vocational school	8 (9.6)	3 (10.3)	5 (9.3)
Completed grad/professional school	2 (2.4)	--	2 (3.7)
Currently employed^a			
Yes	10 (12.0)	5 (17.2)	5 (9.3)
No	72 (86.7)	23 (79.3)	49 (90.7)
Currently on food stamps^a			
Yes	68(81.9)	24 (82.8)	44 (81.5)
No	14(16.8)	5 (17.2)	9 (16.7)
Living Situation^a			
Shelter-based	32 (38.6)	5 (17.2)	27 (50.00)
Home-based	50 (60.2)	24 (82.8)	26 (48.2)
Current cigarette use			
	43(51.8)	16 (55.2)	27(50)
Age^c			
	36±10.227	36.93±12.0	35.5±9.20
Household size^{a,c}			
	3.76±1.9	3.45±1.9	3.93±1.9
Number of children^c			
	3.1±2.1	2.93±1.9	3.19±2.2
Perception of diet			
	2.52±.98	2.93±.70	2.3±1.0
Perception of health			
	2.67±.93	3.00±.80	2.5±.97

^aData not reported for n=1

^bData not reported for n=3

^cMean±standard deviation

Chapter 3:

Food choice, eating behavior, and food liking differs between lean/normal and overweight/obese, low-income women

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Appetite. Under second review.

CHAPTER SUMMARY

The higher rate of obesity among low-income women has widely been attributed to environmental barriers; however, many low-income women are still able to maintain a healthy weight despite living in an obesogenic environment. To better understand differences between overweight/obese and lean/normal weight women living in similar low-income environments, focus groups and taste testing sessions (n =83) were used to explore food choice, eating behavior, and food liking. During focus groups, lean/normal weight participants reported that health was influential in food choice while overweight/obese expressed cost as being more of a factor, and taste was of predominate importance for both BMI groups. Personal factors, like emotional eating, and overeating eating were also discussed with differences noted between BMI groups. Quantitative data also showed cost to be more important for overweight/obese women. Taste testing results revealed that overweight/obese had a higher overall liking for most foods, both healthier foods and less healthy foods. Additionally, they had a higher liking of fat in the context of spreadable fats and milk, as well as a greater liking for bread. Our results show that a variety of complex factors interact to influence eating behavior and present weight status of women living in similarly impoverished environments, although further research is warranted.

INTRODUCTION

Obesity is disproportionately prevalent in low-income and minority populations (1,2), with an accompanying increased risk for chronic disease (3), heightening the need for a better understanding of the relationship between obesity and poverty. Many have suggested the food environment contributes to this relationship because healthy food is more costly (4), and low-income neighborhoods often lack supermarkets that offer high-quality, affordable food (5), while less healthful options are abundant (6). This creates cost and accessibility barriers to healthy food choice for low-income individuals (4). Of possible consequence, low-income women consume characteristically unhealthy diets that are high in fat and added sugars (7-9) and low in fruits and vegetables (10,11).

Nevertheless, personal and behavioral factors also determine an individual's food choices and eating behavior but are not as well established in the literature as environmental contributors. One factor for low-income women may be food preference for less healthful foods, and a dislike of more healthy foods, because liking of foods increases with exposure and early environmental influences (12-14), and according to the literature, low-income populations have greater exposure to less healthy, energy-dense foods (7,11,15). Although liking for certain food does not exclusively determine food choice, hedonic response may influence an individual's food preferences (12), along with other factors including health and weight concerns, convenience (16), individual-level psychological factors (17) and educational attainment (18). However, to our knowledge, actual liking of foods is one area that has not been tested in this population. Furthermore, most of the literature examining factors related to food choice and eating behavior, fails to differentiate between normal weight women and overweight/obese women (19,20). Given the poor diet quality of low-income women (8,11), investigation of food liking and other related factors influencing food choice in both normal and overweight/obese may provide insight into the dietary behavioral of this high risk population, and help inform future research and behavioral interventions.

Therefore, the purpose of this research was to examine food liking of a variety of foods and to investigate other factors that are affect food choice and eating behavior in a group of lean/normal and overweight/obese subjects living in similar, low-income

environments. To fulfill these objectives, focus groups were used to explore differences in personal, and behavioral factors influencing food choice and eating behavior. Additionally, taste testing sessions were held to see if hedonic response to a variety of foods would vary between low-income women of difference weight status.

METHODS

For this study, mixed methodology was employed and both qualitative (focus groups) and quantitative (taste testing and demographic information) data were collected with women (n = 83), aged 18-64 years, who qualified for the U.S.'s Supplemental Food and Nutrition Assistance Program (SNAP) (≤ 130 percent poverty level) and resided in low-income neighborhoods within the Twin Cities Metropolitan area. Although inherently different, the combined use of qualitative and quantitative methodologies in research has been shown to be effective in understanding the complex interactions characteristic of human behavior (21).

Participants were recruited through flyers and in-person recruiting at libraries; food shelves; homeless shelters; community centers; hot meal sites and Special Supplemental Nutrition Program for Women, Infants and Children (WIC). Because this study sought to compare and contrast food liking and the importance of various factors related to food choice between healthy BMI and overweight/obese women, participants were purposefully recruited according to their respective body weights and were asked their height and weight when they called to enroll. Women were recruited on a rolling basis, and the same group of women in a focus group, attended the same taste testing sessions. Focus groups were heterogeneous for BMI group and were held one week prior to taste testing sessions. Upon arrival at focus groups, participants provided written consent, completed a demographic questionnaire, and had their actual height and weight measured, using a standard protocol (22). Body mass index (BMI) was calculated as kg/m^2 and participants were categorized as lean/normal weight ($\text{BMI} < 25$) and overweight/obese ($\text{BMI} \geq 25$) (23). Cash was provided as compensation for their time. The study was approved by the University's Institutional Review Board.

Qualitative Data

Utilizing Social Cognitive Theory (SCT) as theoretical framework, focus group questions were developed from a review of the literature and previous research with low-income women in the same geographical area (23-27). Commonly used in nutrition research (28-31), SCT describes an individual's behavior as a reciprocal interaction between personal, environmental, and behavioral constructs (32). Constructs of interest that were addressed by SCT questions included environmental situation, emotional coping response, and self-control. However, focus groups questions are used to elicit broad discussion and other SCT related constructs emerged from the discussion that was not directly addressed in questions. Examples of open-ended questions include, "How do you make food choices?"(prompted with—"What factors are most important prompted with—personal preference, cost, convenience, or children?"); "If you have a craving for a food, what type of food do you crave?" (prompted with—"Is it usually something hot, sweet, or salty?"); "Do you ever eat because you're sad, happy, stressed-out?"(prompted with—"Can you tell us more about that?"). Focus groups were comprised of 3 to 7 women, adequately allowing each woman to express her thoughts. Sessions were conducted by two researchers trained in focus group methodology, and lasted approximately 90 minutes in length. Audio recordings were transcribed verbatim and researchers then independently read transcripts. While reading the transcripts, researchers created codes by assigning a label to participants' comments, which is a process known as the open coding method (33). Following independent analysis the researchers met and discussed discrepancies between coding, reconciled differences, and organized codes into themes and subthemes (34). Quotes from lean/normal women and overweight/obese were methodologically separated and organized according to themes/subthemes into spreadsheets and examined, allowing for patterns to emerge between BMI groups (34). This was a rigorous, systematic process, and is an acceptable method of examining the variations in comments between groups (34).

Quantitative data

Food and food categories used for the blinded taste testing are displayed within Table 1. In selecting foods and deciding upon food categories, the literature was consulted and a variety of factors were considered. Specifically, commonly consumed

foods were selected and grouped according to their respective food group, eating occasions (i.e. snacking), and type (i.e. soda), because the consumption of certain foods has been associated with weight (35-37), and linked to low-income populations (8,9). Additionally, some of the categories included foods that are considered to be both healthier (lower fat, sodium, sugar, calories, whole grain) and less healthy (higher fat, sodium, sugar, calories, refined grain) food items because these nutritional qualities have also been linked to weight [Table 1, footnote] (38).

Individual stations were set up for each of the 15 food categories with one participant at each station at a time. The order in which subjects tasted foods was randomized with each participant starting the session at a different station and then after tasting all of the items at a station, rotated to another station. Participants were instructed to individually taste a bite-sized sample of each item and record degree of liking. Water was provided for participants to use between samples. After tasting each item within the respective category of food, participants were prompted by the question, "When deciding which type of [specific food category] to use, I believe," to indicate the importance, using a 4-point Likert scale, of eight factors (liking, flavor, texture, color, cost, nutritional information, availability and familiarity) related to food choice within each category of food, except the soft drink category. Participants recorded "acutely perceived hedonic reaction" (39), or subjective liking of each food item on a 176mm labeled affective magnitude scale (LAM), transformed from a 200mm scale (40). Scales were provided on a paper ballot and participants were instructed to mark a line in red ink corresponding to their liking, after tasting each food. Taste testing sessions were held at the University and lasted approximately 2 hours and subjects were asked to not eat an hour before coming, to take their time, and break as needed.

Participants' liking marks on the LAM scale were measured with a ruler and entered into PASW Statistics 17.0, 2009. Descriptive statistics were computed for demographic and taste testing data. Differences between lean/normal and overweight/obese for demographic information, liking, and factors influencing food choice, were compared using independent t-tests for parametric data, and Chi-squared and Mann-Whitney tests for nonparametric data. In analyzing liking data, both individual

liking ratings, as well as computed category averages, were compared between the two BMI groups [Table 1]. Additionally, mean overall liking ratings were calculated from healthier and less healthy food items, and compared both between BMI groups [Table 1], and within BMI group [Table 1]. To further analyze liking of healthier and less healthy foods, paired t-test were used to examine differences between individual healthier and less healthy items within soda drinks-colas, snacks, meat, beverages, bread, rice, and milk in both BMI groups [Table 1]. To analyze importance of factors influencing food choice, means were calculated for each of the 8 factors from the Likert scale responses and compared between BMI groups.

RESULTS

Sample characteristics of the participants are provided in Table 2. Within the overweight/obese group, 33% of those women were classified as overweight, and 66% were obese. Only three women in the lean/normal group were underweight. No significant differences were found in demographic information between BMI groups.

Qualitative

The major themes that emerged within the context of our analysis were factors influencing food choice (1), emotional eating (2), and food cravings and overeating behavior (3). Both similarities and differences were found within the themes between overweight/obese and lean/normal women.

1) Factors Influencing Food Choice

Participants spoke about the factors influencing their food choices while discussing grocery shopping habits, meal preparation, food groups, and foods consumed away from home. The subthemes found within factors influencing food choice were taste and cost, and health.

1a) Taste and Cost

Most women reported that price and personal preference were the foremost factors influencing their grocery shopping and food consumption habits, with overweight/obese women more commonly describing that they were influenced by price when purchasing food. Expressing this sentiment one woman said, "I go with what's on sale" (BMI: 32.4). Common cost-controlling strategies were discussed and included

buying generic brands, purchasing sale items, and shopping around at various grocery stores for the best price, with some of these women reporting that they compromised on taste and quality to keep costs down. Although many still managed to purchase some favored items despite cost constraints, like one woman who said, “There’s maybe a dozen items that it doesn’t matter if it’s on sale or not that I will get just because of the taste for it” (BMI: 37.2). Some expressed that taste consistently preceded price in importance, like one participant who explained, “I just won’t get anything, or whatever’s available, or what’s in stock, or what’s cheap or whatever. I like to get a certain brand. I gotta have good quality taste” (BMI 41.9). Aside from shopping strategies, some women discussed eating out to stretch their food dollar, as one participant discussed, “You can get 24 chicken wings, fries, and a 2 liter for 14 dollars, and it’s me, my three kids, my fiance, and if my other kids is with me, it’s like 4 or 5 of us, and it feeds all of us... the price is right, the food is good” (BMI: 38.1). Eating at free meal sites and using food shelves when funds were low, was also reported by both lean/normal and overweight/obese women.

1b) Health

Another influential factor in food choice, mostly among the lean/normal weight participants, was health. Although many of these participants conceded that the higher costs of healthier foods made it challenging to purchase these foods, they still shopped with health in mind and tried to buy foods like fruits and vegetables when they could. This mentality was reflected well in one woman’s comment, “We have very little to spend to feed quite a few...at least get apples, maybe a bag of carrots, you know like baby carrots. Kinda at least stuff like that. When I buy vegetables it’s frozen, I try to stay away from the cans because they have all kinds of added stuff in them” (BMI: 19.7). Women also discussed their motivations for purchasing healthy food, with one woman simply explaining, “I try to watch what I eat just for my own weight” (BMI: 22.7). While there were some participants in the overweight/obese group who expressed a desire to buy healthier foods, they tended to discuss cost as being more of a barrier than lean/normal weight women. One woman, who had previously been in a nutrition invention study, lamented “I was even doing the ingredient you taught us with the whole

wheat, the first ingredient and then I was like man I can't afford it. It's just cheaper to buy the white bread and the system keeps you buying things that aren't good" (BMI: 38.2). However, a few women in the overweight/obese group did describe following through with health intentions because they, or a family member, had been diagnosed with a diet-related disease like, diabetes or hypertension. Yet, most overweight/obese women tended to exhibit more of a reactive instead of preventative approach to health, and less concern for their health, as one woman explained, "Well, I don't really worry about it till the problem comes up, you know, then I just try to mellow it out, keep it at a balance" (BMI: 32.4).

Healthy foods were mostly talked about in the context of fruits and vegetables, but many also mentioned health when discussing what type of fats they preferred to buy, such as butter, margarine, and olive and vegetable oils, with more lean/normal weight women citing health as an influence when purchasing fat type as well. Carbohydrates and protein foods were also discussed, with all women similarly describing foods within these categories. While very few said they ate the whole grain rice or pasta, many said they preferred whole grain bread. Most women reported protein, specifically from meat, as being priority when purchasing and preparing food.

2) Emotions

Overweight/obese women frequently mentioned using food as a coping mechanism during times of stress, depression, or boredom, while their lean/normal weight counterparts mostly described eating less, or the same as they normally would under negative emotional influences. Among the former BMI group, some women commented that specific negative emotions trigger them to eat and others said they ate regardless of which negative emotion they were experiencing. Although positive emotions were also discussed, they were not commonly reported to influence food intake. Many described several factors triggering their emotional eating, similar to how one woman described hers, "I feel overwhelmed with things or I'm just kinda at home and the foods there, I just gravitate towards it I guess. It's a form of comfort" (BMI: 36.7). Another woman commented, "I starve myself when I'm stressed. I just can't eat, like, if I try to eat while I'm thinking about what's stressing me out then I just throw it up" (BMI:

21.6), exemplifying the other extreme of emotional coping response. More frequently heard from lean/normal weight women was that their appetite did not change with emotions and they just ate to satisfy their hunger, as one woman succinctly shared, “I don’t eat if I get stressed or if I’m happy. I just eat when I’m hungry” (BMI:19.0).

3) Food cravings and overeating behavior

Most women described their food cravings as being, salty, sweet, or a combination of both with chips, nuts, chocolate, ice cream, and cookies commonly listed as foods that were craved. Women in both BMI groups mentioned having similar flavor cravings, although, the connotations of these flavors were sometimes different between the BMI groups, as apparent in one woman’s comment, “I eat grapes and stuff for sweets, like I have cherries and all that and that’s what I try ... cause I don’t always have cake mixes or fruit snacks or Debbie cakes around” (BMI: 22.5). Another notable difference was that overweight/obese were more descriptive of their cravings and often described self-control issues with food and eating. Illustrating this, one woman shared her food cravings saying, “I eat like two packs, I gotta have those cookies. I’ll send my kids father out late to get some cookies... that’s like my drug them cookies” (BMI: 37.1) Other overweight/obese women described their overeating tendencies in general, with one woman saying, “I’ll eat and I’ll eat until like my stomach is literally full and then like I’ll think back...and I’ll realize that I ate some strawberries, some chips, some cookies, some more chips and I went back and got steak, you know” (BMI: 36.5). Another woman explained her behavior saying, “I would sit here and eat 3-4 bowls of cereal back to back, it’s almost like I don’t get full” (40.5). Conversely, lean/normal women mostly comment that they stop eating when they are full. This behavior was described by one woman who said, “I can’t eat a big plate of something... I can’t overeat” (BMI: 24.3). Many lean/normal women described this self-control behavior within the context of nutritional awareness and concern for what they were eating, as one woman shared, “I like the kettle chips but I don’t eat them very much because there’s so much fat in there. I’ll have a few but I won’t go crazy. You know get the taste and then walk away.” (BMI: 19.7).

Quantitative

Independent t-test results showed that overweight/obese women had significantly higher liking ratings for unsalted butter; salted butter, margarine; whole wheat bread; “brown” bread; baked chips; real turkey; and trail mix [Table 1], and for all categories except fruit, with the spreadable fat and bread categories significantly higher [Table 1]. Overweight/obese women also had a significantly higher overall liking of both healthier and less healthy foods [Table 1]. When comparing liking of overall healthier versus less healthy foods within BMI groups, results for liking of healthier and less healthy were similar for women in both lean/normal and overweight/obese groups [Table 1]. However, paired t-tests examining liking of individual healthier versus less healthy items within food categories, indicated that preference for healthier or less healthy varied by food category. For instance, in the snack category, both BMI groups liked potato chips more than carrots, but in the meat category they both preferred the leaner turkey breast to bologna [Table 1], and in the beverage category, both liked water and 100% juice more than cola [Table 1]. In the bread category, there were no differences in liking between whole wheat and white, for either BMI group; however, in the rice category, the overweight/obese group liked both the white rice and instant white rice more than the whole grain option [Table 1]. For the milk group, overweight/obese women also had a higher liking of the less healthy item, with their liking of whole milk higher, as compared to skim. Additionally, liking for regular cola was also higher than the liking for diet and cola zero among the overweight/obese women [Table 1].

In examining factors influencing food choice overweight/obese women felt that cost was significantly more important than lean/normal weight women when deciding what type of spreadable fat, rice, bread, meat, beverage, chocolate milk, fruit, and vegetable to consume [Table 3]. Additionally, overweight/obese women considered calorie content to be significantly more important than lean/normal weight women when considering what type of snack and beverage to consume, and nutrition when buying milk. When analyzing the factor rankings overall, both BMI groups selected liking and flavor as being the top two most important when deciding what to eat for all food categories represented in the taste testing (results not shown).

DISCUSSION

This mixed methodology study is distinct from most of the literature on food choice of low-income women because food liking was incorporated into the design, and lean/normal and overweight/obese participants were analyzed separately. Importantly, this approach allows for an expanded understanding of the food choice of low-income women, and may guide further research and interventions with low-income populations. Overall, notable findings from this research include differences in emotional eating and overeating behavior, and motivators for food choice, in addition to variations in food liking between the lean/normal and overweight/obese participants.

Adding to the current literature were our findings that health was influential in food selection for lean/normal women. Comparable to previous research on low-income women's food choice (4,16,24,41), both qualitative and quantitative data suggest that cost was a priority for overweight/obese women in this study, and sensory factors were of predominant importance for all women. Although one study by Chang et al. did distinguish between normal weight and obese women, and found obese women to be more influenced by cost than normal weight women; food choice was only examined within the context of fat (42). Food choice was studied within the context of multiple food categories in the present study, expanding upon this previous research, with results demonstrating that cost was more influential for overweight/obese participants in most food groups, notably fruits and vegetables, as well as spreadable fats, and beverages. Placing an emphasis on costs when purchasing more expensive items, such as fruits and vegetables, may compound already existing barriers to consuming the recommended servings of these items, and instead, encourage the intake of less costly, energy-dense items (43).

Conversely, lean/normal weight women considered health when making food choices and this may partially explain their ability maintain a normal weight while facing environmental barriers to consuming a healthy diet, such as cost and access. While health consciousness has been typically associated with higher income and education attainment (44), no differences in income or education were found between lean/normal and overweight/obese participants in this study. When asked why health was important to

them during focus group conversation, most lean/normal women cited weight-related concerns for selecting healthy foods. Similar worries have been found to motivate health consciousness of other low-income women (20,42). Although body-image concerns may not be the most ideal motivator, these results suggest outcome expectations (e.g. expecting weight-related outcome of diet), and expectancies (e.g. value individual places on outcome) (45), are involved in the lean-normal women's purchasing behavior. Further understanding of these SCT factors and their influence on food choice would be beneficial, because if an individual does not value the outcome of consuming a healthy diet, interventions addressing other factors impacting food choice, such as the environment, may be ineffective. Yet, other SCT constructs not measured here, such as self-efficacy, could also be involved with their food choices (42,46), because self-efficacy has been found to be associated with a healthy body weight (47), as well as fruit and vegetable intake (48.). Considering the complexity of behavior, more research would be necessary in elucidating which SCT constructs are most influential in food purchasing and consumption decisions among low income populations so that interventions might successfully target these factors.

Seemingly contradictory to other results, overweight/obese women ranked calorie content as being more important when deciding what type of snack and beverage to consume. One explanation for this may be that women with higher BMIs typically exhibit frequent dieting behavior (49), and it is probable that frequent dieters are more focused on calorie content of foods that tend to be high calorie. Furthermore this concern for calories may be related to overweight/obese women's described overeating behavior. Numerous studies have shown that restricting calorie intake, as is common among overweight/obese women (50), induces a counter regulatory response, which leads to excessive calorie intake (51) and weight gain (52).

Results from the taste testing component of this study may indicate that overall, overweight/obese women like a greater variety of foods, both healthier and less healthy, as compared to lean/normal women. Furthermore, this may suggest that these women consume a more a varied diet because food liking is largely influenced by an individual's exposure to various foods (12). Early food environments also influence food

acceptability, which may indicate that these women were exposed to more types of food at a young age (15). Interestingly, higher dietary variety has been associated with between body fatness in a long-term observations study (53). Within group comparison revealed that overweight/obese women had a greater liking of some healthier items compared to less healthy items like turkey breast as compared to bologna, and water and apple juice as compared to cola, as well as a similar liking scores for healthier versus less healthy foods overall; suggesting that a dislike of healthier foods, such as fruits and vegetables, and lower fat meats, is not necessarily a barrier to healthful food choice among these women. Rather other factors described here, such as cost concerns and health-related values, may be more involved in consumption barriers.

