© 2010 Leia Kedem

PSYCHOSOCIAL CONSTRUCTS RELATED TO HEALTHY EATING IN FEMALE COLLEGE FRESHMEN: RELIABILITY ANALYSIS AND INFLUENCE OF BODY MASS INDEX

BY

LEIA ELLEN KEDEM

THESIS

Submitted in partial fulfillment of the requirements
for the degree of Master of Science in Nutritional Sciences
in the Graduate College of the
University of Illinois at Urbana-Champaign, 2010

Urbana, Illinois

Master's Committee:

Associate Professor Manabu Nakamura, Chair
Professor Karen Chapman-Novakofski, Director of Research
Professor Edward McAuley

ABSTRACT

There were three objectives of the present study, which evaluated nutrition belief questionnaires used with a sample of female college freshmen (n=268) participating in a weight gain intervention. Surveys measured social cognitive constructs including self-efficacy (SE), outcome expectations (OE), food environment (FE), and goals (G); items from Project EAT (EAT) and the Weight Efficacy Lifestyle Questionnaire (WELQ) were also used. The first objective of the study was to investigate surveys for reliability using Cronbach's α and principal components analysis (PCA). Cronbach's α assessed internal consistency while PCA compared underlying data patterns with previously published item groupings. Second, validity was assessed through comparison of these two methods. Third, psychometric properties of surveys were compared among normal- and overweight subjects. Body mass index (BMI) was calculated using baseline height and weight data; subjects were then categorized as normal- or overweight using classifications issued by the National Institutes of Health. If scales had adequate Cronbach's α values ($\alpha \geq \sim 0.70$), composite scores were calculated as mean scores of all items within a construct. Composite scores for reliable constructs were compared by BMI category using Mann-Whitney U. Factor structures for the different surveys were also compared with PCA using body mass index (BMI) category as an independent variable.

SE, OE, EAT, and WELQ had good internal consistency ($\alpha \geq \sim 0.70$) based on previously published item groupings. Previous groupings were not available for G and FE, so only those indicated by PCA were tested for internal consistency; α values were high for G subscales but were not adequate for FE. Agreement between PCA and

Cronbach's α indicated that the item grouping for OE was a valid reflection of the construct; most SE and EAT constructs were also similar when comparing the two methods. WELQ groupings for PCA vs. Cronbach's α original groupings were considerably different than described, indicating that these groupings may not be valid in this sample and other groupings may be more reliable. Scales may better address population concerns by integrating such issues as social pressure, emotional eating, food availability, and alcohol use. FE should be refined and further tested due to low α values.

Only a few composite scores were significantly different according to BMI. Overweight subjects were more concerned about their weight ($p<.01$) and had lower SE to consume vegetables when physical effort is required ($p<.05$). More obvious differences were seen through PCA, with factor structures differing by BMI for each questionnaire except for OE. Normal- and overweight subjects may have varying cognitive patterns regarding nutrition and health, possibly due to differing influences and habits regarding health behaviors. Questionnaires may not have been constructed so that items had the same meaning for all subjects; psychosocial variables may not have been adequately measured in order to make valid comparisons.

An additional finding was that in the sample as a whole, scores were very positive for OE but less so for SE and WELQ. Scores for G indicated that subjects had goals to incorporate fruits & vegetables and calcium-rich foods less often as compared to lower-fat foods. EAT scores were mostly positive except for weight concern and taste barriers. Due to less positive scores for SE, G, certain WELQ subscales (availability, social pressure, emotional eating), and taste barriers from EAT, interventions in this population may be more successful by incorporating strategies to overcome these barriers.

To my husband, Yore, for seeing my potential,
to Zayde and Gima,
and to every girl who ever dreamed of becoming a butterfly

ACKNOWLEDGEMENTS

I am extremely grateful to my advisor and mentor, Dr. C-N, who took a chance on a psychology nerd. I am very thankful for the generous intellectual, emotional, and financial support she has provided throughout my program. In addition, I am grateful to her for taking the time to listen to my ramblings and musings, and for always encouraging me to be "self-efficacious."

Thank you to Dr. Ellen Evans for the wonderful opportunity and financial support through Project PEER and providing me access to the baseline data, without which none of this would have been possible.

Thanks to Dr. Manabu Nakamura and Dr. Edward McAuley for serving on my advisory and thesis committees and for their valuable guidance and feedback.

Special thanks to my labmates for their constant support, both technical and emotional. Finally, thanks to my husband, family, and friends for their unwavering encouragement throughout my personal and professional growth.