Despite an overall similar liking between healthier and less healthy foods for overweight/obese women, these women had a higher liking of spreadable fats among compared to their healthy weight counterparts, along with a higher liking of whole milk as compared to skim, and a greater liking for regular cola as compared to diet. Research has generally found similar liking of sweet between obese and non-obese similar (54), but a higher liking of fat among obese persons (12,54,55). While, sweet preference is mostly innate, fat liking may be partially related to the amount of fat in the individual's usual diet (56), and could influence increased consumption of fat (57). Alternatively, others postulate that psychological factors are more influential in food choice and maintaining increased consumption (58,59). Thus, it may be that emotional coping response and self-control issues, as described by the overweight/obese women in this study, and supported in other research (60), has a greater impact on eating behavior. Nevertheless, it is agreed that reinforcing factors (e.g. food liking) influence food choice to some degree (12,58), consequently, interventions attempting to reduce fat intake in women who have a greater liking for fat, as found in this study, may present a challenge for health professionals. However, actual dietary behavior of low-income women, especially in relation to normal weight and overweight/obese, is not well understood and deserves further attention.

Conclusions and Limitations

This study demonstrates that food liking, a factor not tested among this population previously, in addition to emotional coping response, self-control with food, importance

of cost, and the value an individual places on health, may influence food choice in low-income women and contribute to their present weight status. However, other personal and behavioral factors not examined in this study may also be involved. Further research should examine the influence and interaction among SCT constructs, along with early food exposure and dietary intake. While this research expands upon the current literature with this demographic, results may not be generalizable because regional variation may occur. An additional limitation is the absence of exclusion criteria for factors that may influence appetite and taste such as smoking, medication usage, or psychiatric disorders. Although, excluding for these factors would have limited the sample size because these are commonly observed in this population (61,62,63). Other limitations of the taste testing component include the large number of foods tasted may have led to sensory fatigue and influenced participants' appetite and liking ratings, and perceived hunger was not tested. Additionally, participants tasted a small number of items twice, which may have resulted in sensory-specific satiety and impacted liking ratings for those foods. Despite these limitations, this study adds new findings to the complexity of food choice among low-income lean/normal and overweight/obese and provides a basis for future research.

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Table 1. Food liking in lean/normal and overweight/obese low-income participants

Food category	Food Items	Lean/Normal		Overweight/Obese	
Spreadable Fats	unsalted butter*	82	+/- 52	107	+/- 45
	salted butter*	82	+/- 47	109	+/- 44
	margarine	89	+/- 46	97	+/- 39
	"healthy" margarine*	84	+/- 50	110	+/- 43
	Category average*	84	+/- 40	106	+/- 25
Soft Drinks	cola	69	+/- 43	91	+/- 54
	diet cola	52	+/- 35	72	+/- 49 ^a
	zero calorie cola	52	+/- 45	58	+/- 46 ^a
	Category average	58	+/- 30	74	+/- 41
	Snacks	grapes	142	+/- 19	144
carrots		109	+/- 45 ⁿ	120	+/- 45 ^b
chips		131	+/- 27	140	+/- 31
plain popcorn		109	+/- 32 ⁿ	117	+/- 38 ^{b,c}
buttered/salted popcorn		121	+/- 38 ^o	131	+/- 32
Category average		122	+/- 16	131	+/- 19
Fruit	apples	128	+/- 40	130	+/- 39
	bananas	129	+/- 32	126	+/- 51
	oranges	119	+/- 43	124	+/- 42
	cantaloupe	135	+/- 34	123	+/- 54
	pineapple	146	+/- 22	149	+/- 34
	Category average	132	+/- 20	130	+/- 26
Sweets	plain M&Ms	123	+/- 37	132	+/- 33
	chocolate covered nuts	116	+/- 47	130	+/- 34
	trail mix*	95	+/- 50	121	+/- 44
	gummy candy	121	+/- 35	122	+/- 47
	Category average	114	+/- 26	126	+/- 26
Vegetable	peas	87	+/- 47	87	+/- 63
	carrots	99	+/- 47	119	+/- 44
	green beans	101	+/- 44	119	+/- 54
	tomatoes	104	+/- 57	121	+/- 54
	Category average	98	+/- 25	112	+/- 38
Bread	white bread	101	+/- 51	115	+/- 50
	whole wheat bread*	102	+/- 47	128	+/- 32
	"brown" bread*	103	+/- 45	127	+/- 39
	Category average*	102	+/- 32	123	+/- 26
Overall	Healthy Liking*	102	+/- 15	111	+/- 18
	Unhealthy Liking*	104	+/- 19	115	+/- 18

Table 1. Food liking in lean/normal and overweight/obese low-income participants

Food category	Food Items	Lean/Normal	Overweight/Obese
Chips	regular salted chips	127 +/- 30	135 +/- 33
	baked chips*	93 +/- 36	118 +/- 34
	white corn tortilla chips	112 +/- 46	123 +/- 35
	blue corn tortilla chips	98 +/- 53	88 +/- 47
	Category average	108 +/- 29	116 +/- 24
Rice	white rice	87 +/- 46	94 +/- 49
	brown rice	86 +/- 38	82 +/- 43 ^{d, c}
	instant white rice	98 +/- 41	117 +/- 47
	Category average	90 +/- 28	98 +/- 32
Specialty bread	cornbread	114 +/- 41	118 +/- 47
	biscuits	91 +/- 48	104 +/- 39
	corn tortilla	65 +/- 44	84 +/- 44
	flour tortilla	92 +/- 44	113 +/- 44
	ciabatta bread	98 +/- 50	98 +/- 50
	Category average	92 +/- 28	103 +/- 29
Popcorn	plain	88 +/- 42	94 +/- 41
	buttered/salted popcorn	114 +/- 34	115 +/- 37
	cheese	123 +/- 33	133 +/- 34
	caramel	128 +/- 37	133 +/- 40
	kettle	118 +/- 48	106 +/- 47
	Category average	114 +/- 27	117 +/- 26
Meat	bologna	75 +/- 47 ^{p, i}	88 +/- 53 ^{l, g}
	ham	126 +/- 26	132 +/- 36
	turkey loaf	105 +/- 38 ^f	109 +/- 47 ^h
	real turkey*	115 +/- 41	139 +/- 29
	Category average	105 +/- 24	117 +/- 30
Beverages	2% milk	78 +/- 47	88 +/- 53
	juice	129 +/- 18	127 +/- 42
	cola	95 +/- 42	91 +/- 48 ^{i, j}
	water	133 +/- 37	134 +/- 43
	Category average	109 +/- 28	110 +/- 27
Milk	fat free skim milk	71 +/- 51 ^{s, i}	63 +/- 48 ^{k, l, m}
	1% milk	80 +/- 44 ^s	84 +/- 47 ^{l, m}
	2% milk	87 +/- 51 ^s	92 +/- 49 ^{l, m}
	whole milk	80 +/- 50 ^s	96 +/- 47
	fat free chocolate milk	108 +/- 51	116 +/- 42
	2% chocolate milk	107 +/- 55	128 +/- 44
	Category average	87 +/- 40	97 +/- 32

Values are mean liking ratings +/- SD. Corresponding verbal labels: Greatest imaginable dislike: 0; Dislike Extremely: 19; Dislike moderately: 58; Dislike slightly: 78; Neutral 87; Like slightly: 97; Like moderately: 120; Like very much: 137; Like extremely: 154; Greatest imaginable like: 176. Values presented in millimeters.

Multiple paired t-test within BMI groups:

Overweight/Obese: Soft Drinks: ^a indicates significantly < cola; Snacks: ^b indicates significantly < chips, ^c indicates significantly < buttered popcorn; Bread: no differences; Rice: ^d indicates significantly < white rice, ^e indicates significantly < instant rice; Meat: ^f indicates significantly < turkey loaf, ^g indicates significantly < real turkey; ^h indicates significantly < ham; Beverage: ⁱ indicates significantly < juice, ^j indicates significantly < water; Milk: ^k indicates significantly < whole, ^l indicates significantly < fat free chocolate, ^m indicates significantly < 2% chocolate. **Lean/normal:** Snacks: ⁿ indicates significantly < grapes, ^o indicates significantly < chips; Bread: no differences; Rice: no differences; Meat: ^p indicates significantly < turkey loaf; ^q indicates significantly < real turkey; ^r indicates < ham; Milk: ^s indicates significantly < fat-free choc milk, ^t indicates significantly < 2% choc milk

Healthy items: healthy margarine, diet cola, zero calorie cola, all fruit, all veg, trail mix, whole wheat bread, plain popcorn, corn tortilla, cornbread, brown rice, turkey loaf, real turkey, 100% juice, water, fat-free skim, reduced-fat 1% milk, reduced-fat 2% milk. **Unhealthy items:** unsalted butter, salted butter, margarine, cola, M&Ms, chocolate covered nuts, gummy candy, white bread, "brown" bread, reg chips, baked chips, white corn tortilla chips, blue corn tortilla chips, white rice, instant rice, biscuits, flour tortilla, ciabatta, buttered/salted popcorn, cheese popcorn, kettle popcorn, bologna, ham, whole milk, fat-free chocolate milk, 2% chocolate milk

Significance at $p < .05$

Table 2. Demographics for lean/normal and overweight/obese low-income participants

Characteristic	n=83	BMI < 25 n=29	BMI > 25 n=54
Race			
Caucasian	23 (27.7)	9 (31.0)	14 (25.9)
African American	48 (57.8)	16 (55.2)	32 (59.3)
American Indian	5 (6.0)	1(3.4)	4 (7.4)
Hispanic	2 (2.4)	--	2 (3.7)
Other	5 (6.0)	3(10.3)	2 (3.7)
Annual income^a			
<\$5,000	38 (45.8)	16 (55.2)	22 (40.7)
\$5,000-\$9,999	27 (32.5)	8 (27.6)	19 (35.2)
\$10,000-\$19,999	12 (14.5)	1(3.4)	11 (20.4)
\$20,000-\$39,999	4 (4.8)	3 (10.3)	1 (1.9)
>\$40,000	1 (1.2)	1 (3.4)	--
Education^b			
Eighth grade or less	3 (3.6)	2 (6.9)	1 (1.9)
Some high school	14 (16.9)	7 (24.1)	7 (13.0)
High school graduate/GED/equivalent	28 (33.7)	8 (27.6)	20 (37.0)
Some college/tech/vocational school	25 (30.1)	9 (31.0)	16 (29.6)
Completed college/tech/vocational school	8 (9.6)	3 (10.3)	5 (9.3)
Completed grad/professional school	2 (2.4)	--	2 (3.7)
Currently on food stamps^c			
Yes	68(81.9)	24 (82.8)	44 (81.5)
No	14(16.8)	5 (17.2)	9 (16.7)
Living Situation^d			
Shelter-based	32 (38.6)	5 (17.2)	27 (50.00)
Home-based	50 (60.2)	24 (82.8)	26 (48.2)
Age^f	36±10.227	36.93±12.04	35.5±9.20
Household size^{e, f}	3.76±1.92	3.45±1.92	3.93±1.98
Number of children^f	3.1±2.14	2.93±1.89	3.19±2.27

^aData not reported for n=1 (BMI > 25 = 1)

^bData not reported for n=3 (BMI > 25 = 3)

^cData not reported for n=1 (BMI > 25 = 1)

^dData not reported for n=1 (BMI > 25)

^eData not reported for n=1 (BMI > 25)

^fMean±standard deviation

Table 3. Significant differences in factors influencing food choice between lean/normal and overweight/obese low-income participants

Food category	Lean/Normal	Overweight/Obese	P-value
spreadable fat cost	0.33 +/- 1.3	1.12 +/- 1.3	.015
snack calories	0.00 +/- 1.4	0.76 +/- 1.3	.028
rice cost	0.21 +/- 1.3	1.12 +/- 1.2	.005
bread cost	0.13 +/- 1.4	0.96 +/- 1.4	.017
meat cost	0.25 +/- 1.4	1.06 +/- 1.2	.022
beverage cost	0.21 +/- 1.4	1.02 +/- 1.4	.015
beverage calories	-0.13 +/- 1.3	0.82 +/- 1.4	.014
fruit cost	0.39 +/- 1.3	1.15 +/- 1.2	.018
vegetable cost	0.17 +/- 1.3	0.86 +/- 1.3	.039

Values are mean 5-point Likert scale scores +/- SD

Chapter 4:

Dietary intake and environmental, personal, and behavioral factors are related to BMI in a group of multi-ethnic, low-income women.

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CHAPTER SUMMARY

Background: Dietary intake and behavioral correlates of BMI are not well understood in low-income women.

Objective: To 1) investigate environmental, personal and behavioral predictors of body mass index (BMI) in low-income women, 2) to examine differences in dietary intake between lean/normal and overweight/obese women, and 3) analyze the relationship between dietary intake and predictors of BMI.

Design: Cross-sectional survey using formative data and Social Cognitive Theory (SCT) as the framework. Food-related self-identity, food security status, a 24-hour recall, and heights and weights were also measured.

Participants/Setting: Lean/normal and overweight/obese low-income, urban women ($n = 330$) who qualified for a food and nutrition assistance program. Data collection occurred at sites within the community including homeless shelters, food pantries, libraries, and community centers.

Main outcome measures: Body mass index (BMI) and the relationship to environmental, personal and behavioral factors, and dietary intake between lean/normal and overweight/obese women.

Results: SCT constructs exhibited different levels of influence on BMI. The personal construct regression model predicted the greatest variance in BMI among the women (31%), followed by the behavioral construct (20%), and then the environmental construct (3%). Emotional eating variables and variables indicating preventative behavior were associated with BMI. Overweight/obese women consumed more energy (kcal) ($p = .03$), carbohydrates (g) ($p = .05$), sodium (mg) ($p = .01$), and MyPlate servings of grain ($p = .02$). Further, energy (kcal) intake was correlated with several variables.

Conclusions: Personal, behavioral and dietary factors may help to explain some weight variation observed among women living in similar obesogenic, low-income environments. Although further research is needed, results suggest interventions with this population should address emotional eating, and physical activity.

INTRODUCTION

In the United States (US), obesity and food insecurity are both particularly common among low-income women (1-4). The food environment of low-income neighborhoods, which offer plenty of cheap, calorically dense food, while more expensive healthier alternatives are less accessible (5-7), has been widely implicated in the paradoxical association between hunger and obesity (8,9). Additionally suggested to contribute to the increased weight of low-income women, have been the disordered eating patterns and binge eating behaviors associated with the episodic periods of food deprivation, as a result of the Supplemental Nutrition Assistance Program (SNAP) cycle (10,11). In households with children, food deprivation may be even more pronounced because women have been found to restrict food intake to allow their children to eat more (12,13). Furthermore, prolonged experiences with food insecurity whether in childhood or adulthood have been shown to result in a psychological attachment to food and emotional eating (14-16), which has also been proposed as a mediating factor in the relationship between low-income and obesity (16).

However, eating for emotional reasons has been associated with eating behavior and weight across all income and demographic groups (17,18), as have food-related self-identifications (19,20), which are shaped by an individual's personal values (21), and other personal and behavioral factors such as nutrition knowledge (22), food liking (23,24), and physical activity (25). Investigation of these and other personal and behavioral factors influencing eating behavior and weight status of disadvantaged women is limited, thus deserves further attention within the context of the low-income food environment. Furthermore, among those who have studied behavioral factors associated with BMI (2,26-28) in low-income women, to our knowledge, none have examined them in conjunction with actual dietary intake, especially within the context of lean/normal and overweight/obese. Although several studies have reported low-income women to have dietary intake patterns that are associated with chronic disease and conditions of excess weight (29-31), few have detailed actual dietary intake, or examined differences in consumption between lean/normal and overweight/obese participants.

Therefore, the aim of this research was to explore factors that influence behavior to provide further insight into why some women maintain a more healthy weight while

living in obesogenic, low-income environments, and others do not. Furthermore, this study sought to examine actual dietary intake in relation to BMI, as well as the association between dietary intake and predictors of BMI. This information may contribute to an expanded understanding of the hunger-obesity paradox, and help to shape more effective, individualized health and nutrition interventions.

METHODS

Study design and sample

To investigate the relationship between behavioral, personal, environmental and dietary factors, and weight status in low-income, urban women, a cross-sectional survey was developed and administered to (*n* 330) women. Recruitment and data collection occurred at homeless shelters, food shelves (A.K.A. food pantries), libraries, soup kitchens (hot meal sites), and neighborhood centers. To include a variety of weight categories, purposeful sampling was used. Low-income women residing within the Greater Twin Cities were eligible to participate if they qualified for a food and nutrition assistance program and were aged between 18 and 64 years. In total, self-administered surveys, diet recalls, and height and weight measurements took approximately 60 - 90 minutes. Participants provided written informed consent and were given monetary compensation for participating. The University's Institutional Review Board approved this study.

Survey development and measures

This survey measured demographic information, food security status, food-related self-identification, and behavioral and actual dietary intake associations to BMI status. The main survey questions and self-identification questions were developed from qualitative data collected from 16 focus groups with 83 multi-ethnic low-income women (32) and a review of the literature. Questions were framed within the context of Social Cognitive Theory (SCT), which is commonly used in nutrition research (2, 28, 29) because it provides guidance for shaping interventions that directly target behavior (33, 34). Specifically, questions pertained to coded themes from focus group data analysis (32) (e.g. emotional eating, health beliefs, physical activity), and were framed within each of SCT's main constructs (34). For instance, physical activity questions were framed within the context of the environment "I do not feel safe walking in my neighborhood,"

within the context of behavior “I exercise regularly to help keep myself healthy,” and within the context of personal, “I like how I feel after exercise.” Twenty self-identification questions followed the SCT construct questions and included statements, such as “I consider myself to be an emotional eater,” “I consider myself to be a meat eater,” and “I consider myself to be a healthy eater.” The survey was written at a Flesch - Kincaid level of four and a five-point Likert scale was used for SCT and self-identification questions, with the following possible responses: strongly disagree [-2], disagree [-1], does not apply [0], agree [1], and strongly agree [2]. The survey was pilot-tested with the target population ($n = 31$), for reliability and readability, and reviewed by experts knowledgeable in survey development. To test reliability of the pilot sample participant responses, Cronbach α coefficients were calculated and were .81, .74, and .70, for environmental [63], personal [73], and behavioral [67], respectively. For the self-identity questions, the coefficient was .72. Cronbach α coefficients of $\geq .70$ indicates good internal consistency (35). Minimal revisions were necessary for the final SCT survey.

security status, and referred to the household's experience during the past 12 months (36). The Cronbach α coefficient for the food security measure in the pilot sample was .87, illustrating good internal consistency (35). Because of the transitory nature of the target population, dietary intake data was collected via one 24-hour recall. Trained researchers administered the USDA's five-step dietary recall method, which includes a quick list of foods and beverages [1]; forgotten foods [2]; the time and occasion of food consumption [3]; the detail of foods and amounts eaten, aided by the use of three dimensional food models and stand measuring utensils [4]; and a final review [5] (37). One trained researcher took all measures of heights and weights, using a standard protocol (38). Body mass index (BMI) was calculated and women were grouped into two BMI categories, lean/normal ($BMI < 25 \text{ kg/m}^2$) and overweight/obese ($BMI \geq 25 \text{ kg/m}^2$), and these dichotomous variables were used in analysis where appropriate.

Data analysis

Version 17.0 of SPSS (SPSS Inc, Chicago, IL) was used for data analysis, with statistical significance of ($p < .05$). Sociodemographic data were analyzed for means and frequencies, and differences between lean/normal and overweight/obese participants were

compared using t-test, one-way analysis of variance, and nonparametric tests. Food security scores were computed and means were analyzed between BMI categories. Pearson correlation coefficients were also used to analyze the association between raw food security score, and BMI as a continuous variable.

Pearson correlation coefficients were used to reduce the SCT data set and examine the relationship between constructs and BMI. Significant correlations were then entered into a multiple linear regression model within each of the three constructs. Assumptions for using a multiple linear regression were checked and met. Additionally, intercorrelations, tolerance, and variance inflation factor values were examined to assess multicollinearity. Two pairs of questions, measuring similar SCT components (personal beliefs/preferences) were correlated; therefore, one from each pair was removed from the model. Adjusted R^2 values are reported in Table 2.

Elizabeth Stewart Hands and Associates (ESHA) *The Food Processor QSL v 10.2* (ESHA Research, Salem, Oregon) was used to analyze dietary data and computed nutrient and MyPlate intakes, which were subsequently imported into the SPSS for analysis. Ten cases were found to be outliers for energy intake, and were removed from the data set. Dietary Reference Intakes (DRI) were used as a reference for each nutrient recommended within the participant's age group and gender (39) (Table 3), and The Dietary Guidelines for Americans were used as a reference for participant MyPlate mean servings (40) (Table 4). Fat servings were computed from total fat grams, with 12.8 grams equating to one serving (41) (Table 4). In calculating servings of added sugar, one serving was equivalent to 4 grams (41, 42) (Table 4). Dietary intake data were analyzed both comparatively between BMI categories, and using Spearman's correlation to test the relationship between nutrient data and BMI as a continuous as variable. Pearson's correlations were used to examine the relationship between BMI and self-identity, and significant predictor variables of BMI and energy intake.

RESULTS

Sample characteristics

Seventy-one percent of the sample was categorized as overweight/obese and 29% was lean/normal (Table 1). The majority of women were African American (40%) followed by American Indian (29%) and Caucasian women (19%), with the remainder

self-identifying as Hispanic, Asian, or other/mixed race (Table 1). Although mean BMIs were not significantly different between ethnicities, categorical BMI status was associated with American Indian women more likely to be overweight/obese than Caucasian women ($p < .05$). Food insecurity was prevalent in the sample, with 32.1% classified as having low food security and 30.3% as having very low food security. Importantly, no association between BMI and food security was found.

SCT constructs

The reciprocal nature of the SCT was upheld; Pearson correlation coefficients were significant between the three construct means at ($p < .01$) level. Within the three SCT regression models, all of the significant Pearson correlation coefficients entered into the model as predictors of BMI, and all of the models were significant (Table 2). The personal construct explained the greatest amount of variance at 31%. Five questions within this construct were statistically significant. The behavioral construct explained 20% of the variance and six questions statistically significant. However, the environmental construct explained only 3% of the variance in BMI with both questions in the model statistically significant (Table 2).

24-hour dietary recall

Dietary intakes for both BMI categories were below the DRI levels for fiber, vitamins C, D, E, and K, folate, Ca, Cu, fluoride, iodine, Fe, Mg, and K (Table 3). Both lean/normal and overweight/obese participants consumed less than the recommended MyPlate servings for fruits, vegetables and dairy (Table 4). Additionally, intakes of grain were below recommendations for lean/normal women but above for overweight/obese, and intake between the two weight groups was significantly different (Table 4). Protein intake was above recommendations for both BMI categories, and servings of fats, oils and sweets were high for both, as well (Table 4). When comparing dietary intake between lean/normal and overweight/obese, results showed that women in the overweight/obese category consumed significantly more energy (kcal), carbohydrates (g), and sodium (mg) than their lean/normal counterparts (Table 3). Correlations coefficients showed a positive relationship between total fat (g) (.127, $p < .05$) saturated fat (g) (.140, $p < .05$), protein (.122, $p < .05$) and BMI.