TABLE OF CONTENTS

LIST OF TABLES vii

CHAPTER 1: INTRODUCTION 1

CHAPTER 2: REVIEW OF LITERATURE 13

CHAPTER 3: PRIMARY AIMS 25

CHAPTER 4: METHODOLOGY 28

CHAPTER 5: RESULTS 44

CHAPTER 6: DISCUSSION 58

CHAPTER 7: CONCLUSIONS AND FUTURE DIRECTIONS 82

REFERENCES 85

TABLES 97

APPENDIX A: INFORMED CONSENT 163

APPENDIX B: OUTCOME EXPECTATIONS FOR NUTRITION 167

APPENDIX C: SELF-EFFICACY FOR FRUITS, VEGETABLES, LOWER-FAT, AND HIGHER-CALCIUM 171

APPENDIX D: WEIGHT EFFICACY LIFESTYLE QUESTIONNAIRE 176

APPENDIX E: PROJECT EAT ITEMS 179

APPENDIX F: FOOD ENVIRONMENT 185

APPENDIX G: NUTRITION GOALS 186

AUTHOR'S BIOGRAPHY 187

LIST OF TABLES

Table Page

1 Baseline Anthropometric Data: Descriptive Statistics 97

2 Outcome Expectations for Fruits and Vegetables: Descriptive Statistics.....98

3 Outcome Expectations for Low-Fat Foods: Descriptive Statistics 99

4 Outcome Expectations for Calcium-Rich Foods: Descriptive Statistics.....100

5 Outcome Expectations for Fruits and Vegetables: Factor Loadings 101

6 Outcome Expectations for Low-Fat Foods: Factor Loadings 102

7 Outcome Expectations for Calcium-Rich Foods: Factor Loadings.....103

8 Outcome Expectations: Rotated Component Matrix of All Items 104

9 Outcome Expectations: Internal Consistency and Composite Score Analyses 106

10 Self-Efficacy for Fruits: Descriptive Statistics.....107

11 Self-Efficacy for Vegetables: Descriptive Statistics.....108

12 Self-Efficacy for Lower-Fat Foods: Descriptive Statistics 109

13 Self-Efficacy for Higher-Calcium Foods: Descriptive Statistics 111

14 Self-Efficacy for Fruits: Initial Factor Loadings.....112

15 Self-Efficacy for Vegetables: Initial Factor Loadings.....113

16 Self-Efficacy for Lower-Fat Foods: Initial Factor Loadings.....114

17 Self-Efficacy for Higher-Calcium Foods: Initial Factor Loadings.....116

18 Self-Efficacy for Fruits: Final Factor Structure 117

19 Self-Efficacy for Vegetables: Final Factor Structure.....118

20 Self-Efficacy for Lower-Fat Foods: Final Factor Structure 119

21 Self-Efficacy for Higher-Calcium Foods: Final Factor Structure.....120

LIST OF TABLES (cont.)

Table Page

22 Self-Efficacy: Rotated Component Matrix of All Items 121

23 Self-Efficacy for Fruits: Consistent Factor Structure across Weight Categories 123

24 Self-Efficacy for Vegetables: Consistent Factor Structure across Weight Categories 124

25 Self-Efficacy for Lower-Fat Foods: Consistent Factor Structure across Weight Categories 125

26 Self-Efficacy for Higher-Calcium Foods: Consistent Factor Structure across Weight Categories 126

27 Self-Efficacy: Internal Consistency and Composite Score Analyses.....127

28 Weight Efficacy Lifestyle Questionnaire: Descriptive Statistics 128

29 Weight Efficacy Lifestyle Questionnaire: Initial Factor Loadings 130

30 Weight Efficacy Lifestyle Questionnaire: Final Factor Structure.....131

31 Weight Efficacy Lifestyle Questionnaire: Consistent Factor Structure across Weight Categories 132

32 Weight Efficacy Lifestyle Questionnaire: Internal Consistency and Composite Score Analyses 133

33 Project EAT: Descriptive Statistics.....134

34 Project EAT: Initial Factor Loadings for General Sample 138

35 Project EAT: Final Factor Loadings for General Sample.....140

36 Project EAT: Initial Factor Loadings for Normal-Weight Subjects.....142

LIST OF TABLES (cont.)

Table Page

37 Project EAT: Final Factor Loadings for Normal-Weight Subjects 144

38 Project EAT: Initial Factor Loadings for Overweight Subjects 146

39 Project EAT: Final Factor Loadings for Overweight Subjects 148

40 Project EAT: Internal Consistency and Composite Score Analyses 150

41 Food Environment Questionnaire: Descriptive Statistics 152

42 Food Environment Questionnaire: Factor Loadings 153

43 Food Environment Questionnaire: Consistent Factor Structure across Weight Categories 154

44 Food Environment Questionnaire: Internal Consistency and Composite Score Analyses 155

45 Nutrition Goals Questionnaire: Descriptive Statistics 156

46 Nutrition Goals Questionnaire: Factor Loadings 157

47 Nutrition Goals Questionnaire: Internal Consistency and Composite Score Analyses 158

48 Item Groupings Consistent across Weight Categories: Internal Consistency and Composite Score Analyses 159

49 Nonparametric Analysis of Variance (Mann-Whitney U) According to Weight Category 161

50 Summary of Factor Loading Pattern Differences between Normal- and Overweight Subjects 162

CHAPTER 1

INTRODUCTION

The Obesity Challenge

The prevalence of overweight and obesity has significantly increased over the past few decades, likely due to a combination of higher food intake and lower amounts of physical activity (World Health Organization, 2004; Ogden et al., 2006). Furthermore, overweight and obesity have been on the rise all over the world and across age, race, and ethnicity categories, suggesting that common social and environmental factors may be partly to blame (Bell, Ge, & Popkin, 2001; Australian Institute of Health and Welfare, 2003; National Health Service, 2006; U.S. Department of Health and Human Services, 2008). Excess weight is associated with many health problems, including cardiovascular diseases, diabetes and other metabolic disorders, some types of cancers, and psychological disorders (World Health Organization, 2004). These comorbid conditions ultimately affect one's quality of life, raise healthcare costs, and can lead to early mortality (Rosamond et al., 2008).

The myriad physical, emotional, and financial costs of overweight and obesity and comorbid health concerns have naturally resulted in attempts at prevention and attenuation of weight gain. Surprisingly, in their review of weight gain interventions in adults, Lombard et al. (2009) found that there have been few programs aiming to specifically prevent weight gain, as opposed to focusing on weight loss or other particular health changes. Interventions that utilized multiple delivery modes tended to be more successful, but in general, trials were not consistently based on theoretical models and

successful components were not always identified. Cerin et al. (2009) reported that interventions aiming to alter dietary behavior as a means to improve health have resulted in limited changes, which may be due to improper targeting of behavioral modifiers and ineffective implementation of theoretically-based strategies in translational research. Properly applying behavioral theory to dietary interventions can be beneficial, as results of these trials can contribute to development and adjustment of theories. Meanwhile, theories themselves provide frameworks for interventions by identifying potential determinants and modifiers of behavior. Indeed, it is understood that health-related interventions tend to be more effective when they are framed within a behavioral theory. (Noar & Zimmerman, 2005; Cerin et al., 2009).

Social Cognitive Theory

Social cognitive theory (SCT), developed by Albert Bandura, is one such framework that is often used to elicit behavior change. SCT states that personal, behavioral, and environmental factors influence each other in a dynamic way to affect our behavior. This interaction, termed reciprocal determinism, is the major organizational concept for understanding behavior (Bandura, 1986). Personal factors include outcome expectations, self-efficacy, reinforcement, perceived facilitators or benefits to behavior change, and perceived impediments or barriers to change. Behavioral factors include knowledge, skills, and self-regulation processes such as goal setting. The environmental factors most important to nutrition education include imposed environments over which one has no control, selected environments that can be influenced based on one's actions, created environments that one develops to support his or her needs, and observational

learning or modeling of important others' behavior. According to Bandura (2004), the core set of behavioral determinants include self-efficacy, outcome expectations, perceived barriers and benefits, knowledge, and goal-setting. Several of these determinants have been targeted in non-experimental studies and have been found to positively correlate with dietary behavior change in adults and children (Cerin et al., 2009), as possessing knowledge while building confidence and skills "enables people to make changes in the face of less than ideal circumstances" (Anderson et al., 2007, p. 304).

Self-Efficacy

Self-efficacy, or situational confidence in oneself to perform a behavior, is one of the most central constructs of SCT because "whatever other factors may serve as guides and motivators, they are rooted in the core belief that one has the power to produce desired changes by one's actions" (Bandura, 2004, p.144). The stronger one's self-efficacy, the more likely one is to be committed to their goals and ultimately achieve those aspirations. Differing levels of self-efficacy also affect the way one perceives outcomes to a behavior; one with high self-efficacy will expect to experience positive outcomes more often, while one with low self-efficacy will be more likely to anticipate the negative outcomes associated with performing the behavior. Self-efficacy can also influence the perception of impediments or barriers to performing the desired action.

While people may have differing levels of self-efficacy when it comes to performing the same behavior under different circumstances, self-efficacy can also differ depending on where one is in the process of incorporating a new behavior into their lifestyle. When one considers adopting a new behavior, motivational self-efficacy

describes how confident one is in their abilities to exert control over their actions in difficult situations. Coping self-efficacy refers to one's conviction in their ability to persist in trying to adopt the new behavior, even if they don't succeed the first time or many times. Even if the person is successful in maintaining the desired behavior for a certain period of time, it is still possible (and likely) that they will revert back to old habits at some point. A high recovery self-efficacy means that the person is confident in their ability to get back on track. Having high self- efficacy for a variety of situations is instrumental in increasing the likelihood that a person will be successful in adopting a habit by affecting the amount of effort put into achieving a goal and the amount of time one will persist when experiencing setbacks (Strecher et al., 1986).

Self-efficacy can be increased in four major ways. Garnering personal mastery experiences by setting goals and achieving them despite obstacles is one way for a person to raise their self-efficacy in various situations. Social modeling is the process of watching others successfully perform a behavior under both favorable and adverse circumstances and internalizing the feeling that one could also be successful, especially if those observed are similar to the observer. Social persuasion, or encouragement from others, can also play a role in bolstering self-efficacy by helping one overcome doubt in one's ability to succeed. Self-efficacy can also be influenced by modification of emotional or physical responses to the behavior. For example, negative outcomes of certain behaviors may be interpreted as a personal failure if one does not understand the mechanisms behind the outcome, which can result in lowered self-efficacy. Changing the way one interprets and perceives these outcomes can improve the way one judges their capabilities to perform an action, thereby increasing their self-efficacy (Bandura, 1986).