Dietary associations

A relationship was also observed among energy intake, predictors of BMI, and self-identity including eating when stress ($r = .201, p < .01$); weight gain when stressed ($r = .118, p < .05$); eating healthy to decrease chance of diet related diseases ($r = -.145, p < .01$); and self-identifying as a stress eater ($r = .166, p < .01$).

BMI and self-identity

When examining self-identity questions, 5 questions were found to correlate to BMI. Junk food eater ($.110, p < .05$) and stress eater ($.125, p < .05$) showed a positive correlation to BMI and correlations fruit eater ($-.111, p < .05$), light eater ($-.155, p < .01$) and healthy eater ($-.215, p < .01$) were inversely correlated to BMI.

DISCUSSION

This study examined dietary intake, food-related self-identity, and perceived personal, behavior, and environmental factors in relation to BMI among low-income women. Of the SCT constructs, personal variables predicted the greatest variance in BMI. Important findings of this research within both the personal and behavioral regression models were that several variables related to emotional eating were found to be significant predictors of BMI. Although less of a predictor than the personal construct, other results within the behavioral construct showed that women with a healthier BMI more strongly agreed that they eat healthy to decrease their chances of getting a chronic disease and exercise on a regular basis to keep themselves healthy. The environmental construct predicted the least variance in BMI within this sample, although both questions were significant in the model. Previous research has also observed personal factors to be most related to BMI (2, 28), although the current study is distinct as dietary intake was also measured and correlated to significant predictors of BMI and self-identification questions.

Dietary results of this study showed that diets of both lean/normal and overweight/obese women were energy dense but nutrient poor, as they were lacking in most micronutrients, but high in fats and added sugars. Researchers examining dietary patterns of low-income women have reported similar findings (2, 43,44); however, the present study also examined differences in nutrient intakes between lean/normal and overweight/obese and found that overweight/obese participants consumed more energy (kcal), and may carbohydrate, sodium and grain servings than lean/normal participants.

Higher mean energy intake of the overweight/obese participants may partly explain their excess weight, although it cannot be determined if energy intake among these women exceeded total energy needs.

Almost all of the emotional eating variables were positive predictors of BMI and included women of higher weight status more strongly agreeing that they gain weight when stressed. Although biological mechanisms may partly explain the relationship between stress and weight (45), results showed that women of a higher BMI status more strongly agreed that they eat more when stressed, suggesting that behavioral mechanisms (e.g. increased food intake) may also be involved. Congruently, positive relationships between self-identifying as a stress eater, junk food eater and BMI were observed. Additionally, positive correlations were found between total energy intake (kcal) and emotional eating predictors of BMI (agreement of weight gain when stressed, eating when stressed, and self-identifying as a stress eating eater). These data suggest that dietary factors may mediate a relationship between stress and weight, and demonstrate that responses to emotional eating questions were more than just participant perception; rather they impacted actual eating behavior. While others have demonstrated an association between emotional eating and weight status in low-income women (2, 28), the current results expand upon this relationship, linking emotional eating variables to actual increased intake, as measured by a 24-hour recall and reinforced through self-identity questions. However, more research should be conducted to further the understanding of the relationship between stress, food intake and weight, as limited human studies have examined the correlation between stress and total energy intake (46,47). Despite the paucity of mechanistic studies, results from this study, as well successful interventions studies that have addressed emotional eating with this highly stressed demographic (48), greatly supports the inclusion of behavior change strategies focusing on coping response to stress in future interventions. Although, women of lower BMIs did agree more strongly that they give sweets to their children to make them feel better, possibly suggesting that these women were also more likely to eat for emotional reasons (49), the research examining the maternal use of food to soothe their children in relation to their own eating behaviors is limited and not well understood (50). Also possibly indicating an emotional relationship with food, women of lower BMIs reported

that they eat more at restaurants when happy. In light of this response, future research might consider the types of emotions influencing eating, as most of the literature has focused on eating response to negative emotions (16, 51).

The inverse relationship found between BMI and those self-identifying as a healthy eater, fruit eater, and light eater, corroborate the findings that women with lower BMIs more strongly reported engaging in preventative behavior like eating healthy and exercising, are supported by a previous study which reported a relationship between similar food-related self-identities and BMI (19). Additionally, findings from self-identity questions suggest that these women may value health-related behaviors more than women with higher BMIs, and align these behaviors with how they view themselves as a person (21). However, while women of lower BMIs identified as being a fruit eater, a relationship was not found between BMI and MyPlate servings of fruit. Timing of SNAP benefit disbursement may have influenced 24-hour dietary intake because over half of the participants agreed or strongly agreed with the survey question: "I can only afford to buy fruits and vegetables when I first get my food stamps." Therefore, further research examining eating behavior should try to include repeated dietary intake measures at varying times of the month in order to control for feast/famine influences, and more accurately assess eating behavior within this population. Interestingly, although most of the construct variables and nutrient data suggest that women of lower BMI engage in behavior more favorable to a healthy weight, several body image questions relating to the desire to gain weight were significantly correlated to BMI. However correlations were not observed between the desire to gain weight and energy intake, suggesting that it did not influence eating behavior.

Converse to findings that women of lower BMI more strongly agreed that they exercise regularly for their health, women with a higher weight status were more likely to report that health problems prevent them from exercising. The literature has greatly focused on the built environment as a major barrier to activity (8) but health problems, such as diabetes, hypertension and arthritis, have also been found (52) and may also be influencing the high rate of inactivity among low-income populations (53). Additionally, other barriers have been described by low-income women in focus groups and include fatigue from labor-intensive jobs, caring for children by themselves, lack of childcare,

limited social support, lack of money, cultural influences, and self-consciousness (54). Given these barriers, it would be beneficial to examine how women of healthier weights are able to overcome them and engage in regular exercise, as this study and one by MacFarlane et al (26), indicate they do. This information could be used to develop more tailored and appropriate physical activity intervention programs for this high-risk demographic. Furthermore, women with higher BMIs in this study recognized that they would be healthier if they lost weight, suggesting they may be amendable to engaging in affordable, low-impact, culturally appropriate exercises for their health.

Limitations

This study took place with low-income, urban women living in the Midwestern US; hence, results may not be generalized to low-income women in other geographical locations. Also, only one 24-hour recall was collected in this study, limiting the ability to capture daily variations in the diet. However, obtaining additional 24-hour recalls would not have been feasible because a portion of our sample was homeless and living in transient situations with inconsistent access to a phone. Additionally, overweight and obesity occur as a result of prolonged positive energy balance; thus assessment of dietary and behavioral factors at one point in time, making inferences related to diet and weight challenging.

Conclusion

Environmental, personal, and behavioral predictors of BMI and dietary intake were investigated, revealing that personal factors predicting the greatest variance in BMI. In both the personal and behavioral constructs, several variables relating to stress were significant, suggesting that emotional coping response to stress plays a role in low-income women's weight status, as well as increased energy intake. Conversely, regular physical activity and diet-related preventative behavior may help to explain the ability of some women to maintain a more healthful weight while living in environments associated with obesity. Overall, these findings indicate that interventions with low-income women should address emotional eating and emphasize physical activity. However, SCT variables relating to self-efficacy or observational learning, that may further explain these healthy behaviors of the women with lower BMIs and assist with planning interventions, were not correlated to BMI in this study. More research examining SCT factors may

provide further insight into the basis for the reported behaviors of the women in this study.

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Table 1. Sample characteristics of low-income women from Minneapolis/St Paul

	Total		BMI Category			
	(n 330)		BMI < 25		BMI ≥ 25	
	n	%	n	%	n	%
Race						
Caucasian	63	19	25	26	38	16
African American	131	40	42	44	89	38
American Indian	95	29	15	16	80	34
Hispanic	9	3	3	3	6	3
Asian	3	1	1	1	2	1
Other	29	9	9	10	20	8
Annual income*						
<\$5,000	195	59	57	60	138	59
\$5,000-\$9,999	70	21	18	19	52	22
\$10,000-\$19,999	43	13	13	14	30	13
\$20,000-\$39,999	16	5	1	1	13	6
\$40,000-\$59k	3	1	1	1	2	1
\$60k or >	1	.3	1	1	--	
Education*						
Eighth grade or less	10	3	1	1	9	4
Some high school	87	26	21	22	66	28
High school/GED equivalent	120	36	29	31	81	35
Some college/tech/vocational	94	29	3	3	65	28
Completed college/tech/vocational	13	4	1	1	10	4
Completed grad/professional	4	1	--		3	1
Living Situation[†]						
Yes	91	28	66	70	64	27
No	234	71	27	28	167	71
Currently employed[‡]						
Yes	49	15	77	81	203	86
No	280	85	23	19	31	13
Currently on food stamps						
Yes	303	92	82	86	221	94
No	27	8	13	14	14	6
Living Situation						
Shelter-based	63	19	20	21	43	18
Home-based	252	76	73	82	179	76
Other	15	5	2	2	13	6
	<u>Mean</u>	<u>SD</u>	<u>Mean</u>	<u>SD</u>	<u>Mean</u>	<u>SD</u>
Age (years)[§]	36.5	11.1	35.1	12.6	37.1	11.3
Body mass index, kg/m²[§]	31.2	8.9	21.9	1.9	34.9	7.9
Food security (raw score)[§]	2.9	2.3	3.0	2.4	2.8	2.2
Household size^{*,§}	3.5	2.1	3.2	1.9	3.6	2.2

* Data not reported for n = 2

† Data not reported for n = 5

‡ Data not reported for n = 1

§ Mean±SE

Table 2. SCT construct multiple linear regression for body mass index (BMI)

	B	SE*	Beta	t	P
Environmental Construct^a					
Constant	29.2	.676		43.2	000
1. I eat at restaurants when I am happy.	-.82	.39	-.11	-2.1	.04
2. People with money are more likely to be overweight.	-1.02	.441	.13	-2.31	.02
Personal Construct^b					
Constant	29.2	.68		43.2	000
1. Watching T.V. and reading celebrity magazines makes me feel bad about the way I look.	.18	.37	.03	.48	.63
3. When my child is upset, I give them sweets to make them feel better.	-1.34	.44	-.15	-3.02	003
2. I eat my child's leftovers because I do not like to waste food.	-.54	.38	-.07	-1.41	.16
4. When I am feeling stressed, I tend to lose weight.	-.52	.35	-.076	-1.48	.14
5. When I am feeling stressed, I tend to gain weight.	.96	.38	.14	2.55	.01
6. Fast food is not appealing.	-.39	.36	-.05	-1.1	.27
7. I feel guilty if I overeat.	-.56	.39	-.08	-1.45	.15
8. I am happy with my weight.	-.19	.413	-.14	-2.81	005
9. I have lost weight and kept it off.	-.57	.37	.08	-1.57	.12
10. After having my children I was able to lose the weight.	-1.04	.37	-.14	-2.81	005
11. I do not worry about my weight.	-.35	.42	-.05	-.083	.41
12. I would be healthier if I lost a few pounds.	2.4	.41	.36	-5.86	000
13. I would look healthier if I gained a few pounds.	-.162	.38	-.02	-.42	.67
14. When I go out to eat I bring home leftovers.	-.58	.36	-.08	-1.64	.1
Behavioral Construct^c					
Constant	29.6	1.04		28.6	000
1. When I am stressed, I eat more.	.77	.34	-.17	2.25	.03
2. I smoke cigarettes when I am stressed.	-.68	.39	-.09	-1.76	.08
3. I move around or fidget a lot.	-.71	.37	-.1	-1.91	.06
4. I exercise on a regular basis to keep myself healthy.	-.87	.39	-.12	-2.19	.03
5. Health problems prevent me from exercising.	1.34	.39	.17	3.36	001
6. I eat healthy to decrease my chances of getting a disease like diabetes.	-.96	.39	-.12	-2.25	.03
7. I eat more because I want to gain weight.	-1.89	.49	-.23	3.86	000
8. I eat less because I want to lose weight	1.24	.39	.18	3.38	001
9. I eat more because I want to be bigger, like my family and friends.	.47	.55	.05	.85	.4
10. I hide food from my children.	-.71	.51	-.073	-1.37	.17
11. I worry if my stash runs out before my food	-.71	.42	-.089	-1.67	.09
12. I buy fruits and vegetables but I cannot afford to buy them for my children.	-1.02	.52	-.103	-1.96	.05

*B, XXXX; SE, standard error

^aF (2, 327) = 5.633; p value = .004, Adjusted R² = 2.8%^bF (14, 308) = 11.498; p value = .000; Adjusted R² = 31.3%^cF (12, 307) = 7.554; p value = .000; Adjusted R² = 19.8%

Table 3. Nutrient means (SD) for lean/normal and overweight/obese women

	DRI [†]	BMI < 25		BMI ≥ 25	
		Mean	SD	Mean	SD
Energy (kcal)*	--	1913.8	844.2	2165.5	985.1
Carbohydrates(g/d)*	130	244.4	121.6	278.5	144.3
Protein (g)	46	73.5	33.5	80.1	41.7
Fat (g)	--	73.2	40.8	82.9	48.4
Saturated fat (g)	--	24.1	15.6	28.0	18.4
Trans fat (g)	--	1.7	3.6	1.9	3.2
Chol (mg)	--	262.9	25.8	277	14.6
Fiber (g) [‡]	25	14.2	10.5	13.8	8.3
Vitamin A (µg)	700	725.6	615.1	731.4	770.5
Vitamin C (mg/d)	75	65.9	74.1	61.6	71.6
Vitamin D (µg)	15	3.4	4.0	2.8	4.1
Vitamin E (mg)	15	4.22	4.8	5.1	10.5
Vitamin K (µg) [‡]	120	32.4	60.9	42.5	68.5
Thiamin (mg/g)	1.1	1.4	1.5	1.4	1.9
Riboflavin (mg/d)	1.1	1.6	1.2	1.5	0.9
Niacin (mg/d)	14	26.5	16.1	28.5	18.9
Vitamin B ₆ (mg/d)	1.3	1.4	1.01	1.4	1.6
Folate (µg)	400	296.6	290.8	291.8	240.6
Vitamin B ₁₂ (µg)	2.4	3.7	3.5	3.8	4.8
Ca (mg)	1000	656.5	518.2	654.8	459.9
Cu (mg)	.9	0.6	0.4	0.7	0.6
Fluoride (mg) [‡]	3	.3	0.5	0.3	1.1
Iodine (µg)	150	54.1	66.3	47.6	50.5
Fe (mg)	18	14.0	9.9	13.5	8.2
Mg (mg)	320	157.3	91.6	159.8	99.7
P (mg)	700	792.8	452.9	914.0	589.5
Zn (mg)	8	9.1	7.8	8.1	6.4
K (mg)	4700	1854	1182.6	1826.1	1159.5
Na (mg)* [‡]	1500	2954.3	1581.2	3602.3	2391.7

* Indicates significant differences in nutrient intakes between BMI categories ($p < .05$)

[†] DRI refer to Dietary Reference Intakes⁽³²⁾, including Recommended Dietary Allowances (RDA) and Adequate Intakes (AI). Dashes indicate that values have not been determined

[‡] Adequate Intakes

Table 4. MyPlate food group analysis for lean/normal and overweight/obese women

	Recommended Servings	BMI < 25		BMI ≥ 25	
		Mean	SD	Mean	SD
Grains (ounce equivalents)*	6	5.3	4.1	6.7	5.8
Vegetables (cups)	2.5	1.1	1.1	1.1	1.5
Fruits (cups)	2	0.9	1.9	0.8	1.3
Milk (cups)	3	1.2	1.6	1.1	1.2
Meat and beans (ounce equivalents)	5.5	5.7	4.3	6.2	5.2
Fats, oils, added sugars (servings)	--	2.3	2.0	2.8	2.3

* $p < .05$

Chapter 5:

Summary of Key Findings
Conclusions and Implications

SUMMARY OF KEY FINDINGS

Phase 1a: Focus Groups

The results presented below have been adapted from the following manuscript:

Dressler H, Smith C. Health and eating behavior differs between lean/normal and overweight/obese low-income women living in food insecure environments. *Am Health Promotion* (In press)

Quantitative

This sample included 83 women with a mean age of 36.0 years. Approximately 35% were classified as lean/normal and 65% were overweight/obese. Of the latter group, 33% were classified as overweight and 66% were obese. In the lean/normal group, three women were underweight. Demographic information were similar for weight groups. There was no significant difference in smoking between lean/normal and overweight/obese women. Lean/normal women perceived their diet as being healthier than overweight/obese women (p -value = .001) (**Chapter 2, Table 1**).

Qualitative

Major themes that emerged from focus group analysis include: (1) aberrant eating behavior, (2) health beliefs and values, and (3) food environment. Although data were analyzed using the open-coding method, components of the various SCT constructs emerged from discussion and include situation for the environmental construct; emotional coping response, self-control, reinforcements, and expectancies for the personal construct; and behavioral capability and outcome expectations for the behavioral construct.

Theme 1: Aberrant eating behavior

Subthemes include emotions influence eating behavior, stashing or hoarding of food, and overeating behavior. Personal constructs such as emotional coping response and self-control were evident in this theme. Overweight/obese women tended to talk about eating more because of emotional states such as stress, depression, and boredom. Consistent with these findings, overweight/obese women also described frequent episode of overeating, and discussed stashing high calorie junk foods away from their children and/or significant other. In contrast, lean/normal women reported that they ate less or that emotions had no influence on their consumption patterns, and did not typically stash food

or overeat. Among the lean/normal weight group, some described using healthy coping mechanisms instead like walking or eating fruit as opposed to sweets or high fat foods when they were struggling with emotions. Demonstrating adherence to internal hunger cues and greater self-control over their behavior, lean/normal women reported that they ate mostly for hunger and stopped eating when they were full. Cigarette smoking was another coping strategy for emotional upset, which was heard across both weight groups.

Theme 2: Health beliefs and values

Subthemes within health beliefs and values were nutrition knowledge, importance of exercise and influencers of body weight. Many lean/normal women exhibited nutrition knowledge and illustrated the application of this knowledge to their eating decisions to prevent chronic disease and maintain a healthy weight. A few overweight/obese women were somewhat knowledgeable about nutrition, although this was not applied towards preventative behavior, but was because they or a family member had been diagnosed with a diet-related chronic disease and were trying to manage the condition.

Personal and behavioral components interacted during the discussions of physical activity with lean/normal women expressing positive outcome expectations towards exercise in helping to maintain a healthy, and valuing the health benefits of exercise, of which both were undoubtedly influential in promoting their described exercise behavior. However, lean/normal women seemed to be ambiguous in their outcome expectations, because they also discussed similar beliefs as the overweight/obese women that body weight and onset of disease were more determined by genetics.

Theme 3: Environment

All three SCT constructs emerged in this theme. Subthemes included food insecurity, grocery shopping, food preparation, and restaurant foods. Both women discussed similar interactions with the food environment including struggling with episodes of food insecurity and consuming foods frequently from restaurants. All women discussed grocery shopping at similar places, but motivators for food purchases varied between weight groups. Although recognizing the higher cost of healthier food, lean/normal women described health being a main priority in their food purchases but overweight/obese women did not, suggesting differences in personal expectancies related to the outcome of eating healthy. A range of cooking skills were noted across weight

groups, although many overweight/obese women were more descriptive and exhibited greater excitement when talking about cooking and food in general.

Phase 1b: Taste Testing

The results presented below have been adapted from the following manuscript:

Dressler H, Smith C. Food choice, eating behavior, and food liking differs between lean/normal and overweight/obese low-income women. *Appetite*. (Under second revision).

Qualitative

Major thematic findings relevant to taste testing were factors influencing food choice, emotional eating, food cravings and overeating behavior.

Quantitative

Primary findings from the taste testing analyses were that overweight/obese liked fat within the context of spreadable fat and milk. Additionally, results showed that overweight/obese liked both healthier and less healthy foods more than lean/normal women, and both groups had a similar liking of healthier versus less healthy when comparing these means within weight groups. This indicates that a dislike of healthier foods compared to less healthy, is not a barrier to healthier food choice and inability to maintain a healthy weight status, but rather, their higher liking of fat may be more of a barrier to healthy food choice, and a contributing factor to their current weight status.

Consistent with findings from focus groups, overweight/obese women valued cost significantly more than lean/normal weight women when deciding what to buy within most of the food categories (**Chapter 3, Table 3**), and when considering the inverse relationship between energy-density and food cost, an emphasis on cost may encourage the purchase of more energy-dense foods. Overall, both groups selected liking and flavor as the top two most important factors when deciding what to eat for all food categories represented in the taste testing (**Chapter 3, no table**), highlighting the role of sensory factors in food choice.

Phase 2: Survey and 24-hour recall

The results presented below have been adapted from the following manuscript:

Dressler H, Smith C. Dietary intake and environmental, personal, and behavioral factors are related to BMI in low-income women. Submitted to *Academy of American Dietetic Association*.

This sample consisted of 330 women that had a mean age of 36.5 years. Seventy-one percent of the sample was classified as overweight/obese and 29% was lean/normal (**Chapter 4, Table 1**). The majority was African American followed by American Indian, and Caucasian, with the remainder self-identifying as Hispanic, Asian, or other/mixed race (**Chapter 4, Table 1**). American Indian women more likely to be overweight/obese than Caucasian women ($p < .05$) but mean BMIs were not different between ethnicities. Food insecurity was common, with 32.1% classified as having low food security and 30.3% as having very low food security. No association between BMI and food security was found.

SCT constructs

For all each of the three multiple linear regressions, all of the significant Pearson correlation coefficients entered into the model as predictors of BMI, and all models were significant. The personal construct explained the greatest amount of variance at 31%, and five questions within this construct were found to be statistically significant. The behavioral construct explained 20% of the variance, and six questions statistically significant. The environmental construct explained the least amount of variance in BMI at 3%, with both questions in the model statistically significant (**Chapter 4, Table 2**).