Specific to health-related interventions, self-efficacy is targeted to increase the chances that participants will integrate a behavior into their lifestyle to decrease health risks. In studies investigating mediating variables of eating behavior, self-efficacy has been found to be a crucial factor in proposed models to explain eating patterns across age groups (Shannon et al., 1990; Sheeshka et al., 1993; DeWolfe & Shannon, 1993). Self-efficacy is not limited to SCT; it is an important construct in other theories, including the Theory of Planned Behavior, Health Belief Model, and others. In a review of behavioral interventions, self-efficacy was consistently found to be an important correlate of dietary behavior regardless of the study's theoretical framework (Cerin et al., 2009). In recent years, researchers have heeded the call to address social cognitive factors in dietary interventions, and self-efficacy has often been included in programs aiming to improve nutrition behaviors across the lifespan.

Outcome Expectations

Outcome expectations describe outcomes or events that a person associates with performing a given action (Bandura, 1997). These outcomes can fall into one of three categories: physical, social, or self-evaluative. The outcomes that one associates with a behavior may be positive or negative; consequently, it seems rather intuitive that the more positive outcomes a person associates with a behavior, the more likely they are to do it. A person weighs the positive and negative outcomes, and will perform the behavior if it maximizes positive outcomes while minimizing negative outcomes. Physical outcomes include unpleasant physical reactions such as having a stomachache, or experiences that are perceived to be positive, like having more energy after eating fruits and vegetables.

Social outcomes, or the social consequences of the behavior, are related to others' perception of us for performing the behavior and events that may arise according to social acceptability of the behavior. Positive social effects may include approval or social recognition, while negative social outcomes include disinterest, disapproval, and social rejection to name a few (Bandura, 1997). Finally, self-evaluative outcomes are those that are related to perceptions of ourselves after engaging in a behavior. Not surprisingly, people engage more in behaviors that they believe will lead to a feeling of self-satisfaction and confidence rather than those that decrease feelings of self-worth and satisfaction.

Self-Regulation

Self-regulation, the ability to monitor and control one's own actions, is an important part of adopting new behaviors (Bandura, 1997). Goal setting is an important self-regulation process that can be used to increase the likelihood of adopting and maintaining a behavior. Setting goals creates a sense of anticipation which enhances motivation. In the process of working toward a goal, one augments and builds a set of self-regulation skills and strategies that can help control one's own behavior and create a sense of empowerment. It may also be useful to brainstorm implementation intentions. According to Gollwitzer (1999), these are almost like contingency plans that prompt a goal-fulfilling response when an obstacle arises. For example, “when situation Y occurs, I will do X.” Priming oneself can help the person reflexively dodge an obstacle when it is encountered, as the person is consciously or unconsciously reminded of their plan and the ultimate goal. Indeed, de Nooijer and colleagues (2006) found that when subjects formed

implementation intentions before enacting a behavior change, they were more successful in increasing their intake of fruit. Gollwitzer (1999) has also suggested that planning ahead prevents the effort needed to make a novel decision each time the person is presented with an obstacle, thereby promoting the behavior by automatization of the action.

Goals are more likely to be effective and lead to achievement the more specific they are, as well as the more proximal they are as compared to distal (Bandura & Schunk, 1981). Nothwehr & Yang (2007) found that setting specific goals related to diet or physical activity was more strongly associated with strategy use than was setting goals related to body weight; that is, subjects were more likely to engage in behaviors that encouraged goal achievement.

Ultimately, attaining a goal results in feelings of fulfillment, achievement, and satisfaction, which encourages repetition of the actions taken to reach the goal. This outcome of goal setting contributes to behavioral reinforcement. In addition, before attempting to reach a goal one may decide on a reward to be received once the goal has been met. Aside from reaping the emotional benefits, rewarding oneself with a desired item acts as a positive reinforcement to encourage reenactment of the behavior. While self-efficacy increases the chances that one can overcome obstacles when initially implementing the behavior(s) necessary to reach a goal, achieving the goal increases self-efficacy. The mastery developed from one's experiences conquering impediments and internalizing the feeling of confidence in one's abilities promotes continuance of the behavior.

Environment

Environment is a dynamic entity; humans constantly interact with and alter the surroundings to suit unique needs while the environment, in turn, influences those within it. As stated previously, the environmental factors most important to dietary interventions include imposed environments over which one has no control, selected environments that can be influenced based on one's actions, created environments that one develops to support his or her needs, as well as observational learning or modeling of important others' behavior (Bandura, 1997). Observational learning is an important way people learn new behaviors, especially when growing up. Learning by observation can often be quicker and more useful than learning by trial-and-error. By watching experienced others perform a behavior, one can merge the social acceptability, consequences, and rules of the behavior into one's understanding. The more exposed one is to others performing an action that one wants to adopt, the more likely one is to learn how to properly enact the behavior, as well as understand where, when, and how to use it based on social mores. Moreover, one may be more likely to model behaviors of familiar or important others. For example, children usually model their parents' behaviors, while adolescents tend to start mimicking the actions of their peers, older role models, and public figures. Again, modeling can also increase self-efficacy by making one feel that if others can successfully perform a behavior, one too can do it. In addition, one's outcome expectations for a given behavior can be affected by witnessing the outcomes that arise from others' actions.