24-hour dietary recall

Both BMI groups did not adequately meet the DRIs for several nutrients (**Chapter 4, Table 3**) and consumed less than the recommended amounts of fruits, vegetables and dairy. MyPlate analysis also showed that overweight/obese had grain intake above recommendations and lean/normal women were below. Both BMI groups had protein intakes above recommendations, and high intakes of fats, oils and added sugars (**Chapter 4, Table 4**). Comparison between lean/normal and overweight/obese showed that overweight/obese women consumed significantly more energy (kcal), carbohydrates (g), and sodium (mg) than lean/normal women (Table 4). Positive relationships were found between total fat (g) (.127, $p < .05$) saturated fat (g) (.140, $p < .05$), protein (.122, $p < .05$) and BMI (**Chapter 4, no table**).

Dietary associations

Eating when stressed ($r = .201, p < .01$); weight gain when stressed ($r = .118, p < .05$); eating healthy to decrease chance of diet related diseases ($r = -.145, p < .01$); and self-identifying as a stress eater ($r = .166, p < .01$), were all found to be correlated with total energy intake.

BMI and self-identity

Self-identity questions that were correlated to BMI include junk food eater ($.110, p < .05$); stress eater ($.125, p < .05$); fruit eater ($-.111, p < .05$); light eater ($-.155, p < .01$); and healthy eater ($-.215, p < .01$).

CONCLUSION AND IMPLICATIONS

Utilizing SCT as the theoretical framework, this multi-phase research project sought to examine variation in environmental, personal, and behavioral factors impacting food choice and eating behavior and the relationship of these factors to the current weight status of low-income women residing in Minneapolis/St Paul. These factors were analyzed comparatively in phase 1a and 1b, through examining differences between women of healthy weight status and overweight/obese, and using BMI as a continuous variable in phase 2. Differences in nutrient intake, collected during phase 2 via a 24-hour recall, were compared between the two BMI groups.

Primary findings from this study indicate that, personal and behavioral attributes including food-related values, emotional eating, food liking, nutrition knowledge, physical activity, and actual food intake may be more contributory to the current weight status of lean/normal and overweight/obese women living in similar food-related environments. Although additional SCT construct influences on behavior should also be considered such as self-efficacy, this research establishes a solid basis for understanding some of the behavioral factors that allow some low-income women to maintain a healthy weight, despite the odds, and offers potential avenues for future research and interventions to target specific behaviors. Findings from this research are elaborated upon in the following paragraphs, along with the suggested opportunities interventions and further research.

Having the inclination to eat for emotional reasons, especially in light of the stressful circumstances that women living in poverty encounter and the abundant

opportunities within the food environment to escape these stressful situations with cheap, energy-dense, palatable foods, may explain the increased energy intake among the overweight/obese women in this study and their current weight status. In contrast, lean/normal weight women appear to be less sensitive to the obesity-promoting food environment low-income populations are exposed to, because they lack an eating response to emotions, or eat less, even when struggling with the stresses of poverty. While interventions directed at improving the food environment may result in greater accessibility of healthier foods, unhealthy foods are still widely available, and may be a more appealing option to those prone to eat for emotional reasons. Thus, interventions targeted at the environment need to also incorporate long-term, individualized alternative strategies for dealing with emotions and stress in order to manage temptations better within the current food environment, and effectively address non-environmental contributors to weight in this population. This undoubtedly will require interventions that focus on establishing and building cognitive skills such as self-efficacy and self-control to avoid resorting to unhealthy environmental distractions during times of emotional distress, and emphasize focusing on internal cues and following regular meal patterns.

Similarly, the wide availability of high-fat foods within the food system, coupled with their greater liking of fat, may also place overweight/obese women at-risk for excess calorie intake and contribute to their current weight status. This suggests that interventions with this group should be interactive and introduce lower-fat food options and include demonstrations on preparing lower fat foods in order to increase their exposure to lower-fat items and help shift their preference from high fat. Positive findings of an overall similar liking of healthier and less healthy foods in the overweight/obese women indicates that they are amenable to consuming healthy foods and may be responsive to interventions that introduce different types of vegetables, fruits, and whole grain foods. Although interventions may help to address changing taste preferences in overweight/obese women, more research is needed to better understand the development of food likes and exposure to healthy foods in low-income children.

However, for any intervention to be effective at changing behavior, the individual must value the outcome of performing that specific behavior. This poses a major challenge because results from phase 1 of this study suggest that overweight/obese do not

value health as much as their lean/normal low-income counterparts. Additionally, survey results showed women of higher BMIs did not have self-identities that were aligned with healthy behaviors while the lean/normal women did. Values and self-identities may change throughout an individual's life, but health promotion efforts aimed at molding values supportive of health may be more effective in children. Although, more research should examine the relationship between health-related values, self-identity and weight, in order to better inform intervention efforts.

In conclusion, based on this project, directions for research and interventions relating to health and eating behavior in this population should include: 1.) implementation of nutrition intervention programs that focus on healthful stress reduction methods with the aim of decreasing emotional eating, as well as interventions that incorporate nutrition education and emphasize the link between diet and health; 2.) further evaluation of food liking, especially in populations of disadvantaged children, to better understand the formation of food likes within the low-income food environment; 3.) investigation of health-related values and the role of food-related identities in shaping food choice and health; and 4.) longitudinal studies with low-income women to establish stronger relationships between weight status and dietary and health behaviors in this population.

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Appendices

PARTICIPANT CONSENT FORM

This research project is being conducted by Chery Smith, PhD, MPH, RD and Diana Brostow, MPH, a graduate student, from the Department of Food Science and Nutrition at the University of Minnesota. This research is funded by Families That Work.

You have been invited to join a small group of people to talk about the foods you decide to eat. We are curious how your beliefs, tastes, family background and financial situation affect what you choose to eat, and how food choices impact your weight. We consider you, the potential participant, to be an “expert”, and hope that you share your opinions with us.

This project has two parts to it, the first visit will include a discussion group talking about food, height and weight measurements (measurements on you are required in order to take part in this study), and background information about you (information such as age, gender, education level, number of children in your household, eating patterns, where you currently live), and this session will take up to 2 hours. It will be audio-taped and the session may be photographed for teaching purposes. You will be asked to talk about how you make food choices; what drives you to eat (hunger, boredom, the time of the day-scheduled eating, pleasure, etc.); what are your favorite foods and what makes them favorites; what you like about foods that are mainly fat, protein, and carbohydrates; do you like sweets-why-why not; do you like salty snack foods-why-why not; do you eat for taste, for nutrition, or for comfort (or for other reasons); do you hoard food; do eat in the car or walking down the street, or just in the home; do you ever eat a lot (binge) some foods; do ever forget to eat; do you overeat because you are not sure when the next meal will be; and do you think constantly about food or do you never think about it, and why do you think that you are lean or heavy. You will need to come back for the second visit of the project which will include tasting a variety of foods and answering questions about those foods.

Please read this form and ask any questions you have before agreeing to take part in this survey. By agreeing to take part in this project, you agree to attend both sessions and will receive \$25 for session #1 and \$45 for session #2.

Risks and Benefits:

There are no risks and there are no benefits to you taking part in this research study. However, you may find the topics we discuss boring, or they may make you uncomfortable. On the other hand, you may find the discussion interesting.

Compensation: You will receive \$30 for your first visit and \$40 for your second visit, providing you complete all tasks at each session.

Confidentiality:

All information shared within in the focus group discussions, your measurements, demographic information and tasting information will be kept private, in a locked file cabinet in Dr. Smith’s office. Only Dr. Smith and Diana Brostow will have access to the collected information. The information collected may be published. Your privacy will be protected and you will not be identified in anyway. No individual information will be released. We may ask if we can take your picture for future use in teaching materials, but

your name will never be attached to any images. You are free to refuse to have your picture taken, and your refusal will not affect your payment for participation.

Voluntary Nature of the Survey:

Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with the University of Minnesota or any community public programs. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships.

Contacts and Questions:

Those conducting this research project are Dr. Chery Smith and Diana Brostow. You may ask any questions you have now, and if you have any questions later, you may contact Dr. Chery Smith at (612) 624-2217 csmith@umn.edu or Diana Brostow at (612) 695-7750 (bros0131@umn.edu). You will be given a copy of this form to keep for your own records.

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher(s), please contact the Research Subjects' Advocate Line, D528 Mayo, 420 Delaware St. Southeast, Minneapolis, Minnesota 55455; (612) 625-1650.

CHOOSE ONE OF THESE OPTIONS:

By signing below, you indicate you understand the process involved in this study. I have read the above information. I _____ (name) agree to take part in this research project and give permission to have my picture taken. I have asked questions and have received answers.

Signature of Participant: _____ Date: _____

OR

By signing below, you indicate you understand the process involved in this study. I have read the above information. I _____ (name) agree to take part in this research project, but I do not give permission to have my picture taken. I have asked questions and have received answers.

Signature of Participant: _____ Date: _____

Signature of Investigator: _____ Date: _____

DEMOGRAPHIC INFORMATION

Please fill in the blank or check the box that's the best choice.

Focus group: _____ Location: _____ ID number: _____

1. Age: _____ yrs

2. Gender: Female Male

3. Race:

Caucasian (white)

Hispanic

American Indian

African American (black)

Other: _____

4. Household Income (Annual or yearly):

Less than \$5,000

\$10,000-\$19,999

\$20,000-\$39,999

\$40,000-\$69,000

\$70,000-\$99,000

>\$100,000

5. Education:

8th grade or less

Some high school

High school graduate, GED or equivalent

Some undergraduate/college/technical/vocational school

Completed college/technical/vocational school

Completed graduate/professional school

6. How many children do you have? _____

7. Total number of people in household: _____

8. Number of children in household: _____

9. Where do you currently live? _____ For how long? _____

10. Do you currently have a job?

- Yes; What do you do: _____
- No ----->

If no: <ul style="list-style-type: none">• What was your last job? _____• How long have you been jobless? _____

11. Do you receive WIC benefits? Yes, I do now I used to No, never

12. Have you received food stamps? Yes, I do now I used to No, never

13. Are you currently eligible for food stamps?

- Yes
- No ----->

If no, why not? <ul style="list-style-type: none"><input type="checkbox"/> On waiting period to become eligible<input type="checkbox"/> Moved here recently<input type="checkbox"/> Application process too hard to do<input type="checkbox"/> Other, please specify: _____

14. How many times have you used food pantries in the PAST 12 MONTHS?

- 0 1 2-3 4-6 7-9 10+

15. How many times have you used a hot meal program in the PAST MONTH?

- 0 1 2-3 4-6 7-9 10+

16. In general, would you say your DIEI is:

- Poor Fair Good Very Good Excellent

17. Were you overweight as a child?

- Yes, I was No, I was not

If YES, when did you start being heavy? _____

18. As a child, do you remember ever not having enough to eat?

Yes No, never

19. Do you think about food often throughout the day?

Yes, most days Yes, some day No, almost never

20. Do you now, or have you ever smoked cigarettes?

Never Yes, I used to smoke Yes, I smoke _____
cigarettes per day

Height: _____ Weight: _____

Focus Group Questions

Introduction

Ice breaker question: What is your favorite food and why?

1. How do you make food choices? What factors are most important—personal preference, cost, convenience? What food is available? Food characteristics?
2. What drives you to eat (hunger, boredom, the time of the day-scheduled eating, presence of ours in the house, pleasure, etc.)?
3. Do you ever eat because you're sad? happy? stressed-out? How does eating make you feel afterwards?
4. Where do you eat? In the car? Walking down the street? A work? Just at home?
5. Do you ever eat a lot (binge) of some foods? Do you ever forget to eat; do you overeat because you are not sure when the next meal will be? Do you think constantly about food or do you never think about it?
6. How important is food to you? Do you ever worry about running out of food? Do you stash food away for later?
7. Let's talk a little about places that you like to eat at. What are your favorite restaurants? Fast food places? How often do you go?
8. Where do you do most of your food shopping? (Supermarket, mom 'n pop grocery, convenience store, food bank, etc.) Why do you choose this place(s) most often?
9. Let's go back to your favorite foods - what makes them favorites?
10. What do you like about foods that are mainly fat, protein, or carbohydrates?
11. When you have a craving for a food, is it usually something crunchy? Creamy? Cold? Hot? Sweet? Salty? What is it about the texture of the food that you like most?
12. When you think about your body, why do you think it has the shape it does?

Fats

- a. When you think of fats, what sorts of foods do you think of?
- b. Do you like to eat fats like butter or margarine? Which do you like better? What do you like about these fats?
- c. Do you cook with this fat as well, or do you use something else?
- d. What motivates you most when you're at the store and choosing a fat – taste? Price? Habit?
- e. Is this the same fat your family used when you were growing up?
- f. What do you think is “healthy” or “unhealthy” about your favorite fat?

Starches/Carbohydrates

- a. What do you like about it? What's your favorite way to prepare it or have it cooked? Is this what you grew up eating, or have your tastes changed since becoming an adult?

- b. If/when you make these starches, do you put anything on them? (sauces, fats, seasonings, sour cream, mixed in a dish, other condiments, etc.)
- c. What is most important to you when buying a starchy food – taste? price? what the rest of your family likes?
- d. Have you ever compared the taste of your usual starch with its whole-grain version (if applicable)? What did it taste like? What did you like or dislike?

Meats/Proteins

- a. Do you eat meat? If not, what protein-rich foods do you like to eat? How often do you eat meat? What do you like about meat? Do you buy it already cooked, or do you like to cook it yourself?
- b. How important is meat in your diet? Have you increased or decreased the amount of meat you eat in the last few years? How come?
- c. When you go to the store, what sorts of meats do you buy? What is most important to you when choosing meat – price? appearance? value?
- d. Would you like to be eating different meats than you're currently used to, or are you happy with your meat choices?

Sweets/Snacks

- a. Do you like sweet foods – why or why not? How often do you eat them? Do you make them yourself?
- b. When you have sweets, is it a spur-of-the-moment decision, or do you like to plan out when you're going to eat them?
- c. Do you like salty snack foods (like chips, pretzels, etc.) – why or why not?
- d. Do you usually eat sweets or salty snacks alone, or in a group setting? Does this affect which foods you choose?
- e. Do you have favorite sweets or snacks you like to eat when you're feeling a certain way or with certain people? (Sad, tired, lounging with friends, celebrating something, stressed, etc.)

Closure/summarize comments.

Thank you for coming.

Taste Testing

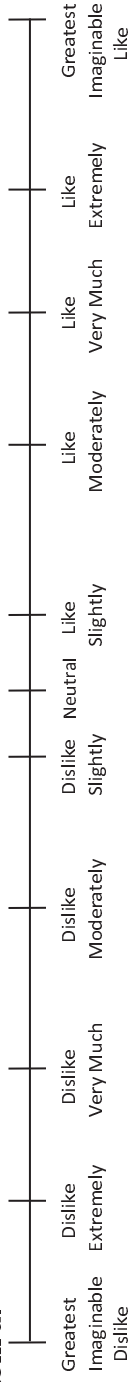
Name: _____

1. SPREADABLE FATS

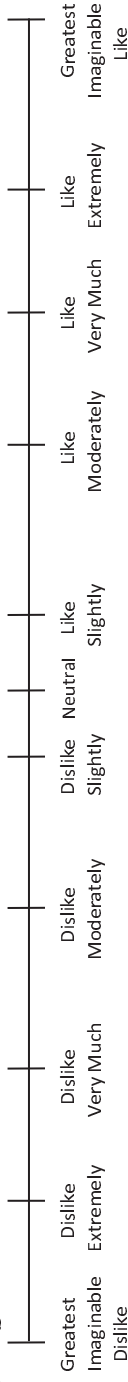
What do you think each food is?

a _____ b _____ c _____ d _____
Evaluate what you thought of each item by marking a hatch-mark (|) on the scale.

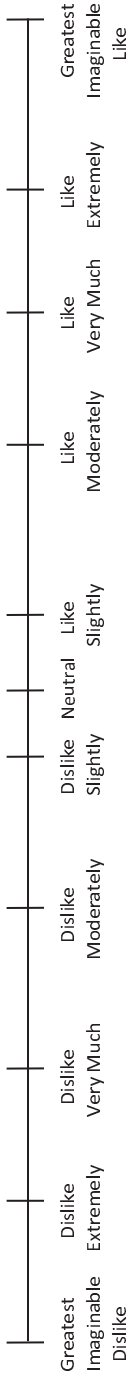
Item a:



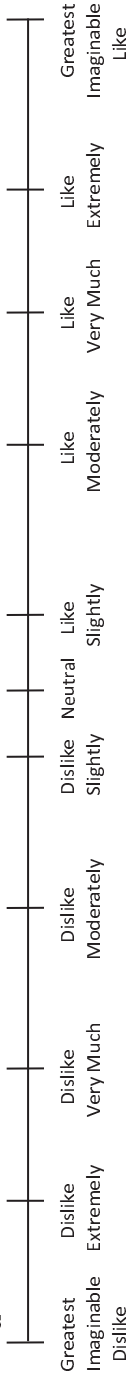
Item b:



Item c:



Item d:



Which food did you like **most**? _____ What did you like about it? _____

Which food did you like **least**? _____ What didn't you like about it? _____

Here are the prices (**per pound**) of each food: a: \$ 2.59 b: \$ 2.59 c: \$ 0.89 d: \$ 2.6

Now that you know the prices, please rank the foods in order from which you would **most likely** buy first, down to the one you would be **least likely** to buy:

1. _____ 2. _____ 3. _____ 4. _____

When deciding which spreadable fat to use, **I believe:**

	Strongly Agree	Agree	Disagree	Disagree Strongly
<u>Liking it is most important</u>	SA	A	D	DS
<u>Flavor is most important</u>	SA	A	D	DS
<u>Texture is most important</u>	SA	A	D	DS
<u>Cost is most important</u>	SA	A	D	DS
<u>Calorie content is most important</u>	SA	A	D	DS
<u>Nutritional information is most important</u>	SA	A	D	DS
<u>I use whatever is on hand</u>	SA	A	D	DS
<u>Buying what I'm used to is most important</u>	SA	A	D	DS

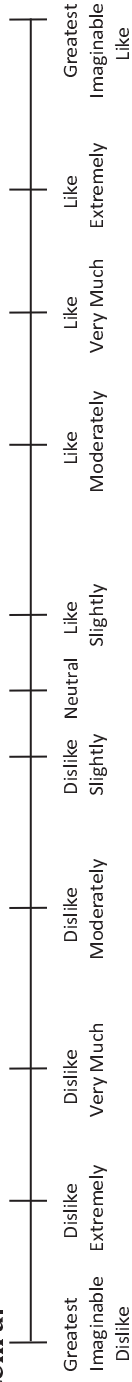
2. SOFT DRINKS

What do you think each beverage is?

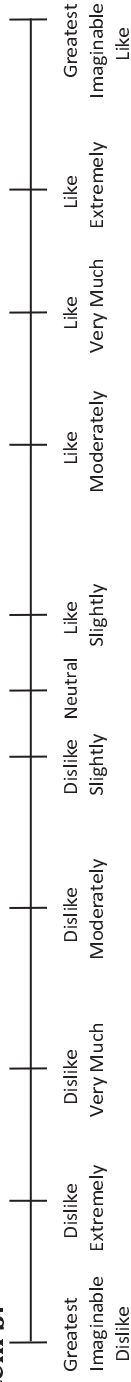
a _____ b _____ c _____

Evaluate what you thought of each item by marking a hatch-mark (|) on the scale.

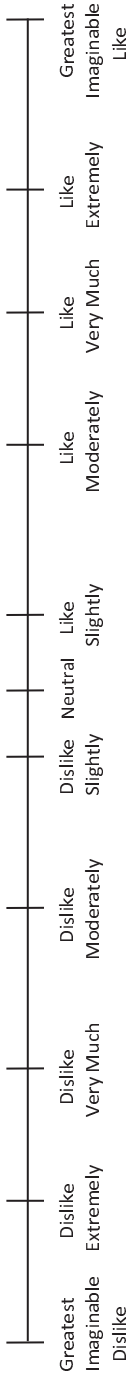
Item a:



Item b:



Item c:



Which soda did you like **most**? _____ What did you like about it? _____

Which soda did you like **least**? _____ What didn't you like about it? _____

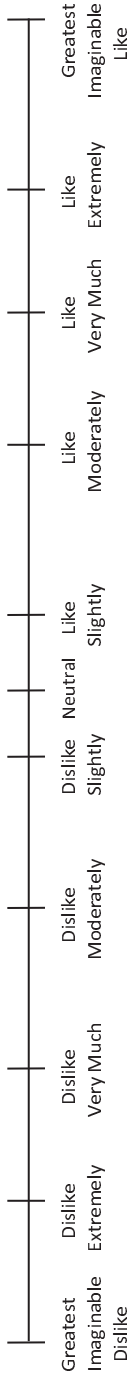
3. SNACKS

What do you think each food is?

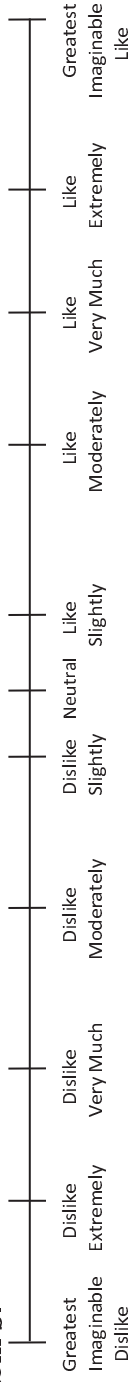
a _____ b _____ c _____ d _____ e _____

Evaluate what you thought of each item by marking a hatch-mark (|) on the scale.

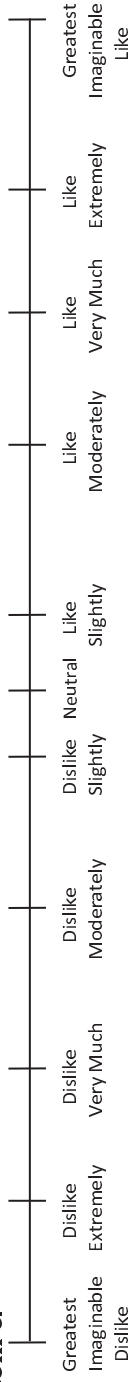
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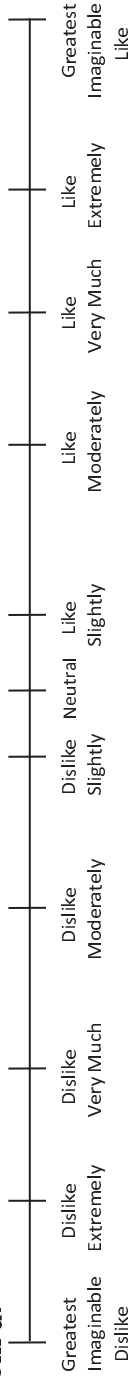
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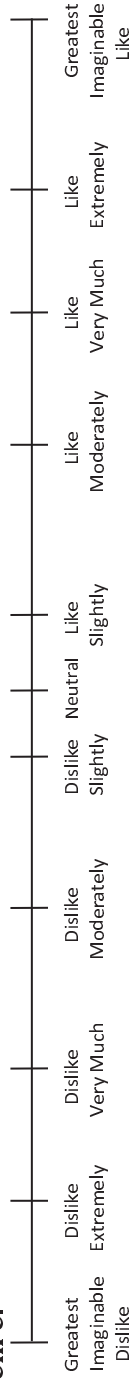
Item c:



Item d:



Item e:



Which food did you like **most**? _____ What did you like about it? _____

Which food did you like **least**? _____ What didn't you like about it? _____

Circle one:	Very Healthy	Somewhat Healthy	Unsure	Somewhat Unhealthy	Very Unhealthy
Item a is	VH	SH	U	SU	VU
Item b is	VH	SH	U	SU	VU
Item c is	VH	SH	U	SU	VU
Item d is	VH	SH	U	SU	VU
Item e is	VH	SH	U	SU	VU

When deciding which snack to eat, **I believe:**

	Strongly Agree	Agree	Disagree	Disagree Strongly
<u>L</u> iking it is most important	SA	A	D	DS
<u>F</u> lavor is most important	SA	A	D	DS
<u>T</u> exture is most important	SA	A	D	DS
<u>C</u> ost is most important	SA	A	D	DS
<u>C</u> alorie content is most important	SA	A	D	DS
<u>N</u> utritional information is most important	SA	A	D	DS
<u>I</u> eat whatever is on hand	SA	A	D	DS
<u>B</u> uying what I'm used to is most important	SA	A	D	DS

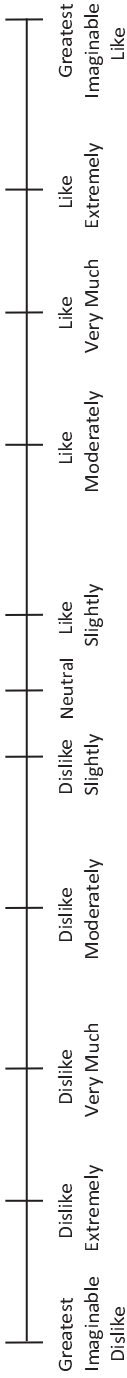
4. RICE

Name each type of rice:

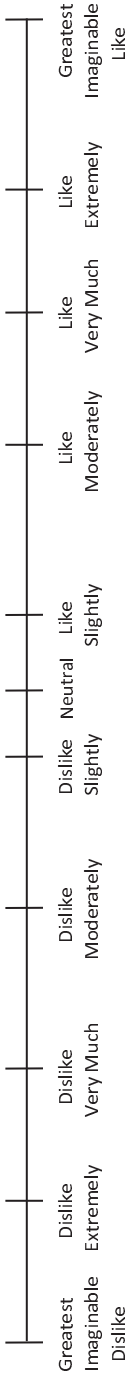
a. _____ b. _____ c. _____

Evaluate what you thought of each item by marking a hatch-mark (|) on the scale.

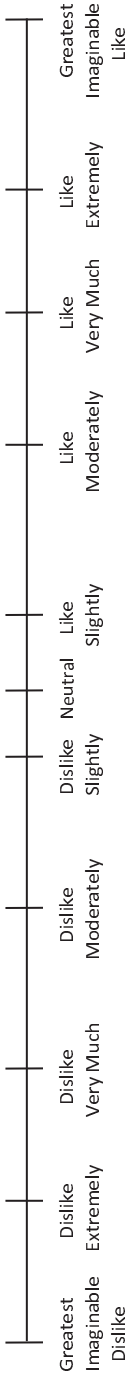
Item a:



Item b:



Item c:



Which rice did you like **most**? _____ What did you like about it? _____

Which rice did you like **least**? _____ What didn't you like about it? _____

Here are the prices (**per pound**) of each rice: a: \$ 1.85 b: \$ 1.85 c: \$ 1.42

Now that you know the prices, please rank the foods in order from which you would **most likely** buy first, down to the one you would be **least likely** to buy:

1. _____
2. _____
3. _____

When deciding which rice to eat, I believe:

	Strongly Agree	Agree	Disagree	Disagree Strongly
<u>Liking it is most important</u>	SA	A	D	DS
<u>Flavor is most important</u>	SA	A	D	DS
<u>Color is most important</u>	SA	A	D	DS
<u>Cost is most important</u>	SA	A	D	DS
<u>Nutritional information is most important</u>	SA	A	D	DS
<u>I eat whatever is on hand</u>	SA	A	D	DS
<u>Buying what I'm used to is most important</u>	SA	A	D	DS

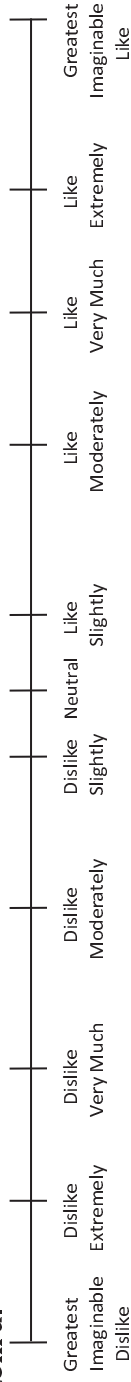
5. BREAD

What do you think each food is?

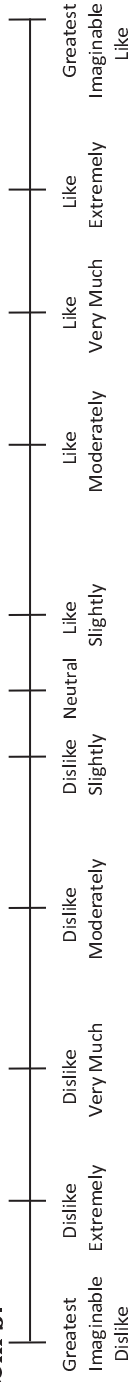
a _____ b _____ c _____

Evaluate what you thought of each item by marking a hatch-mark (|) on the scale.

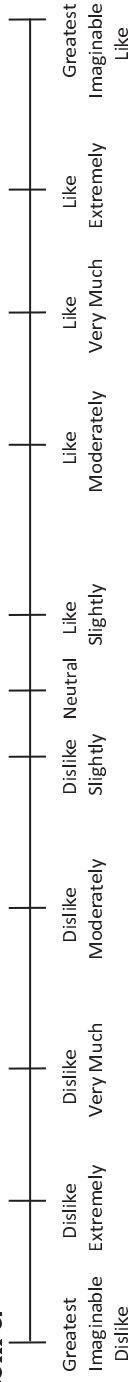
Item a:



Item b:



Item c:



Which food did you like most? _____ What did you like about it? _____

Which food did you like **least**? _____ What didn't you like about it? _____

Here are the prices (**per loaf**) of each food: a: \$ 0.79 b: \$ 1.95 c: \$ 1.58

Now that you know the prices, please rank the foods in order from which you would **most likely** buy first, down to the one you would be **least likely** to buy:

1. _____
2. _____
3. _____

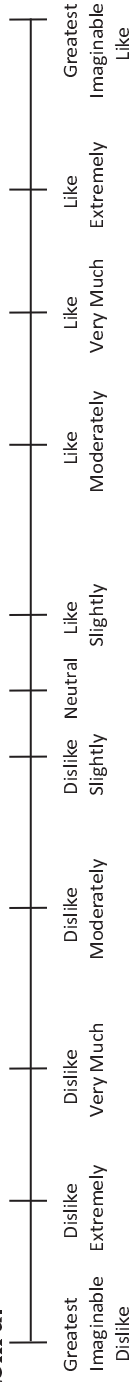
When deciding which bread to eat, **I believe**:

	Strongly Agree	Agree	Disagree	Disagree Strongly
<u>L</u> iking it is most important	SA	A	D	DS
<u>F</u> lavor is most important	SA	A	D	DS
<u>C</u> olor is most important	SA	A	D	DS
<u>C</u> ost is most important	SA	A	D	DS
<u>N</u> utritional information is most important	SA	A	D	DS
<u>I</u> eat whatever is on hand	SA	A	D	DS
<u>B</u> uying what I'm used to is most important	SA	A	D	DS

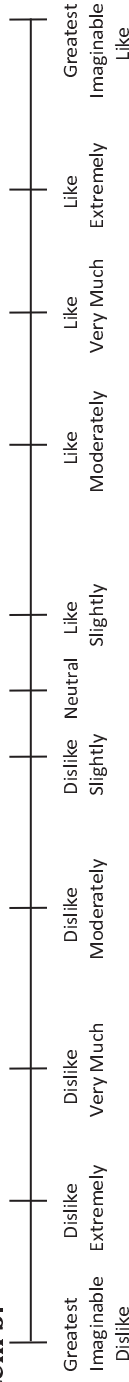
6. MILK

Evaluate what you thought of each item by marking a hatch-mark (|) on the scale.

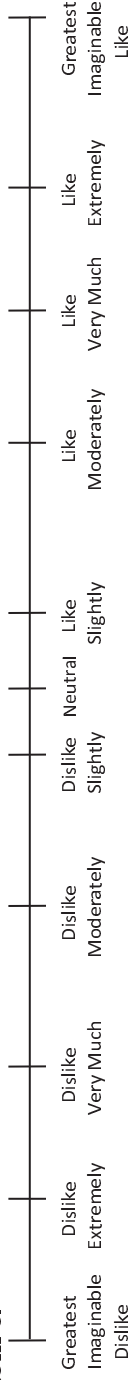
Item a:



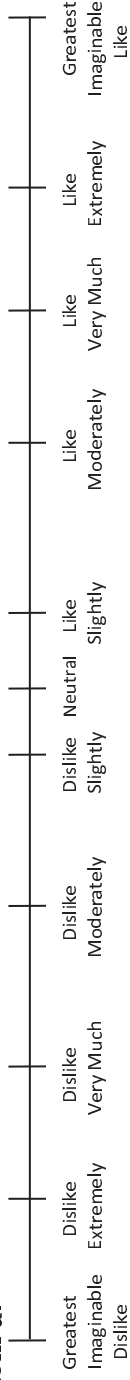
Item b:



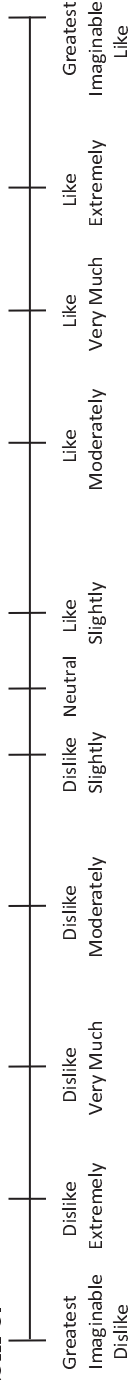
Item c:



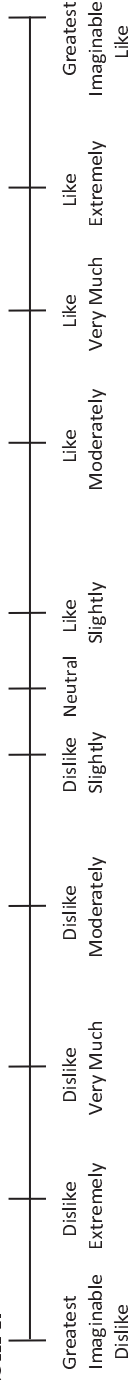
Item d:



Item e:



Item f:



Which milk did you like **most**? _____ What did you like about it? _____

Which milk did you like **least**? _____ What didn't you like about it? _____

Which milk tasted most like the type you drink at **home**? _____

When deciding which milk to drink, **I believe**:

	Strongly Agree	Agree	Disagree	Disagree Strongly
Liking it is most important	SA	A	D	DS
Flavor is most important	SA	A	D	DS
Texture is most important	SA	A	D	DS

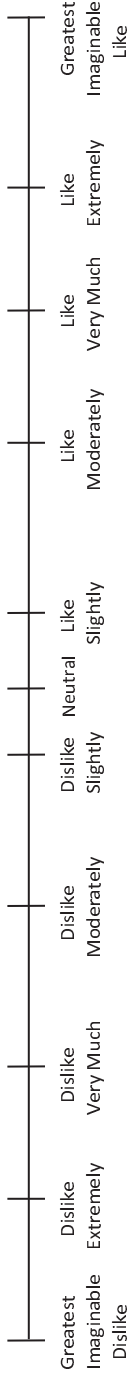
Cost is most important	SA	A	D	DS
Calorie content is most important	SA	A	D	DS
Nutritional information is most important	SA	A	D	DS
I drink whatever is on hand	SA	A	D	DS
Buying what I'm used to is most important	SA	A	D	DS

7. MEATS

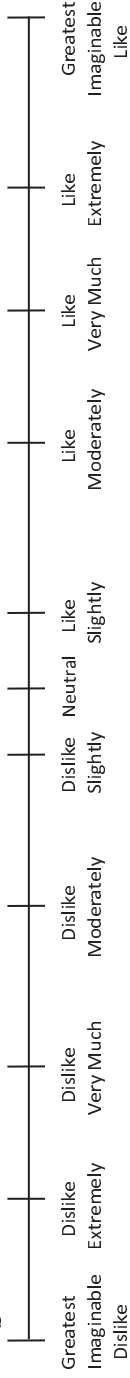
What do you think each meat is?

a _____ c _____ b _____ d _____
Evaluate what you thought of each item by marking a hatch-mark (|) on the scale.

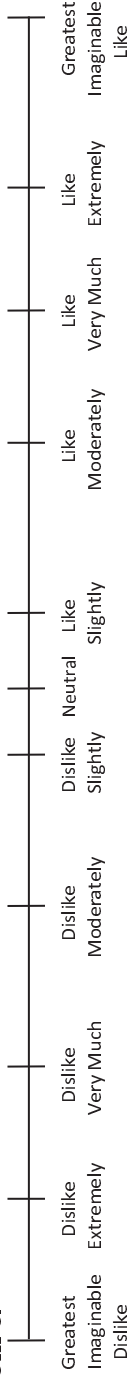
Item a:



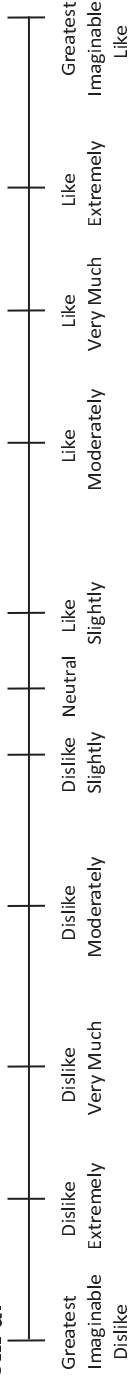
Item b:



Item c:



Item d:



Which meat did you like **most**? _____ What did you like about it? _____

Which meat did you like **least**? _____ What didn't you like about it? _____

Here are the prices (**per pound**) of each meat: a: \$ 3.98 b: \$ 7.98 c: \$ 3.18 d: \$ 6.21

Now that you know the prices, please rank the foods in order from which you would **most likely** buy first, down to the one you would be **least likely** to buy:

1. _____
2. _____
3. _____
4. _____

When deciding which meat to eat, I believe:

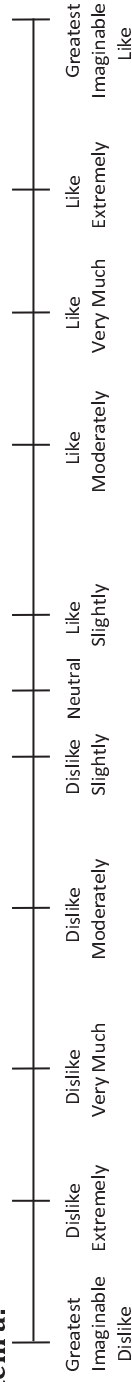
	Strongly Agree	Agree	Disagree	Disagree Strongly
<u>L</u> iking it is most important	SA	A	D	DS
<u>F</u> lavor is most important	SA	A	D	DS
<u>A</u> ppearance is most important	SA	A	D	DS
<u>C</u> ost is most important	SA	A	D	DS
<u>C</u> alorie content is most important	SA	A	D	DS
<u>N</u> utritional information is most important	SA	A	D	DS
<u>I</u> eat whatever is on hand	SA	A	D	DS
<u>B</u> uying what I'm used to is most important	SA	A	D	DS

8. CHIPS

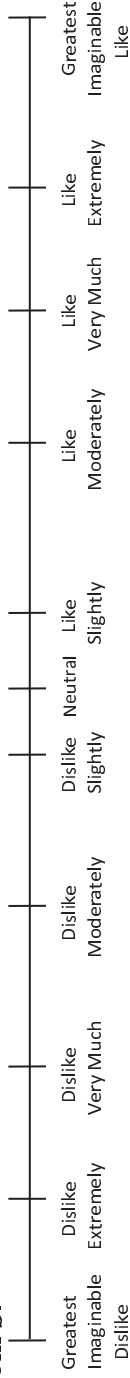
What do you think each chip is (type or brand)?

a _____ c _____ b _____ d _____
Evaluate what you thought of each item by marking a hatch-mark (|) on the scale.

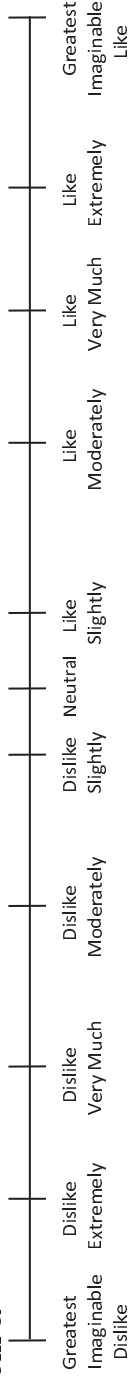
Item a:



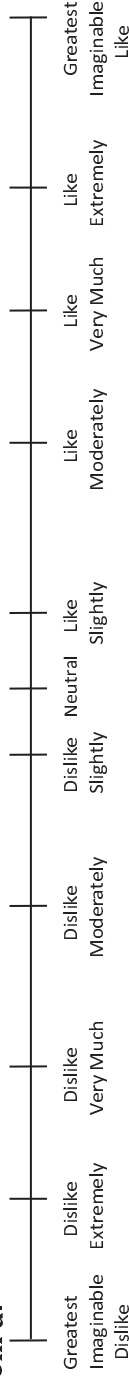
Item b:



Item c:



Item d:



Which chip did you like **most**? _____ What did you like about it? _____

Which chip did you like **least**? _____ What didn't you like about it? _____

Circle one:	Very Healthy	Somewhat Healthy	Unsure	Somewhat Unhealthy	Very Unhealthy
Item a is	VH	SH	U	SU	VU
Item b is	VH	SH	U	SU	VU
Item c is	VH	SH	U	SU	VU
Item d is	VH	SH	U	SU	VU

When deciding which chips to eat, I believe:

	Strongly Agree	Agree	Disagree	Disagree Strongly
L iking it is most important	SA	A	D	DS
F lavor is most important	SA	A	D	DS
T exture is most important	SA	A	D	DS
C ost is most important	SA	A	D	DS

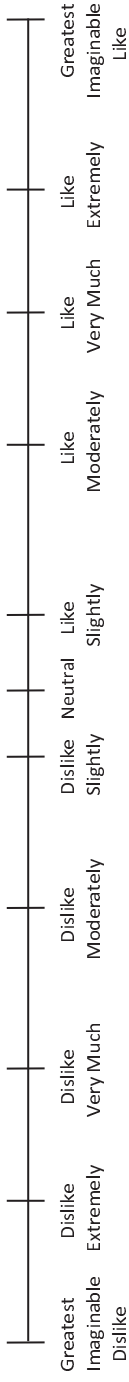
Calorie content is most important	SA	A	D	DS
Nutritional information is most important	SA	A	D	DS
I eat whatever is on hand	SA	A	D	DS
Buying what I'm used to is most important	SA	A	D	DS

9. SWEETS

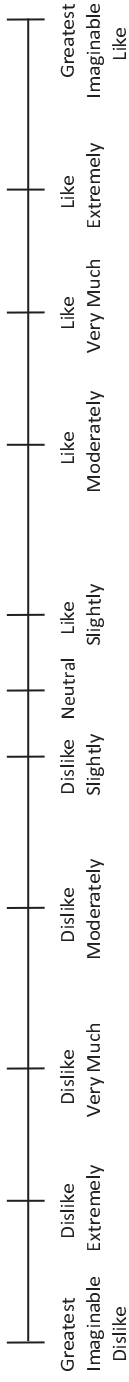
What do you think each food is?

a _____ b _____ c _____ d _____
Evaluate what you thought of each item by marking a hatch-mark (|) on the scale.