Important components of the imposed environment related to nutrition include food availability at home, school, work, and grocery stores, plus social factors like

whether or not one's friends eat fruits and vegetables. Although many parts of the imposed environment cannot be changed, certain aspects can be altered. A potential environment becomes an actuality depending on how one acts within the imposed environment, and is then called a selected environment. Created environments, though, are developed by individuals or groups to meet certain needs. For example, one may campaign for the addition of a refrigerated vending machine that offers yogurt, sandwiches, and fresh fruit in the workplace cafeteria. Creation of a supportive environment is also conducive to goal-setting, and self-efficacy can be increased by eliminating impediments to fulfilling the desired behavior.

Measurement of Psychosocial Theoretical Constructs

While SCT is often used as the framework for nutritional interventions, whether the intervention translates to behavior change is a critical question. To truly understand a program's success, one must enact a thorough evaluation of the results and strategies used to address the potential mediators and determinants of behavior (Contento, 2007). Potential mediators and determinants of behavior change are often measured using questionnaires. Answers are presented to subjects in a Likert scale format (e.g., answers ranging from strongly disagree to strongly agree), and subjects respond to questions both before and after the intervention in order to assess the interventions' effect on the desired outcome.

Questions can be tested against each other in groups to determine whether they measure a similar theoretical construct. This aspect of evaluation can help determine if the questionnaire reliably measures these theoretical constructs for use in future program

evaluations. If scores for items related to the same construct are highly intercorrelated - and therefore have high internal consistency - it can be assumed that a person's score for one item will be approximately the same as the score for another item in the group that is related to the same concept. Internal consistency can be measured using coefficients of equivalence, which demonstrate how closely two measures of the same trait or construct agree. Cronbach's α (Cronbach, 1951) is commonly used test that assesses consistency in terms of the ratio of true score variance to observed score variance, assuming that the observed score is the true score plus measurement error. The closer the observed score is to the true score, the more consistent the set of questions. In simpler terms, α can indicate how often (or consistently) subjects give similar answers to questions that are essentially asking the same thing. α values higher than 0.7 are typically considered to be adequate, while scores exceeding 0.8 are thought to be excellent. However, higher α values do not always suggest true strength of internal consistency; values greater than 0.95 can indicate item redundancy, as simply increasing the number of items can increase α. At the same time, it should be noted that a single item is imperfect for the purpose of measuring a given concept, as each item should be measuring a slightly different aspect (Cortina, 1993).

Assuming that a set of items related to the same construct has good internal consistency, item scores may be combined to yield a more accurate composite score for the construct (Gleason et al., 2010). In addition, further analysis is often less burdensome with fewer items to consider. Conversely, if a group of items is not internally consistent, it would not be appropriate to use composite scores. However, low internal consistency can help contribute to instrument development and provide feedback on behavioral

modifiers for the population in which the questionnaire was used. Low Cronbach's α values can indicate that certain items need to refined or eliminated. This may be due to unclear wording, or it could suggest that an item does not apply or does not fit with the concept for the population being studied (Mitchell & Jolley, 2010). After identifying and addressing problematic items, the questionnaire can be retested and refined further if necessary.

Another way to determine how items relate to one another for a given population is through exploratory factor analysis. Many factor analysis procedures exist, but each uses correlations among variables to identify underlying patterns within the data (Neill, 2010). Principal components analysis (PCA) is often used to reduce the data and to generate scores that can be used for comparisons or other analyses. It can also be used to elucidate the underlying structure of data, which can then help identify potential constructs and find items that do not fit. Once common components are found, items within the same factor can be tested for internal consistency. Composite scores can then be calculated if applicable and used for comparisons.

These comparisons cannot necessarily be made, however, if factor structures differ according to certain demographic characteristics (e.g., race, socioeconomic status, gender, age, etc.). If factor structures are not consistent across subgroups, this suggests that subjects belonging to the different groups may interpret items differently (Rensvold & Cheung, 1998; Dimitrov, 2010). Hence, composite scores to measure a construct may not actually be measuring the construct as assumed by the researcher, and comparisons may not be legitimately measuring differences between groups. Therefore, confirming that factor structure does not vary across subgroups is a necessary condition for

validating a questionnaire and using it in a diverse population.

Statistical analyses are important tools in questionnaire validation. It is necessary to ensure that the survey both accurately and reliably measures psychosocial constructs related to the theory that will be used as a framework for the program. Ultimately, this helps determine a program's impact, which can guide program development and even provide feedback for theory refinement (Contento, 2007). By piloting questionnaires and a program itself before implementation as part of a formative evaluation, one improves the likelihood of properly targeting the specific audience and eliciting behavior change.