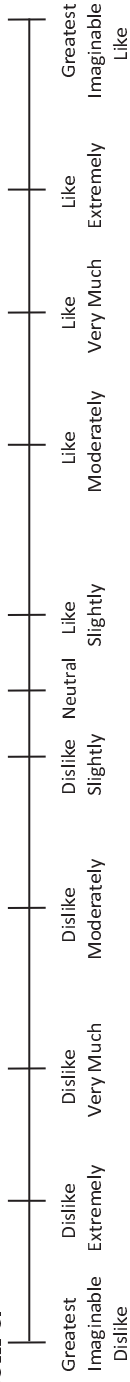
Item a:



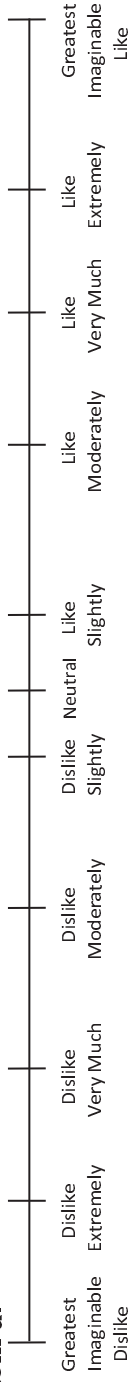
Item b:



Item c:



Item d:



Which food did you like **most**? _____ What did you like about it? _____

Which food did you like **least**? _____ What didn't you like about it? _____

Circle one:	Very Healthy	Somewhat Healthy	Unsure	Somewhat Unhealthy	Very Unhealthy
Item a is	VH	SH	U	SU	VU
Item b is	VH	SH	U	SU	VU
Item c is	VH	SH	U	SU	VU
Item d is	VH	SH	U	SU	VU

When deciding which sweet food to eat, I believe:

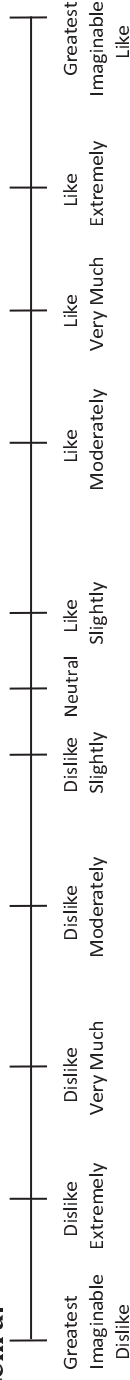
	Strongly Agree	Agree	Disagree	Disagree Strongly
<u>Liking it is most important</u>	SA	A	D	DS
<u>Flavor is most important</u>	SA	A	D	DS
<u>Texture is most important</u>	SA	A	D	DS
<u>Cost is most important</u>	SA	A	D	DS
<u>Calorie content is most important</u>	SA	A	D	DS
<u>Nutritional information is most important</u>	SA	A	D	DS
<u>I eat whatever is on hand</u>	SA	A	D	DS
<u>Buying what I'm used to is most important</u>	SA	A	D	DS

10. BEVERAGES

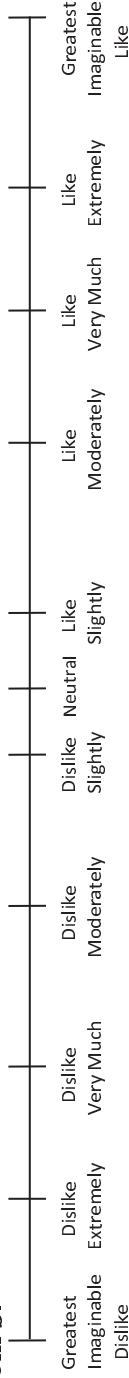
What do you think each beverage is (type or brand)?

a _____ c _____ b _____ d _____
 Evaluate what you thought of each item by marking a hatch-mark (|) on the scale.

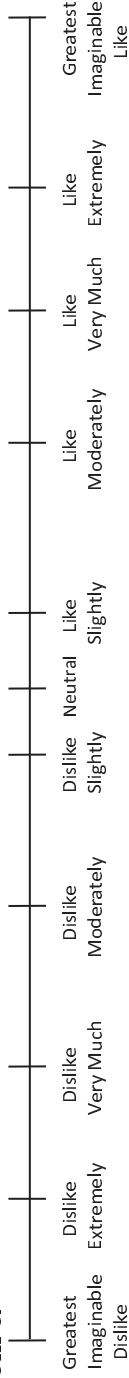
Item a:



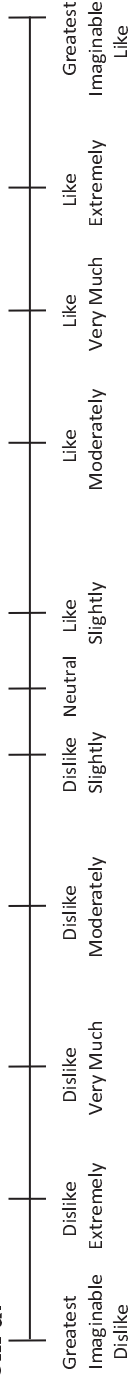
Item b:



Item c:



Item d:



Which beverage did you like **most**? _____ What did you like about it? _____

Which beverage did you like **least**? _____ What didn't you like about it? _____

Circle one:	Very Healthy	Somewhat Healthy	Unsure	Somewhat Unhealthy	Very Unhealthy
Item a is	VH	SH	U	SU	VU
Item b is	VH	SH	U	SU	VU
Item c is	VH	SH	U	SU	VU
Item d is	VH	SH	U	SU	VU

When deciding which beverage to drink, **I believe:**

	Strongly Agree	Agree	Disagree	Disagree Strongly
L iking it is most important	SA	A	D	DS
F lavor is most important	SA	A	D	DS
A ppearance is most important	SA	A	D	DS
C ost is most important	SA	A	D	DS

<u>Calorie content is most important</u>	SA	A	D	DS
<u>Nutritional information is most important</u>	SA	A	D	DS
<u>I eat whatever is on hand</u>	SA	A	D	DS
<u>Buying what I'm used to is most important</u>	SA	A	D	DS

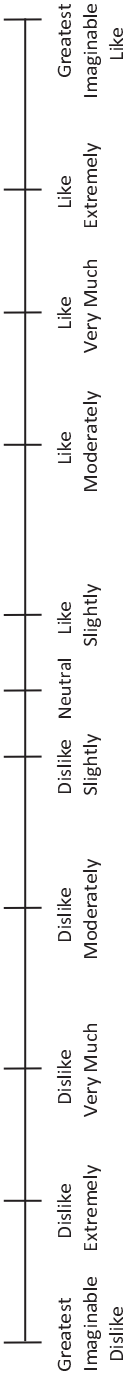
11. POPCORN

Name each kind of popcorn:

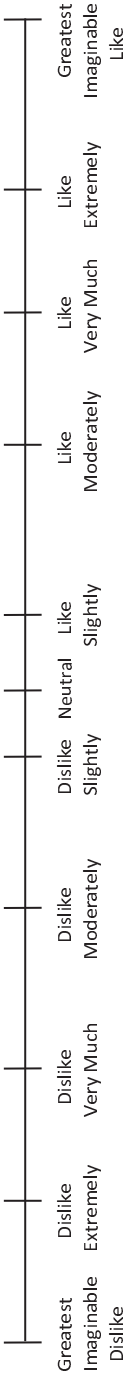
a _____ b _____ c _____ d _____ e _____

Evaluate what you thought of each item by marking a hatch-mark (|) on the scale.

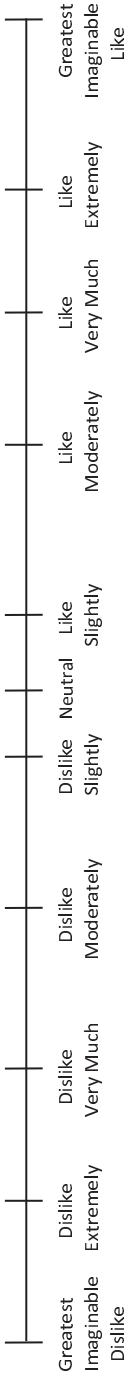
Item a:



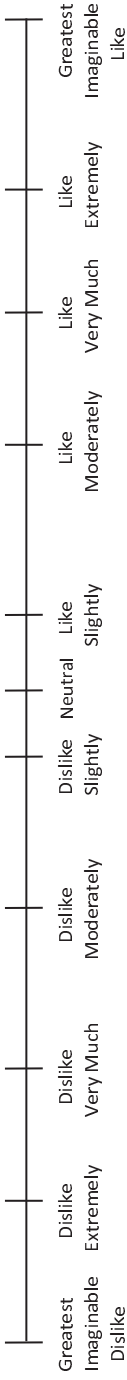
Item b:



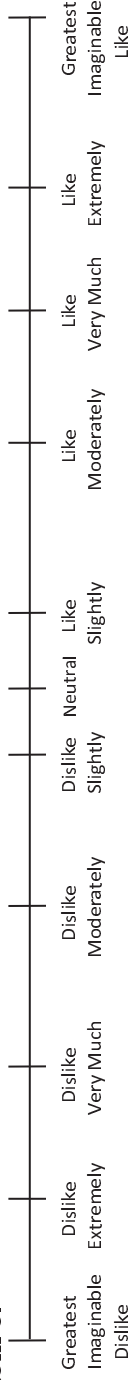
Item c:



Item d:



Item e:



Which popcorn did you like **most**? _____ What did you like about it? _____

Which popcorn did you like **least**? _____ What didn't you like about it? _____

Circle one:	Very Healthy	Somewhat Healthy	Unsure	Somewhat Unhealthy	Very Unhealthy
Item a is	VH	SH	U	SU	VU
Item b is	VH	SH	U	SU	VU
Item c is	VH	SH	U	SU	VU
Item d is	VH	SH	U	SU	VU
Item e is	VH	SH	U	SU	VU

When deciding which popcorn to eat, I believe:

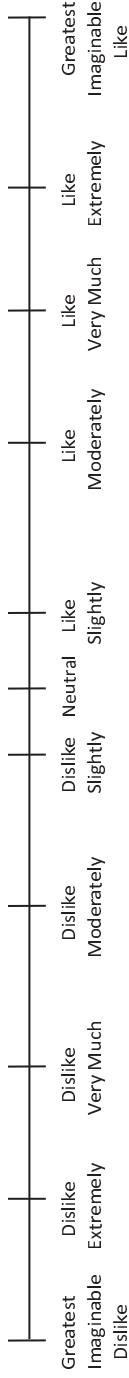
	Strongly Agree	Agree	Disagree	Disagree Strongly
<u>Liking it is most important</u>	SA	A	D	DS
<u>Flavor is most important</u>	SA	A	D	DS
<u>Color is most important</u>	SA	A	D	DS
<u>Calorie content is most important</u>	SA	A	D	DS
<u>Nutritional information is most important</u>	SA	A	D	DS
<u>I eat whatever is on hand</u>	SA	A	D	DS
<u>Buying what I'm used to is most important</u>	SA	A	D	DS

12. CHOCOLATE MILK

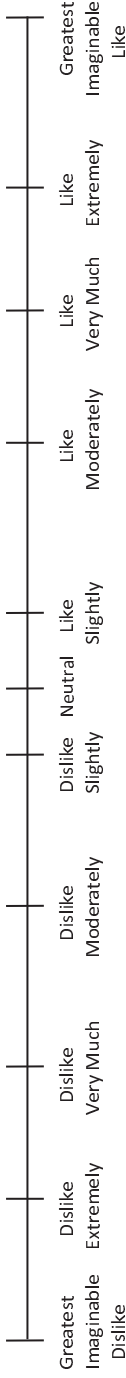
What percent fat do you think each milk has? a _____ b _____

Evaluate what you thought of each item by marking a hatch-mark (|) on the scale.

Item a:



Item b:



Which chocolate milk did you like **most**? _____ What did you like about it? _____

When deciding which chocolate milk to drink, **I believe:**

	Strongly Agree	Agree	Disagree	Disagree Strongly
<u>Liking it is most important</u>	SA	A	D	DS
<u>Flavor is most important</u>	SA	A	D	DS
<u>Color is most important</u>	SA	A	D	DS
<u>Cost is most important</u>	SA	A	D	DS
<u>Nutritional information is most important</u>	SA	A	D	DS
<u>I drink whatever is on hand</u>	SA	A	D	DS
<u>Buying what I'm used to is most important</u>	SA	A	D	DS

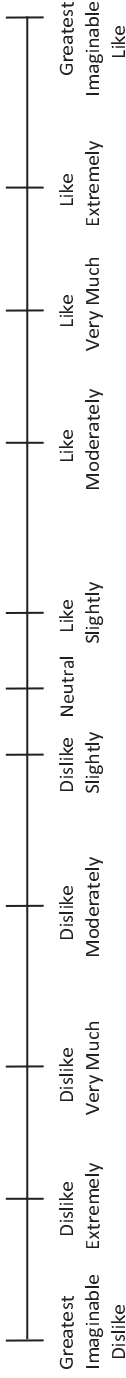
13. SPECIALTY BREADS

Name each kind of bread:

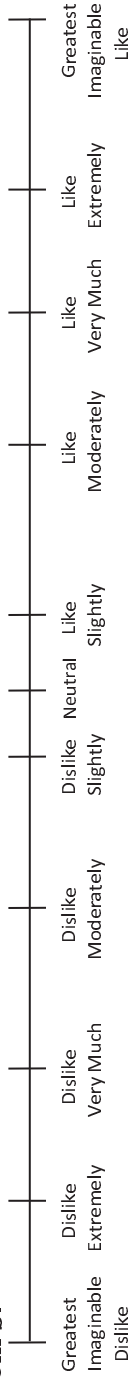
a _____ b _____ c _____ d _____ e _____

Evaluate what you thought of each item by marking a hatch-mark (|) on the scale.

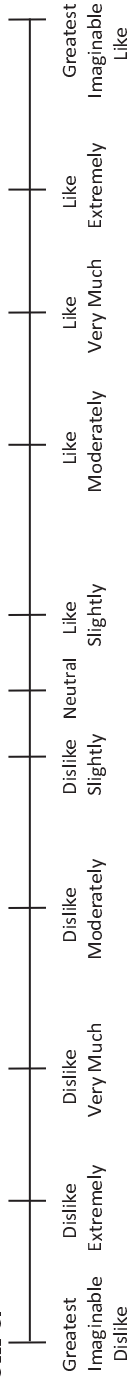
Item a:



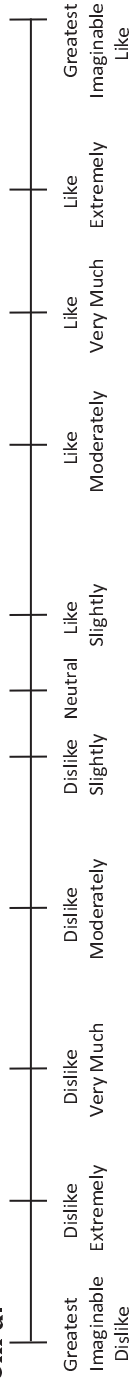
Item b:



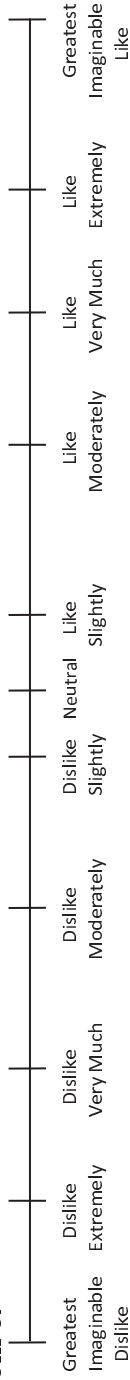
Item c:



Item d:



Item e:



Which item did you like **most**? _____ What did you like about it? _____

Which item did you like **least**? _____ What didn't you like about it? _____

When choosing which specialty bread to eat, **I believe:**

	Strongly Agree	Agree	Disagree	Disagree Strongly
<u>L</u> iking it is most important	SA	A	D	DS
<u>F</u> lavor is most important	SA	A	D	DS
<u>T</u> exture is most important	SA	A	D	DS
<u>C</u> olor is most important	SA	A	D	DS
<u>C</u> ost is most important	SA	A	D	DS

Nutritional information is most important	SA	A	D	DS
I eat whatever is on hand	SA	A	D	DS
Buying what I'm used to is most important	SA	A	D	DS

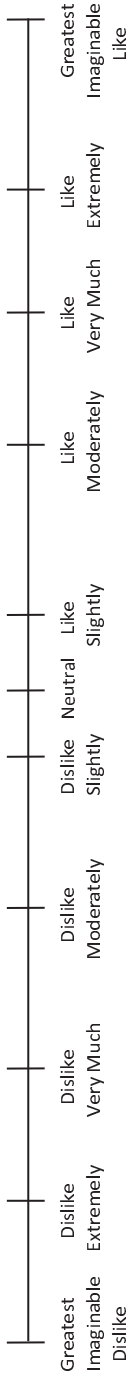
14. FRUIT

Name each kind of fruit:

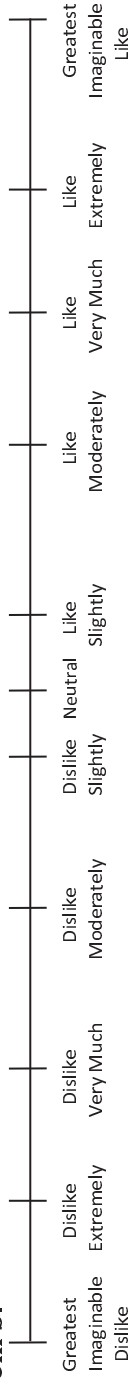
a _____ b _____ c _____ d _____ e _____

Evaluate what you thought of each item by marking a hatch-mark (|) on the scale.

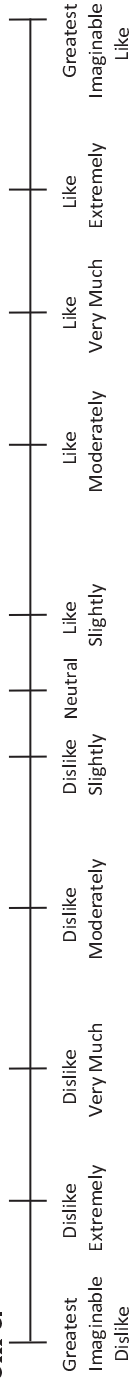
Item a:



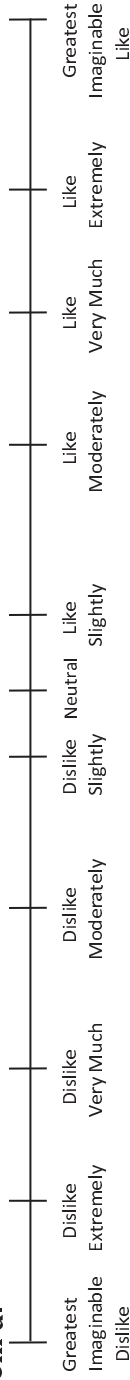
Item b:

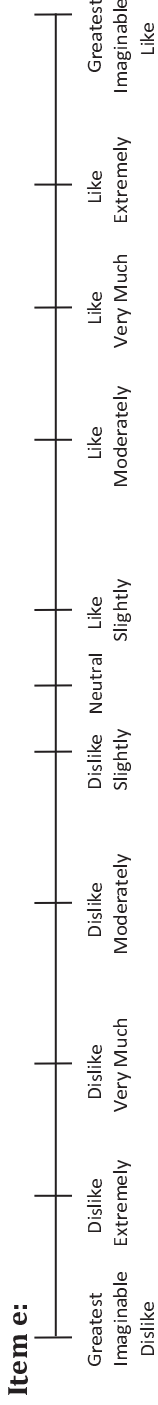


Item c:



Item d:





Which item did you like **most**? _____ What did you like about it? _____

Which item did you like **least**? _____ What didn't you like about it? _____

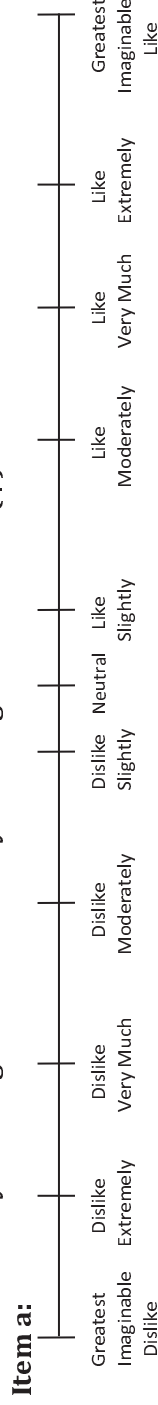
When choosing which fruit to eat, **I believe:**

	Strongly Agree	Agree	Disagree	Disagree Strongly
<u>Liking it is most important</u>	SA	A	D	DS
<u>Flavor is most important</u>	SA	A	D	DS
<u>Texture is most important</u>	SA	A	D	DS
<u>Color is most important</u>	SA	A	D	DS
<u>Cost is most important</u>	SA	A	D	DS
<u>Nutritional information is most important</u>	SA	A	D	DS
<u>I eat whatever is on hand</u>	SA	A	D	DS
<u>Buying what I'm used to is most important</u>	SA	A	D	DS

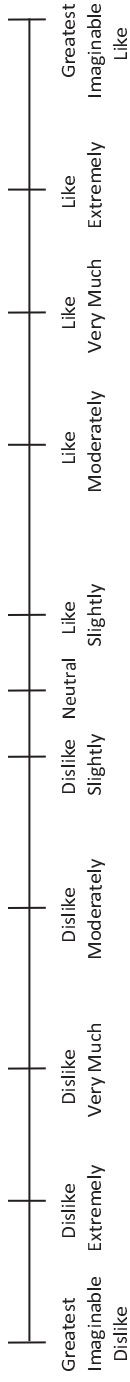
15. VEGETABLES

Name each kind of vegetable:

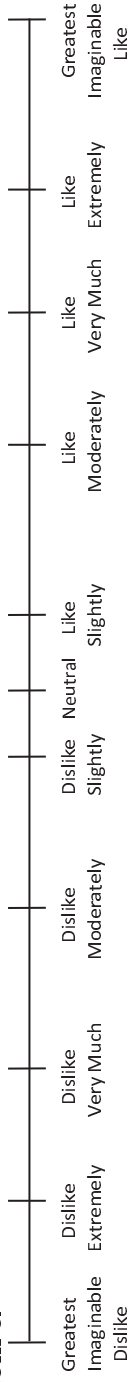
a _____ b _____ c _____ d _____
Evaluate what you thought of each item by marking a hatch-mark (|) on the scale.



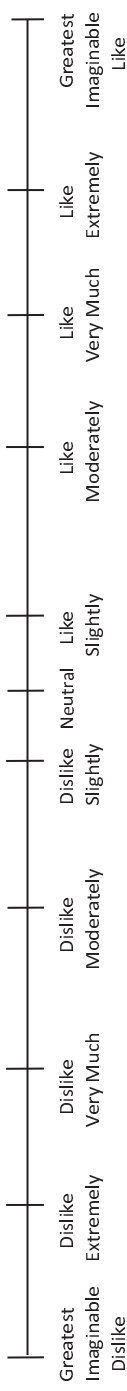
Item b:



Item c:



Item d:



Which item did you like **most**? _____ What did you like about it? _____

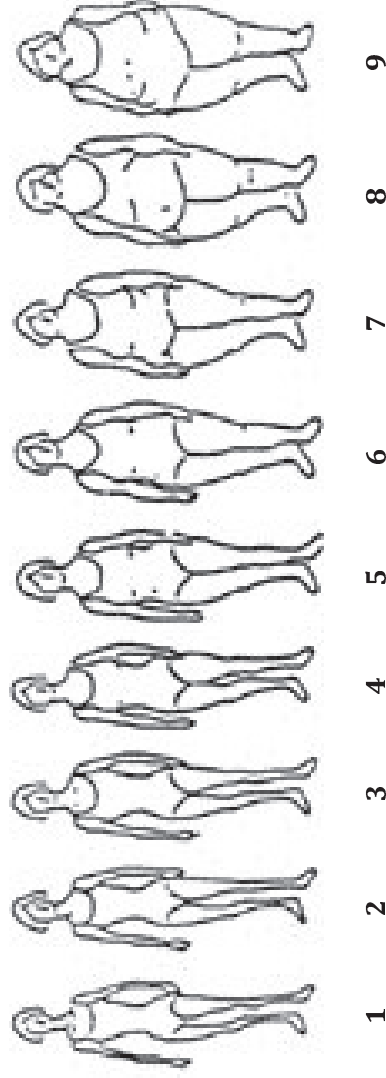
Which item did you like **least**? _____ What didn't you like about it? _____

When choosing which vegetable to eat, **I believe:**

	Strongly Agree	Agree	Disagree	Disagree Strongly
<u>Liking it is most important</u>	SA	A	D	DS
<u>Flavor is most important</u>	SA	A	D	DS
<u>Texture is most important</u>	SA	A	D	DS
<u>Color is most important</u>	SA	A	D	DS
<u>Cost is most important</u>	SA	A	D	DS
<u>Nutritional information is most important</u>	SA	A	D	DS
<u>I eat whatever is on hand</u>	SA	A	D	DS
<u>Buying what I'm used to is most important</u>	SA	A	D	DS

16. BODY IMAGE

Look carefully at these women:
(Tehard et al)



Which number looks like you? _____

Which number is **what you want to look like**? _____

Which number looks **healthiest** to you? _____

Which number looks **most likely to develop diabetes**? _____

Circle one:	Strongly Agree	Agree	Unsure	Disagree	Disagree Strongly
I like my weight.	SA	A	U	D	DS
I would like to gain weight.	SA	A	U	D	DS
I would like to lose weight.	SA	A	U	D	DS

PARTICIPANT CONSENT FORM

This research project is being conducted by Chery Smith, PhD, MPH, RD and Heidi Dressler, RD, a graduate student, from the Department of Food Science and Nutrition at the University of Minnesota. You have been invited to participate in a food and nutrition survey. We are interested in learning how your beliefs, tastes, family background and financial situation affect what you choose to eat, and how your food choices impact your weight.

It will take approximately 1 ½ hours to complete a survey, tell us what you ate yesterday and have your height and weight taken (measurements on you are required in order to take part in this study). You will also be asked about your background information (information such as age, gender, education level, number of children in your household, eating patterns, where you currently live). The survey contains questions about your food choices; what drives you to eat (hunger, boredom, the time of the day-scheduled eating, presence of others in the house, pleasure, etc.); do you like sweet or salty food; do you eat for taste, for nutrition, or for comfort (or for other reasons); do you hoard food; do you eat in the car or walking down the street, or just in the home; do you ever eat a lot of some foods; do ever forget to eat; do you overeat; and do you think constantly about food or do you never think about it, and do you like your current weight. Your honest opinion to these questions is expected and appreciated. You may be photographed for teaching purposes, but only with your permission.

Please read this form and ask any questions you have before agreeing to take part in this survey. By agreeing to take part in this project, you agree to complete the survey and will receive \$20.

Risks and Benefits:

There are no risks and there are no benefits to you taking part in this research survey.

Compensation: You will receive \$20 for completing the survey

Confidentiality:

All information shared through the survey, your measurements, demographic information will be kept private, in a locked file cabinet in Dr. Smith's office. Only Dr. Smith and Heidi Dressler will have access to the collected information. The information collected may be published. Your privacy will be protected and you will not be identified in anyway. No individual information will be released. We may ask if we can take your picture for future use in teaching materials, but your name will never be attached to any images. You are free to refuse to have your picture taken, and your refusal will not affect your payment for participation.

Voluntary Nature of the Survey:

Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with the University of Minnesota or any community public programs. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships.

Contacts and Questions:

Those conducting this research project are Dr. Chery Smith and Heidi Dressler. You may ask any questions you have now, and if you have any questions later, you may contact Dr. Chery Smith at (612) 624-2217 (csmith@umn.edu) or Heidi Dressler at (612) 281-3917 (dress107@umn.edu). You will be given a copy of this form to keep for your own records.

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher(s), please contact the Research Subjects' Advocate Line, D528 Mayo, 420 Delaware St. Southeast, Minneapolis, Minnesota 55455; (612) 625-1650.

CHOOSE ONE OF THESE OPTIONS:

By signing below, you indicate you understand the process involved in this study. I have read the above information. I _____ (name) agree to take part in this research project and give permission to have my picture taken. I have asked questions and have received answers.

Signature of Participant: _____ Date: _____

OR

By signing below, you indicate you understand the process involved in this study. I have read the above information. I _____ (name) agree to take part in this research project, but I do not give permission to have my picture taken. I have asked questions and have received answers.

Signature of Participant: _____ Date: _____

Signature of Investigator: _____ Date: _____

University of Minnesota Eating Behavior Survey

Thank you for agreeing to fill in this survey. This will help us learn about how women make their food choices and what influences their eating behavior. There is no right or wrong answer. Please just give us your honest opinion. If you have any questions about this survey, are having a hard time reading the questions, or do not know what a question means, please ask the research assistant and she will help you. Your name will not be on this survey.

For each question, please circle one answer.

****"Healthy" food includes fruits, vegetables, lean meats, low-fat or non-fat dairy, and whole grains.****

For each question, please circle one answer or check the box with the best answer for you. Sometimes we will ask you to circle or check all answers that are true for you.

Please answer the questions as follows:

SD = Strongly disagree **D** = Disagree **NA** = Doesn't apply **A** = Agree

SA = Strongly Agree

Environment

Emotional Eating

Mood

1. I eat at restaurants more when I am stressed. (E – situation)
2. I eat at restaurants less when I am sad or upset. (E- situation)
3. I eat at restaurants more when I am happy. (E – situation)
4. If I smell fast food I want to eat it. (E – reinforcement)
5. I often eat a snack if I am on the bus or in a car. (E- situation)
6. My cravings for food vary depending on my mood. (E – situation)
7. If I see a tasty looking food, I want to eat it. (E –situation)

Grocery shopping/Household food

1. When I am bored at home I eat snacks. (E – situation)
2. If I shop when I am moody, I buy more junk food than I usually would. (E – situation)
3. I don't keep junk food like chips, cookies and pop in the house, so I won't eat it when I'm bored. (E- reinforcement)
4. I am bored often because I am unemployed. (E-situation)

Social/Media

1. Being with someone who is eating makes me want to eat also. (E- observational)
2. I tend to overeat at celebrations or holiday gatherings. (E – situation)
3. I eat more junk food when the kids are around. (E- situation)
4. Seeing T.V. adds for tasty looking food makes me want to buy it. (E – observational)
5. I get hungry when I watch T.V. (E- situational)

6. I eat junk food like chips, cookies, and pop when I watch T.V. (E – situational)

Exercise/Activity

1. I don't feel safe walking/exercising in my neighborhood. (E- situation)
2. I don't own a car so I take the bus a lot. (E- reinforcement)
3. I don't own a car so I walk to a lot of places I need to go. (E-reinforcement)
4. I live near walking paths. (E- reinforcement)
5. I exercise because people who are important to me exercise. (E- observational)
6. I was taught exercise is important in staying healthy. (E – vicarious reinforcement)
7. My friends and family don't move around a lot. (E – observational)

Health Knowledge/Health Beliefs

Body Image/Weight issues

1. People who are important to me are big in size. (E- reinforcement)
2. I am leaner than most of my family and friends. (E – observational)
3. People who are lean exercise more and eat less. (E- observational)
4. People who are lean are weaker than larger people. (E- observational).
5. Lean people are genetically born that way. (E- observational)
6. People who are heavy exercise less than lean people. (E- observational)
7. I was lean before I had children but since having children I have gained a lot of weight. (E- situational)
8. Watching T.V. and reading celebrity magazines makes me feel bad about the way I look. (E- reinforcement)
9. I have gained weight after getting the Depo birth control shot. (E – situation)
10. I am heavier than most of my family and friends. (E- observational)
11. People who are heavy eat more than thinner people. (E- observational)

Diet – related conditions

1. The health of at least one of my family members has changed our household's diet. (E – vicarious reinforcement).
2. People with unhealthy diets are at greater risk for getting related diseases like diabetes or high blood pressure. (E- observational)
3. I have diabetes or high blood pressure because I made poor food choices. (E - vicarious reinforcement)
4. People with money are more likely to be overweight because they can afford to buy more food. (E- situational)
5. People who are heavy are more likely to get diabetes or high blood pressure. (E – situational)

Eating Behavior

Household/Restaurants

1. My family eats dinner together at a table. (E – situation)
2. My family does not eat snack foods like chips, candy or pop because I keep them in my house. (E- reinforcement).
1. My family eats mostly home cooked meals. (E- situation)

2. I eat most of my meals at restaurants. (E – situation)
3. Fruits and vegetables are almost always available in my house. (E- situation).
4. I am too busy to cook dinner every night. (E- situation).
5. Not having a car limits where I can grocery shop. (E- situation)
6. My kids eat dinner while watching T.V. (E- situation)
7. Living in a homeless shelter has improved my family's diet. (E- situation)
8. Since moving into the homeless shelter my diet has gotten worse. (E – situation)

Cooking

1. My parents taught me how to cook. (E- observational learning)
2. I like to watch cooking shows to get ideas for new recipes. (E-observational learning)
3. I am unable to cook as much as I would like because of my current living situation. (E- situation)
4. I was taught to bake foods more than fry. (E - observational learning).
5. I have a hard time putting a meal together if I don't have any meat in the house. (E- situation)

Night eating

1. When I eat dinner too early I eat later at night. (E- situation)
2. If I go to bed hungry I get up and eat in the middle of the night. (E- situation)
3. I take sleep medication that causes me to get up in the middle of the night and eat. (E-situation)

Hoarding

1. When I was younger I learned to stash food when it's available because it may not be later. (E- vicarious reinforcement).

Upbringing

1. Growing up I was not allowed to get up from the table until my plate was cleaned. (E- reinforcement)
2. Growing up I was taught that it is important to eat fruits and vegetables for your health. (E – reinforcement).
3. Growing up my family had a garden. (E- reinforcement)
4. Growing up there was rarely junk food in my house. (E – reinforcement)
5. I didn't eat breakfast growing up. (E – reinforcement)
6. My family ate meals at a table growing up. (E- reinforcement)
7. I can remember not always having enough food to eat when I was a kid. (E- situation)
8. I was taught to do whatever it takes to make sure my child is not hungry. (E – vicarious reinforcement)

Economics

1. I would eat healthier food if it was less expensive. (E- situation)
2. My family eats at free hot meal programs/churches to stretch our food dollar. (E- situation)
3. I have learned how to make my food stamps last the whole month. (E- observational learning)
4. I shop around at different stores to get the cheapest prices. (E- situation)

4. I can only afford to buy fresh fruits and vegetables when I first get my food stamps. (E- situation).
5. I can't afford to shop at farmers' markets. (E- situation)
6. I use food shelves to stretch my food dollar. (E – situation)

Behavior

Emotional Eating

Mood

1. When I am sad or upset I eat more. (B – behavioral capability)
2. When I am stressed I eat more. (B – behavioral capability)
3. When I am happy I eat more. (B – behavioral capability)
4. I usually eat on a set schedule throughout the day. (B – behavioral capability)
5. My appetite doesn't change when I am sad or upset. (B – behavioral capability)
6. My appetite doesn't change when I am stressed out. (B – behavioral capability)
7. My appetite doesn't change when I am happy. (B – behavioral capability)
8. I have a sweet tooth. (B-behavioral capability)
9. I eat when I'm bored. (behavioral capability)
10. I only eat when I am hungry. (behavioral capability)
11. I don't eat when I'm angry or frustrated. (B – behavioral capability)
12. I smoke more cigarettes when I am stressed. (B – behavioral capability)
13. I smoke cigarettes to control my appetite. (B- behavioral expectations)
14. I smoke cigarettes instead of eating to relieve stress. (B – expectations)
15. I think about food all the time. (B- behavioral capability)

Grocery Shopping/Household Food

1. Before I go grocery shopping I write out a list. (B – behavioral capability)
2. I almost always stick to my list at the grocery stores unless something is on sale. (B – behavioral capability)
3. I usually buy candy or chocolate at check – out counters. (B – behavioral capability)
4. I don't write out a list because I buy the same thing every time. (B – behavioral capability)

Exercise/Activity

1. I move around or fidget a lot. (B – behavioral capability)
2. I don't have time to exercise on a regular basis. (B – behavioral capability)
3. I have a gym membership and use it often. (B- behavioral capability)
4. I exercise daily to help keep myself healthy. (B- behavioral expectations)
5. I exercise to help reduce stress. (B-behavioral capability)
6. I do not exercise as much as I should. (B-behavioral capability)
7. I exercise because my kids do. (B- behavioral capability)
8. I have health problems that prevent me from exercising. (B – behavioral capability)

Health Knowledge/Health Beliefs

Behavior Modeling

1. I buy fruits and vegetables because they are healthy for me and my family. (B- expectations)
2. Eating less snack foods like chips, candy and pop, would affect me and my family's health in a good way. (B-expectations)
3. I eat meat daily to keep healthy. (B – expectations)
4. I pay attention to portion sizes when I am eating. (B- behavioral capability)

Preventative Measures

1. My family and I go to the doctor to help keep us healthy. (B-expectations)
2. I eat healthy to decrease my chances of getting diabetes and high blood pressure. (B- expectations)
3. I read food labels at the grocery store because I am concerned about what is in the food I am eating. (B – behavioral capability)
4. I eat less salt/sodium to decrease my chances of getting high blood pressure. (B – behavioral capability)

Upbringing

1. I eat healthier now than when I was growing up. (B- behavioral capability)
2. My diet is similar now to when I was growing up. (B- behavioral capability)

Body Image

1. I eat more food because I want to gain weight. (B- behavioral capability)
2. I eat less food because I want to lose weight. (B- behavioral capability)
3. I eat more food because I want to be big sized like my friends and family. (behavioral capability)
4. I have had gastric bypass surgery to help me lose weight. (B – behavioral expectations)
5. I want to be thinner. (B – behavior capability)
6. I want to be bigger. (B – behavior capability)

Eating Behavior

Household/Restaurants

1. I don't go to buffet restaurants because I can't eat enough to get my monies worth. (B- behavioral capability)
2. I eat past full when I go to buffet restaurants. (B- behavioral capability)
3. I sometimes eat in my bed. (B – behavioral capability)
4. I eat at fast food restaurants when I run out of food stamps. (B – behavior capability)
5. I eat my child's leftovers because I don't like wasting food. (B- behavior capability)
6. If I eat too much I feel sick to my stomach. (B – behavior expectation)
7. I like to eat corn starch. (B- behavior capability)
8. I overeat the first week after I get my food stamps. (B- behavior capability)
9. I can't stop eating once I start. (B – behavior capability)
10. I love to eat fast food. (B – behavior capability)

Cooking

1. I cook healthy food because it's best for my family. (B – behavior expectations)

2. I don't cook from scratch because it takes too long. (B – behavior expectations)

Hoarding

1. I hide food from my children. (B- behavioral capability).

2. My children have their own stash of food so they don't touch mine. (B – behavior capability)

3. I worry if my stash of food runs out before my food stamps come. (B- behavior capability)

4. I share all my food with my kids. (B – behavior capability)

5. I have to hide my stash in creative places or else my children will find it. (B- behavior capability)

Economics

1. I buy foods in bulk to save money. (B-behavioral capability)

2. I have never stolen food to feed my family (B – behavioral capability)

3. I have taken food from dumpster behind stores and restaurants to feed me or my family. (B – behavior capability)

4. I have prostituted to make money to feed my children. (B- behavioral capability)

5. The quality of food at hot meal site/church meals is poor so I don't go to them. (B – behavioral capability)

6. I buy fruits and vegetables for myself but I don't have the money to buy them for my children also. (B- behavioral capability)

7. I have used my food stamps to buy food at the farmers' markets before. (behavioral capability)

8. I or my children have participated in a community garden. (B – behavioral capability)

9. I have to use cash to buy food because I don't get enough food stamps to make it through the month.(B - behavioral capability)

10. I save some of my food stamps to spend at the end of the month. (B – behavioral capability)

11. I don't buy fresh fruit because it costs too much. (B – behavioral capability)

12. If I have food stamps left over, I sell them for cash. (B – behavioral capability)

Personal

Emotional Eating

Mood

1. Eating helps me reduce my stress. (P – coping response)

2. I feel better if I wake up in the middle of the night and eat. (P – coping response)

3. I think about food more than I think about sex. (P – beliefs/preferences)

4. When my child is upset I give them sweets to make them feel better. (P - coping response)

5. I am stressed out a lot. (self-reinforcement)

6. I only cook for my family when I am in the mood. (P – expectancies)

7. When I am feeling stressed, I tend to lose weight. (P – expectancies)

8. When I am feeling stressed, I tend to gain weight. (P – expectancies)

9. When I am upset I prefer to go for a walk or clean. (P – coping response)
10. I feel better after I eat fast food. (P – expectancies)
11. I eat more snack foods like chips, cookies, pop and chocolate around I my period. (P – self-control)
12. I like to cook when I am depressed because it makes me feel better. (P coping response)
13. I would rather have my favorite food over sex. (P– beliefs/preferences)
14. I feel guilty if I overeat. (self-control)
15. I only think about food when it's time to eat. (P – self-control)
16. Eating sweets makes me feel good. (P – expectancies)
17. Eating fried chicken makes me feel good. (P – expectancies)
18. Sometimes I forget to eat. (P – coping response)

Grocery Shopping

1. If I get a craving for a certain food I will go out and buy it if even if it's late at night. (P - self-control)
2. I buy foods that my children need at the store before buying what I want. (P – self-control)

Social/Media

1. Being around people who are eating makes me want to eat to even if I am not hungry. (P self-control)
2. Fast food isn't appealing to me. (P self-control)
3. I don't think about eating while I'm watching T.V. (P – self-control)

Exercise/Activity

1. I move around a lot to prevent myself from gaining weight. (P – expectancies)
2. I like how I feel after I exercise (P –self-reinforcement)
3. I don't like to sit still for long periods of time. (P – beliefs/preferences)
4. I would rather go for a walk than eat if I'm bored. (P – self-control)
5. Exercise isn't necessary in order to be healthy. (P – beliefs/preferences)

Health Knowledge/Health Beliefs

1. If I am craving a certain food it is because my body is missing whatever is in that food. (P – beliefs)
2. I have lost weight and have kept it off. (self-efficacy)
3. I eat healthy because I want to be a good role model for my children. (P – self-efficacy)
4. Health problems like high blood pressure and diabetes are a result of family background and genetics, not what a person eats. (P – expectancies)
5. Being low income impacts my health in a negative way. (P – expectancies)
6. I do not worry about my health. (P-expectancies)
7. I have tried losing weight before but haven't been successful. (P self-efficacy)
8. I don't worry about my weight. (P – self-efficacy)
9. The enjoyment of food is worth being a bigger size. (P –self-control)
10. I overeat because I like to feel full. (P-coping mechanism)

Preventative Measures

1. After having my children I was able to lose the weight. (P – self-efficacy)
2. I eat breakfast so I don't get hungry and overeat later. (P – expectancies)

3. I eat healthy to help control my weight. (P – expectancies)
4. I weigh myself on a regular basis. (P – self-efficacy)
5. I control my eating so that I can be a smaller size. (P – self-efficacy)

Body Image

1. People cannot help how much they weigh because it is genetic. (P – beliefs)
2. I am trying to gain weight because my significant other wants me to be bigger. (self-efficacy)
3. I am happy with my weight. (P – self-reinforcement)
4. I would be healthier if I lost a few pounds. (P – expectancies)
5. I would look healthier if I gained a few pounds. (P – expectancies)
6. Being a small size is not important to me. (P – beliefs/preferences)

Eating Behavior

Household/Restaurants

1. I limit myself to less than 2 plates when I go to buffets. (P – self-control)
2. I encourage my children to overeat at buffets so they will not be hungry later. (P – emotional coping response)
3. Even if food is really tasty it is not hard for me to stop eating it. (P- self-control)
4. I would eat healthier if I had more food stamps. (P – self-efficacy)
7. I don't eat fast food often because it's not good for your health. (P – self – reinforcement)
8. When I go out to eat I almost always have leftovers. (P –self-control)
9. I will prefer to eat fruit instead of chocolate or other sweets. (P – self-efficacy)
10. I prefer to eat fresh fruit instead of chips and pop. (P – self-efficacy)
11. I drink water instead of pop. (P – self-efficacy)
12. I drink whole milk, not skim. (P – beliefs/preferences)

Cooking

1. I always serve a vegetable when I cook a meal. (P – self-efficacy)
2. I use of lot of sauces and seasoning to make food taste better when I cook. (P – expectancies)
3. I prefer fried foods over baked or broiled foods. (P – self-efficacy)

Economics

1. I receive enough food stamps each month to feed my family without using cash. (P –self- control)
3. I buy some generic brands to help stretch our food dollar. (P – self-efficacy)

ID # _____

University of Minnesota Eating Behavior Survey 2011

Thank you for agreeing to fill in this survey. This will help us learn about how women make their food choices and what influences their eating behavior. There is no right or wrong answer. Please just give us your honest opinion. If you have any questions about this survey, are having a hard time reading the questions, or do not know what a question means, please ask the research assistant and she will help you. Your name will not be on this survey.

For each question, please circle one answer.