CHAPTER 2

REVIEW OF LITERATURE

SCT, Nutrition, and Demographic Factors

Dietary interventions are more successful when they address certain influences on behavior. These influences may differ among subgroup categories within populations. Subgroup factors include age, gender, ethnicity, socioeconomic status, or any inherent quality that could be associated with distinct influences on behavior. Although dietary interventions need to be tailored to specific populations who share many of the same personal, behavioral, and environmental factors, in practice, a program's scope should be limited to what is feasible and effective within various constraints (Contento, 2007). To increase program effectiveness, separate interventions may need to be developed for population subgroups to address appropriate theoretical constructs and maximize the potential for behavior change.

Gender

In an after-school nutrition intervention for Native American children led by Rinderknecht & Smith (2004), programming aimed to improve self-efficacy through exposure to healthier options, offering personal opportunities to pick the healthier alternatives through taste-testing, and discussions on how to balance eating right and exercising. These interactive activities were conducted with peer groups, providing opportunities for participants to model their peers' behaviors. Finally, these sessions also addressed situations that could arise in which the participants might be tempted or

pressured to choose unhealthful options, in order to empower them to make better choices when with family and friends. At baseline, children ages 5-10 years old showed moderate self-efficacy in their ability to choose water or juice instead of soda, fruit rather than candy or sweets, vegetables instead of potato chips, baked foods instead of fried, and lower-fat over higher-fat dairy. 5-10 year old girls had higher self-efficacy at baseline than boys, and both groups' self-efficacy significantly increased by the end of the intervention. However, self-efficacy for 5-10 year olds could not be compared with dietary intake because the researchers felt that diet records for this group were not reliable.

Male and female adolescents may also have differing behavioral influences on their diets. Cusatis & Shannon (1996) had subjects complete food frequency questionnaires, and 3 scores were calculated based on their responses. Food Guide Pyramid (FGP) scores described dietary quality and diversity, while fat and sugar scores described intake compared to dietary recommendations. The researchers then explored the relationships between diet scores and personal variables using bivariate correlations and regression analyses. Male subjects' fat and sugar scores were significantly higher than females' scores, so subsequent analyses were gender-specific. Both groups' fat and sugar scores were positively correlated with consumption of meals and snacks from the school cafeteria and total snack consumption, suggesting that food availability at school has a notable effect on adolescents' diets. Pyramid scores for both groups were positively associated with the number of meals consumed per day. In addition, self-efficacy for making healthful food choices was consistently inversely related to both genders' fat and sugar scores, indicating that higher levels of self-efficacy may have an impact on

adolescents' intake of energy-dense foods. However, gender differences emerged in pyramid scores for dietary diversity as well as fat scores. Males' pyramid scores were predicted by parental conformity, overall snack consumption, and consumption of snacks and meals at home. These results suggest that males' food choices may be influenced by food availability at home. Furthermore, males may be more susceptible to influence by family members concerned with providing and promoting a balanced diet for their children. Conversely, females' pyramid scores were related to the amount of physical activity in which they engaged. Females' fat scores were also significantly associated with their consumption of fast food while males' were not.

Granner et al. (2004) conducted a cross-sectional study of social cognitive influences on fruit and vegetable intake among African-American and Caucasian adolescents ranging in age from 11-15 years old. They found that males reported they were more influenced by peer normative beliefs and social factors when making food choices, while females were more motivated to avoid weight gain. These results suggest that males and females may have differing influences on their food consumption behavior, so they may need to be targeted separately in interventions during adolescence.

Finally, evidence of gender differences for dietary behaviors has also been observed in adults. To understand the relationship between purchasing of nutritious foods (fruits, vegetables, foods low in fat or high in fiber) and social cognitive variables, Anderson, Winett, & Wojcik (2007) conducted a short study with 712 adults ranging in age from 18-92 who were participating in a larger health promotion intervention. Participants completed psychosocial surveys and food frequency questionnaires, and kept annotated food shopping receipts with brand, package size, and other relevant

information. Structural equation modeling was utilized to demonstrate the relationships among psychosocial variables, demographic factors, and nutrition behavior. In this study, women were more likely than men to have higher levels of fiber and fruits and vegetables while having lower levels of fat, and these effects were mostly mediated by self-efficacy and self-regulation.

Socioeconomic Status

In an exploration of the relationships among SCT constructs, socioeconomic status (SES) as measured by maternal education level, and dietary measures (including fruit, fast food, and energy-dense fat intake) in adolescents, Ball et al. (2009) found that most measured SCT variables (self-efficacy, perceived importance of healthy eating, modeling of healthy eating by family, social support for healthy eating by family and availability of fruits and vegetables and energy-dense foods at home) were positively related to SES, except for social support and modeling of healthy eating by one's friends. The researchers suggested that adolescents may have friends from a variety of socioeconomic backgrounds with differing eating attitudes and behaviors. Self-efficacy and perceived importance of healthy eating were major mediators of SES variations in fruit consumption, while intake of fast food and energy-dense snacks were mediated more by availability. Therefore, consumption of less healthy foods may be influenced by the environment, while intake of healthier foods may require active decision-making. Due to the fact that cognitive variables were important mediators for all 3 dietary outcomes, the researchers suggested that interventions for adolescents across socioeconomic backgrounds would likely benefit from an emphasis on personal factors such as self-

efficacy.

Socioeconomic status may also play a role in adult dietary behaviors. Higher socioeconomic status has been associated with higher levels of fiber, which may be mediated by self-regulation (Anderson, Winett, & Wojcik, 2007). Subjects with higher socioeconomic status also bought more fruits and vegetables, but effects were mostly direct and independent of social cognitive variables.

Ethnicity

Different dietary influences have also been found according to ethnicity. Granner et al. (2004) found that African-American adolescents reported a greater influence of social factors on their diet than Caucasians, who were more influenced by family environmental factors such as more frequent family dinners and availability of fruits and vegetables at home. In their study investigating predictors of dietary fat reduction behaviors in young, obese, low-income mothers, Chang et al. (2008) analyzed psychosocial data using structural equation modeling to determine behavioral mediators and how relationships varied according to race. African-Americans who had subscribed to low-fat diets as a means of weight management had higher self-efficacy to eat a low-fat diet in negative emotional situations than Caucasians. African-Americans alone were also more likely to avoid eating fried foods and eat fruits and vegetables instead of high-fat foods as strategies to reduce fat intake. Caucasians, however, were more likely to stop using butter or margarine as a condiment in order to lower fat consumption. The fact that mothers of both races who had previously been on a low-fat diet tended to have higher self-efficacy for eating less fat in a variety of situations lends support to Bandura's

assertion that successful self-regulation and achievement of goals can increase self-efficacy. Also, mothers who had higher self-efficacy for eating low-fat foods when high-fat foods are available were more likely to engage in strategies to lower fat consumption (substitution of lower-fat foods for Caucasians and meat substitution for African-Americans), again providing support for including self-efficacy in dietary interventions. It is important to note, however, that self-efficacy for lowering fat intake in certain situations and associations with distinct strategies for dietary management may differ for low-income, obese females according to race. Moreover, different factors predicted certain self-efficacy measures and strategies to reduce dietary fat for the different races. For example, educational level predicted self-efficacy to eat low-fat foods when in a positive mood for African-Americans but not for Caucasians. Again, these differential findings aid in exploring influences on dietary behaviors according to various demographic factors and determining how programs could be tailored for specific populations.

Age

Developmental stages within childhood and adolescence may play a role in nutrition behaviors (Tuuri et al., 2009; Granner et al., 2004). The "Smart Bodies" school wellness program conducted in Louisiana (Tuuri et al., 2009) targeted fruit and vegetable consumption in fourth- and fifth-grade students with a 12-week intervention (n=7 school pairs). This program focused on increasing knowledge through traveling exhibits, and messages were further emphasized through assemblies and interactive activities featuring the OrganWise Guys™ (characters representing the different organs in the body).

Modeling was incorporated by having teachers remind students of the health benefits of fruits and vegetables and encourage eating the fruit and vegetables offered as part of the National School Lunch program (most students were School Lunch participants, as the schools included in the study were in low-income, inner-city areas). Twelve weeks after program initiation, fifth-graders exhibited higher knowledge and self-efficacy compared to fourth-graders. Interestingly, fourth-graders' preferences for vegetables (greens, green beans, spinach, cabbage, broccoli, lettuce, peas, potatoes, sweet potatoes, and tomatoes) actually decreased, while fifth-graders' preferences remained stable. Older children had higher self-efficacy for consuming salad greens, vegetables, and carrot or celery sticks. They also had more of a preference for vegetables including salad greens, green beans, broccoli, and potatoes. In their previously described study, Granner et al. (2004) found that older adolescents had lower self-efficacy compared to those that were younger. The researchers proposed that this may be due to older adolescents having more accurate perceptions of their abilities compared to younger adolescents, and that their changing social and environmental conditions may negatively affect self-efficacy.

In a review of studies regarding dietary influences in children and adolescents, McClain et al. (2009) concluded that the most consistent correlates of dietary behavior in children and adolescents included perceived modeling, social norms, and taste preferences. Conversely, availability, knowledge, outcome expectations, self-efficacy, and social support did not show consistent relationships with diet. However, there may be marked differences between younger children and adolescents, and McClain et al. acknowledged that they were unable to perform an age-group separation in their review because there would be too few studies to examine for each variable. Had the researchers

been able to separate the groups, they may have found that different variables correlate with dietary behavior for children and adolescents.

Attitudes and behaviors regarding health and nutrition during adolescence as a whole have been extensively examined through Project EAT: Eating Among Teens. This study has investigated eating behavior during adolescence through psychosocial and food frequency questionnaires administered to middle- and high-school students in the Minneapolis-St. Paul region of Minnesota. Prior to developing these questionnaires, the Project EAT research team conducted focus groups to garner information about adolescent perceptions of factors that influence their food choices (Neumark-Sztainer et al., 1999). The primary influences noted by the group included hunger or food cravings, taste and appearance of the food, time needed for preparation and consumption, and convenience. To a lesser extent, they acknowledged food availability, parental influences, situational factors like location, and perceived benefits of eating a food. An analysis of the factors correlated with fruit and vegetable intake (Neumark-Sztainer et al., 2003) revealed that neither self-efficacy nor behavioral factors (such as meal frequency or weight control behaviors) were significantly associated with intake. Similar to previously described focus group findings, home availability and taste preferences were directly associated with fruit and vegetable intake. This is akin to eating patterns in children, which to a large extent are influenced by taste preferences, availability, and accessibility (Cullen et al., 2003; Patrick & Nicklas, 2005). In adults, however, Shaikh et al. (2008) reported that self-efficacy, social support, and knowledge were strong predictors of fruit and vegetable intake, and some evidence was found for perceived benefits and barriers. Thus, it appears that influences common with adults start to become more prominent