****"Healthy" food includes fruits, vegetables, lean meats, low-fat or non-fat dairy, and whole grains. ****

Please answer the questions as follows:

SD = Strongly disagree **D** = Disagree **NA** = Doesn't apply **A** = Agree **SA** = Strongly Agree

	Strongly Disagree	Disagree	Doesn't Apply	Agree	Strongly Agree
I eat at restaurants more when I am stressed.	SD	D	NA	A	SA
I eat at restaurants less when I am sad or upset.	SD	D	NA	A	SA
I eat at restaurants more when I am happy.	SD	D	NA	A	SA
If I smell fast food I want to eat it.	SD	D	NA	A	SA
I eat a snack if I am on the bus or in a car.	SD	D	NA	A	SA
My cravings for food vary depending on my mood.	SD	D	NA	A	SA
If I see food that looks tasty, I want to eat it.	SD	D	NA	A	SA
When I am bored at home I eat snacks.	SD	D	NA	A	SA
If I shop when I am moody, I buy more junk food than I usually would.	SD	D	NA	A	SA
I do not keep junk food like chips, cookies and pop in the house because I will eat them if I get bored.	SD	D	NA	A	SA
I am bored often because I am unemployed.	SD	D	NA	A	SA
Being with someone who is eating makes me want to eat also.	SD	D	NA	A	SA
I tend to overeat at celebrations or holiday gatherings.	SD	D	NA	A	SA
I eat more junk food when the kids are around.	SD	D	NA	A	SA

	Strongly Disagree	Disagree	Doesn't Apply	Agree	Strongly Agree
Seeing T.V. adds for tasty looking food makes me want to buy it.	SD	D	NA	A	SA
I get hungry when I watch T.V.	SD	D	NA	A	SA
I eat junk food like chips, cookies, and pop when I watch T.V.	SD	D	NA	A	SA
I do not feel safe walking/exercising in my neighborhood.	SD	D	NA	A	SA
I do not own a car so I take the bus a lot.	SD	D	NA	A	SA
I do not own a car so I walk to a lot of places I need to go.	SD	D	NA	A	SA
I live near walking paths.	SD	D	NA	A	SA
I was taught exercise is important in staying healthy.	SD	D	NA	A	SA
My friends and family do not move around a lot.	SD	D	NA	A	SA
I exercise because people who are important to me exercise.	SD	D	NA	A	SA
People who are important to me are big in size.	SD	D	NA	A	SA
I am leaner than most of my family and friends.	SD	D	NA	A	SA
People who are lean exercise more and eat less.	SD	D	NA	A	SA
People who are lean are weaker than larger people.	SD	D	NA	A	SA
Lean people are genetically born that way.	SD	D	NA	A	SA
People who are heavy exercise less than lean people.	SD	D	NA	A	SA
I was lean before I had children, but since having children I have gained a lot of weight.	SD	D	NA	A	SA
Watching T.V. and reading celebrity magazines makes me feel bad about the way I look.	SD	D	NA	A	SA
I have gained weight after getting the Depo birth control shot.	SD	D	NA	A	SA
I am heavier than most of my family and friends.	SD	D	NA	A	SA
People who are heavy eat more than thinner people.	SD	D	NA	A	SA
The health of at least one of my family members has changed our household's diet.	SD	D	NA	A	SA
People with unhealthy diets are at greater risk for getting related diseases like diabetes or high blood pressure.	SD	D	NA	A	SA
I have diabetes or high blood pressure because I made poor food choices.	SD	D	NA	A	SA
People with money are more likely to be overweight because they can afford to buy more food.	SD	D	NA	A	SA
People who are heavy are more likely to get diabetes or high blood pressure.	SD	D	NA	A	SA
My family eats dinner together at a table.	SD	D	NA	A	SA
My family eats snacks like chips, candy or pop because I keep them in the house.	SD	D	NA	A	SA
My family eats home cooked meals.	SD	D	NA	A	SA
I eat my meals at restaurants.	SD	D	NA	A	SA
Fruits and vegetables are always available in my house.	SD	D	NA	A	SA
I am too busy to cook dinner every night.	SD	D	NA	A	SA

	Strongly Disagree	Disagree	Doesn't Apply	Agree	Strongly Agree
Not having a car limits where I can grocery shop.	SD	D	NA	A	SA
I eat dinner while watching T.V.	SD	D	NA	A	SA
Living in a homeless shelter has improved my family's diet.	SD	D	NA	A	SA
Since moving into the homeless shelter my diet has gotten worse.	SD	D	NA	A	SA
My parents taught me how to cook.	SD	D	NA	A	SA
I like to watch cooking shows on T.V. to get ideas for new recipes.	SD	D	NA	A	SA
I am unable to cook as much as I would like because of my current living situation.	SD	D	NA	A	SA
I was taught to bake foods more than fry.	SD	D	NA	A	SA
I have a hard time putting a meal together if I don't have any meat in the house.	SD	D	NA	A	SA
I dislike the taste of vegetables.	SD	D	NA	A	SA
When I eat dinner too early, I eat later at night.	SD	D	NA	A	SA
If I go to bed hungry I get up and eat in the middle of the night.	SD	D	NA	A	SA
I take sleep medication that causes me to get up in the middle of the night and eat.	SD	D	NA	A	SA
When I was younger I learned to stash food when it's available because it may not be available later.	SD	D	NA	A	SA
Growing up, I was not allowed to get up from the table until my plate was cleaned.	SD	D	NA	A	SA
Growing up, I was taught that it is important to eat fruits and vegetables for your health.	SD	D	NA	A	SA
Growing up, my family had a garden.	SD	D	NA	A	SA
Growing up, there was rarely junk food in my house.	SD	D	NA	A	SA
I did not eat breakfast growing up.	SD	D	NA	A	SA
I was taught to do whatever it takes to make sure my child is not hungry.	SD	D	NA	A	SA
My family ate meals at a table growing up.	SD	D	NA	A	SA
I can remember not always having enough food to eat when I was a kid.	SD	D	NA	A	SA
I would eat healthier food if it was less expensive.	SD	D	NA	A	SA
My family eats at free hot meal programs/churches to stretch our food dollar.	SD	D	NA	A	SA
I have learned how to make my food stamps last the whole month.	SD	D	NA	A	SA
I shop around at different stores to get the cheapest prices.	SD	D	NA	A	SA
I can only afford to buy fresh fruits and vegetables when I first get my food stamps.	SD	D	NA	A	SA
I cannot afford to shop at farmers' markets.	SD	D	NA	A	SA
I use food shelves to stretch my food dollar.	SD	D	NA	A	SA
When I am sad or upset I eat more.	SD	D	NA	A	SA
When I am stressed I eat more.	SD	D	NA	A	SA
When I am happy I eat more.	SD	D	NA	A	SA

	Strongly Disagree	Disagree	Doesn't Apply	Agree	Strongly Agree
I usually eat on a set schedule throughout the day.	SD	D	NA	A	SA
My appetite does not change when I am sad or upset.	SD	D	NA	A	SA
My appetite does not change when I am stressed out.	SD	D	NA	A	SA
My appetite does not change when I am happy.	SD	D	NA	A	SA
I have a sweet tooth.	SD	D	NA	A	SA
I eat when I am bored.	SD	D	NA	A	SA
I only eat when I am hungry.	SD	D	NA	A	SA
I do not eat when I am angry or frustrated.	SD	D	NA	A	SA
I smoke more cigarettes when I am stressed.	SD	D	NA	A	SA
I smoke cigarettes to control my appetite.	SD	D	NA	A	SA
I smoke cigarettes instead of eating to relieve stress.	SD	D	NA	A	SA
I think about food all the time.	SD	D	NA	A	SA
Before I go grocery shopping, I write out a list.	SD	D	NA	A	SA
I almost always stick to my list at the grocery stores unless something is on sale.	SD	D	NA	A	SA
I usually buy candy or chocolate at check – out counters.	SD	D	NA	A	SA
I do not write out a list because I buy the same thing every time I grocery shop.	SD	D	NA	A	SA
I do not have time to exercise on a regular basis.	SD	D	NA	A	SA
I have a gym membership and use it regularly.	SD	D	NA	A	SA
I exercise to help reduce stress	SD	D	NA	A	SA
I exercise regularly to help keep myself healthy.	SD	D	NA	A	SA
I do not exercise as much as I should.	SD	D	NA	A	SA
My kids exercise with me.	SD	D	NA	A	SA
I have health problems that prevent me from exercising.	SD	D	NA	A	SA
I eat fruits and vegetables because they are healthy for me.	SD	D	NA	A	SA
Eating less snack foods like chips, candy and pop would be good for my family's health.	SD	D	NA	A	SA
I eat meat daily to keep healthy.	SD	D	NA	A	SA
I pay attention to portion sizes when I am eating.	SD	D	NA	A	SA
My family and I go to the doctor to help keep us healthy.	SD	D	NA	A	SA
I eat healthy to decrease my chances of getting diabetes and high blood pressure.	SD	D	NA	A	SA
I read food labels at the grocery store because	SD	D	NA	A	SA
I am concerned about what is in the food I am eating.	SD	D	NA	A	SA
I eat less salt/sodium to decrease my chances of getting high blood pressure.	SD	D	NA	A	SA

	Strongly Disagree	Disagree	Doesn't Apply	Agree	Strongly Agree
I move around or fidget a lot.	SD	D	NA	A	SA
I eat healthier now than when I was growing up.	SD	D	NA	A	SA
My diet is similar now to when I was growing up.	SD	D	NA	A	SA
I eat more food because I want to gain weight.	SD	D	NA	A	SA
I eat less food because I want to lose weight.	SD	D	NA	A	SA
I eat more food because I want to be big sized like my friends and family.	SD	D	NA	A	SA
I have had gastric bypass surgery to help me lose weight.	SD	D	NA	A	SA
I want to be thinner.	SD	D	NA	A	SA
I want to be bigger.	SD	D	NA	A	SA
I do not go to buffet restaurants because I cannot eat enough to get my money's worth.	SD	D	NA	A	SA
I eat past full when I go to buffet restaurants.	SD	D	NA	A	SA
I sometimes eat in my bed.	SD	D	NA	A	SA
I eat at fast food restaurants when I run out of food stamps.	SD	D	NA	A	SA
I eat my child's leftovers because I do not like wasting food.	SD	D	NA	A	SA
If I eat too much, I feel sick to my stomach.	SD	D	NA	A	SA
I like to eat corn starch.	SD	D	NA	A	SA
I overeat the first week after I get my food stamps.	SD	D	NA	A	SA
I cannot stop eating once I start.	SD	D	NA	A	SA
I love to eat fast food.	SD	D	NA	A	SA
I cook healthy food because it's best for my family.	SD	D	NA	A	SA
I do not cook from scratch because it takes too long.	SD	D	NA	A	SA
I hide food from my children.	SD	D	NA	A	SA
My children have their own stash of food so they do not touch mine.	SD	D	NA	A	SA
I worry if my stash of food runs out before my food stamps come.	SD	D	NA	A	SA
I share all my food with my kids.	SD	D	NA	A	SA
I have to hide my stash in creative places or else my children will find it.	SD	D	NA	A	SA
I buy fruits and vegetables for myself but I do not have the money to buy them for children.	SD	D	NA	A	SA
I buy foods in bulk to save money.	SD	D	NA	A	SA
I have never stolen food to feed my family.	SD	D	NA	A	SA
I have taken food from dumpster behind stores and restaurants to feed me or my family.	SD	D	NA	A	SA
I have prostituted to make money to feed my children.	SD	D	NA	A	SA
The quality of food at hot meal site/church meals is poor so I do not go to them.	SD	D	NA	A	SA

	Strongly Disagree	Disagree	Doesn't Apply	Agree	Strongly Agree
I have used my food stamps to buy food at the farmers' markets before.	SD	D	NA	A	SA
I or my children have participated in a community garden.	SD	D	NA	A	SA
I have to use cash to buy food because I do not get enough food stamps to make it through the month.	SD	D	NA	A	SA
I save some of my food stamps to spend at the end of the month.	SD	D	NA	A	SA
I do not buy fresh fruit because it costs too much.	SD	D	NA	A	SA
I buy canned fruit because it's cheaper.	SD	D	NA	A	SA
Eating helps me reduce my stress.	SD	D	NA	A	SA
I feel better if I wake up in the middle of the night and eat.	SD	D	NA	A	SA
I think about food more than I think about sex.	SD	D	NA	A	SA
When my child is upset I give them sweets to make them feel better.	SD	D	NA	A	SA
I am stressed out a lot.	SD	D	NA	A	SA
I only cook for my family when I am in the mood.	SD	D	NA	A	SA
When I am feeling stressed, I tend to lose weight.	SD	D	NA	A	SA
When I am feeling stressed, I tend to gain weight.	SD	D	NA	A	SA
When I am upset I prefer to keep busy so I am not tempted to eat.	SD	D	NA	A	SA
I feel better after I eat fast food.	SD	D	NA	A	SA
I eat more snack foods like chips, cookies, pop and chocolate around my period.	SD	D	NA	A	SA
I like to cook when I'm depressed because it makes me feel better.	SD	D	NA	A	SA
I feel guilty if I overeat.	SD	D	NA	A	SA
I only think about food when it is time to eat.	SD	D	NA	A	SA
Eating sweets makes me feel good.	SD	D	NA	A	SA
Eating fried chicken makes me feel good.	SD	D	NA	A	SA
Eating fried chicken makes me feel good.	SD	D	NA	A	SA
Sometimes I forget to eat.	SD	D	NA	A	SA
If I get a craving for a certain food I will go out and buy it if even if it is late at night.	SD	D	NA	A	SA
I buy foods that my children need at the store before buying what I want.	SD	D	NA	A	SA
Being around people who are eating makes me want to eat to even if I am not hungry.	SD	D	NA	A	SA
Fast food is not appealing to me.	SD	D	NA	A	SA
I do not think about eating while I am watching T.V.	SD	D	NA	A	SA
I move around a lot to prevent myself from gaining weight.	SD	D	NA	A	SA
I like how I feel after I exercise.	SD	D	NA	A	SA
I do not like to sit still for long periods of time.	SD	D	NA	A	SA
I would rather go for a walk than eat if I'm bored.	SD	D	NA	A	SA

	Strongly Disagree	Disagree	Doesn't Apply	Agree	Strongly Agree
Exercise is not necessary in order to be healthy.	SD	D	NA	A	SA
If I am craving a certain food it is because my body is missing whatever is in that food.	SD	D	NA	A	SA
I have lost weight and have kept it off.	SD	D	NA	A	SA
I eat healthy because I want to be a good role model for my children.	SD	D	NA	A	SA
Health problems like high blood pressure and diabetes are a result of family background and genetics, not what a person eats.	SD	D	NA	A	SA
Being low income impacts my health in a negative way.	SD	D	NA	A	SA
I do not worry about my health.	SD	D	NA	A	SA
I have tried losing weight before but have not been successful.	SD	D	NA	A	SA
I do not worry about my weight.	SD	D	NA	A	SA
The enjoyment of food is worth being a bigger size.	SD	D	NA	A	SA
After having my children I was able to lose the weight.	SD	D	NA	A	SA
I eat breakfast so I do not get hungry and overeat later.	SD	D	NA	A	SA
I eat healthy to help control my weight.	SD	D	NA	A	SA
I weigh myself on a regular basis.	SD	D	NA	A	SA
I control my eating so that I can be a smaller size.	SD	D	NA	A	SA
People cannot help how much they weigh because it is genetic.	SD	D	NA	A	SA
I am trying to gain weight because my significant other wants me to be bigger.	SD	D	NA	A	SA
I am happy with my weight.	SD	D	NA	A	SA
I would be healthier if I lost a few pounds.	SD	D	NA	A	SA
I would look healthier if I gained a few pounds.	SD	D	NA	A	SA
Being a small size is not important to me.	SD	D	NA	A	SA
I overeat because I like to feel full.	SD	D	NA	A	SA
I limit myself to less than 2 plates when I go to buffets	SD	D	NA	A	SA
I encourage my children to overeat at buffets so they will not be hungry later.	SD	D	NA	A	SA
Even if food is really tasty it is not hard for me to stop eating it.	SD	D	NA	A	SA
I would eat healthier if I had more food stamps.	SD	D	NA	A	SA
I do not eat fast food often because it is not good for my health.	SD	D	NA	A	SA
When I go out to eat I almost always have leftovers.	SD	D	NA	A	SA
I will prefer to eat fruit instead of chocolate or other sweets.	SD	D	NA	A	SA
I prefer to eat fresh fruit instead of chips and pop.	SD	D	NA	A	SA
I drink water instead of pop.	SD	D	NA	A	SA
I always serve a vegetable when I cook a meal.	SD	D	NA	A	SA

	Strongly Disagree	Disagree	Doesn't Apply	Agree	Strongly Agree
I drink whole milk.	SD	D	NA	A	SA
I use a lot of sauces and seasoning to make food taste better when I cook.	SD	D	NA	A	SA
I prefer fried foods over baked or broiled foods.	SD	D	NA	A	SA
I receive enough food stamps each month to feed my family without using cash.	SD	D	NA	A	SA
I buy generic brands to help stretch our food dollar.	SD	D	NA	A	SA
I consider myself to be a picky eater.	SD	D	NA	A	SA
I consider myself to be an emotional eater.	SD	D	NA	A	SA
I consider myself to be a pop drinker.	SD	D	NA	A	SA
I consider myself to be a junk food eater.	SD	D	NA	A	SA
I consider myself to be a neat freak.	SD	D	NA	A	SA
I consider myself to be a night eater.	SD	D	NA	A	SA
I consider myself to be a meat and potatoes person	SD	D	NA	A	SA
I consider myself to be a good cook.	SD	D	NA	A	SA
I consider myself to be a big eater.	SD	D	NA	A	SA
I consider myself to be a coffee drinker.	SD	D	NA	A	SA
I consider myself to be a smoker.	SD	D	NA	A	SA
I consider myself to be a stress eater.	SD	D	NA	A	SA
I consider myself to be a bargain shopper.	SD	D	NA	A	SA
I consider myself to be a candy eater.	SD	D	NA	A	SA
I consider myself to be a fast eater.	SD	D	NA	A	SA
I consider myself to be a bread eater.	SD	D	NA	A	SA
I consider myself to be a soul food eater.	SD	D	NA	A	SA
I consider myself to be a slow eater.	SD	D	NA	A	SA
I consider myself to be a vegetable eater.	SD	D	NA	A	SA
I consider myself to be a fruit eater.	SD	D	NA	A	SA
I consider myself to be a meat eater.	SD	D	NA	A	SA
I consider myself to be a light eater.	SD	D	NA	A	SA
I consider myself to be a fast-food eater.	SD	D	NA	A	SA
I consider myself to be an apple shape.	SD	D	NA	A	SA
I consider myself to be a pear shape.	SD	D	NA	A	SA
I consider myself to be a healthy eater.	SD	D	NA	A	SA

Below is a list of the way you might have felt or behaved. Please tell us how often you have felt like this way during the past week.

SD - Rarely or none of the time (less than 1 day)

D - Some of a little of the time (1-2 days)

A - Occasionally or a moderate amount of time (3-4 days)

SA - Most or all of the time (5-7 days)

Strongly Disagree Disagree Agree Strongly Agree

I was bothered by things that usually do not bother me.	SD	D	A	SA
I did not feel like eating; my appetite was poor.	SD	D	A	SA
I felt that I could not shake off the blues even with help from my family and friends.	SD	D	A	SA
I felt that I was just as good as other people.	SD	D	A	SA
I had trouble keeping my mind on what I was doing.	SD	D	A	SA
I felt depressed.	SD	D	A	SA
I felt that everything I did was an effort.	SD	D	A	SA
I felt hopeful about the future.	SD	D	A	SA
I thought my life had been a failure.	SD	D	A	SA
My sleep was restless.	SD	D	A	SA
I was happy.	SD	D	A	SA
I talked less than usual.	SD	D	A	SA
I felt lonely.	SD	D	A	SA
People were unfriendly.	SD	D	A	SA
I enjoyed life.	SD	D	A	SA
I had crying spells.	SD	D	A	SA
I felt sad.	SD	D	A	SA
I felt that people dislike me.	SD	D	A	SA
I could not get "going."	SD	D	A	SA

Please fill in the box below.

I believe my height is: _____ ft _____ in

I believe my weight is: _____ lbs

Are you pregnant? Yes ----->
 No

IF YES, how many
months? _____

Food in Your Household

Think about your food situation. Were the following statements often true, sometimes true, or never true for your household IN THE LAST 12 MONTHS?

1. I/We worried whether our food would run out before I/we got money to buy more.
 Often true
 Sometimes true
 Never true
 Do not know
2. The food that I/we bought just didn't last, and I/we didn't have money to get more.
 Often true
 Sometimes true
 Never true
 Do not know
3. I/We couldn't afford to eat balanced meals.
 Often true
 Sometimes true
 Never true
 Do not know

4. **IN THE LAST 12 MONTHS, did you or other adults in your household ever cut the size of your meals or skip meals because there wasn't enough money for food?**

- Yes ----->
- No
- Do not know

IF YES, how often did this happen?

- Almost every month
- Some months but not every month
- Only 1 or 2 months
- Don't know

5. **IN THE LAST 12 MONTHS, did you ever eat less than you felt you should because there wasn't enough money to buy food?**

- Yes
- No
- Do not know

6. **IN THE LAST 12 MONTHS, were you ever hungry but didn't eat because there wasn't enough money for food?**

- Yes
- No
- Do not know

Demographic Questionnaire

1. Age: _____ yrs
2. Gender:
 Female
 Male
3. Race:
 Caucasian (white) Hispanic
 African American (black) Asian
 American Indian Other: _____
4. Household income (annual or yearly):
 Less than \$5,000 \$10,000-\$19,999 \$40,000-\$59,999
 \$5,000-\$9,999 \$20,000-\$39,999 \$60,000 or more
5. Which income sources does your household currently receive?
(CHECK ALL THAT APPLY)
 Wages from a job Social Security Unemployment insurance
 SSI for an adult/adult Pension Housing assistance
 Child support SSDI benefits Other: _____
 Veteran's benefits SSI for a child
 Food Stamps MFIP
6. Education:
 8th grade or less Completed college/technical/vocational school
 Some high school Completed graduate/professional school
 High school graduate, GED or equivalent
 Some undergraduate college/technical/vocational
7. Total number of people in household: _____
8. Total number of children in household (under 18): _____
Please list their ages: _____
9. Where do you currently live?
 Rented apartment, house, or townhouse Own townhouse or house
 Parent's home Shelter
 With other relatives Other: _____
10. Are you homeless?
 Yes ----->
 No

IF YES, how long have you been homeless? _____

11. **Do you currently have a job?**

- Yes
- No

IF NO:

- How long have you been jobless? _____
- What was your last job? _____

12. **How long have you received food stamp benefits?**

- <6 months
- 6 months – 1 year
- 1 – 5 years
- >5 years

IF YOU ARE NOT ON FOOD STAMPS RIGHT NOW, WHY NOT?

- On waiting period to become eligible
- Moved here recently
- Application process too hard to do
- Other, please specify: _____

13. **What religion do you practice?**

- Christian (Catholic or Protestant)
- Muslim
- Judaism
- Hindu
- Buddhism
- Non-practicing believer
- Atheist
- Other: _____

This survey was developed by Dr. Chery Smith and Heidi Dressler from the University of Minnesota, Department of Food Science and Nutrition. For permission to use it, please contact Dr. Chery Smith at csmith@umn.edu.

24-Hour Dietary Recall

ID # _____

<u>Time Consumed</u>	<u>Food Item</u>	<u>Serving Size</u>	<u>Where</u>
Breakfast			
Snack			
Lunch			
Snack			
Dinner			
Snack			