during adolescence. The transition to adulthood is an emerging area of research, as it is now being recognized that this is a time in which many independent behaviors – including those related to health and nutrition – are being formed (Nelson et al., 2008). The importance of interventions in this age group is further discussed in the next section.

SCT and Nutrition in Young Adulthood

Young adulthood is marked by personal development and establishment of lifestyle patterns that may set the stage for future health behaviors (Furia et al., 2009). Approximately 50% of young adults aged 17-24 attend postsecondary institutions, and university attendance is associated with the weight gain colloquially referred to as the "Freshman 15." Young adults tend to have a poor diet, as fast food consumption is highest among this group and most eat less than one serving per day of fruits and vegetables (Nelson et al., 2008). Buffet-style dining halls, snacking habits, and eating high-fat foods may also play a role; Levitsky et al. (2004) found that 47% of the variation in first-semester weight gain was due to these factors. Although average weight gain during the first year of college is actually closer to just 5 pounds (Crombie et al., 2009), students' dietary habits do not appear to improve after the freshman year (Driskell, 2005). Therefore, targeting this group may help young adults learn more healthful behaviors.

Strong et al. (2008) reported that students are aware of the benefits of consuming a healthful diet, as evidenced by high ratings for positive dietary outcome expectations and low ratings for negative outcome expectations. However, consuming nutritious foods is not a high priority. Subjects reported that they did not plan ahead for meals and snacks, nor did they tend to track their intake or use Nutrition Facts labels to make informed

dietary choices. Social cognitive variables such as social support, self-regulation, and self-efficacy emerged as possible targets to improve student nutrition behaviors. Students who reported using dietary strategies including regulating energy and fat consumption, planning and tracking, and regulating fiber, fruit, and vegetable intake were more likely to have a diet lower in fat, added sugars and sodium. Utilizing dietary strategies was also correlated with have a higher intake of fiber, fruits, and vegetables. Having social support for regulating intake of fiber, fruits, and vegetables was correlated with several healthful diet factors, including intake of whole grains, fiber, and vitamins and minerals. Self-efficacy for increasing intake of fiber, fruits, and vegetables was positively associated with intake of fruits, vegetables, whole grains, and fiber and negatively associated with added sugar intake. The researchers also found that having obese friends increased one's risk of obesity by 57%, while having obese siblings only increased risk by 40%. In addition, socializing emerged as a high priority for college students. Therefore, the researchers suggested that group interventions may be more effective for college students than those targeting individuals.

Interventions with increased contact may also be more effective. Considering that college students today comprise "one of the most wired groups in the nation," Franko et al. (2008) hypothesized that an internet-based health education program (MSB-N, short for MyStudentBody.com-Nutrition) geared specifically towards college students would be an ideal way to target the group. Participants (n=476) were randomly assigned into the experimental I group (MSB-N), experimental II group (MSB-N plus booster), or control group. Fruit and vegetable intake and percentage of calories from fat over the past 30 days were evaluated using a food frequency questionnaire and a single item asking "How

many servings of fruits and vegetables do you usually eat each day?" Participants also answered 3 items for self-efficacy for eating fruits and vegetables. Data were collected at each of 4 timepoints: baseline, post-test, 3 months post-intervention, and 6 months post-intervention. Subjects in the experiment I group had greater self-efficacy to eat fruits and vegetables ($p<.05$) at post-test, but there were no other significant changes or differences between groups or across timepoints. By 6 months post-test, all three groups' self-efficacy as well as fruit and vegetable intake stabilized back to baseline values and no significant differences could be determined. Based on the food frequency questionnaire, no changes in fruit and vegetable intake or percentage of calories from fat were observed across any of the groups at 3 or 6 months post-intervention. Based on the single measure asking students to estimate their usual daily intake of fruits and vegetables, both experimental I and II subjects had higher intake of fruits and vegetables compared to the control group ($p<.01$) at post-test, but not at follow-up timepoints. Based on these results, it appears that more intensive efforts are needed with college students as they transition from adolescence to adulthood and to living independently within a new environment.

Ha and Caine-Bish (2009) used a classroom format to deliver their intervention aiming to increase fruit and vegetable intake in college students. Their class met 3 times per week over a 15-week period and emphasized consuming an overall healthy diet (including low-fat dairy, fruits, vegetables, and whole grains) using traditional methods of instruction as well as activities related to SCT. For example, students kept food records to address self-regulation and goal setting, completed home cooking assignments to target self-efficacy, and tasted healthy snacks in class to increase positive outcome expectations. By the end of the intervention, total servings of vegetables, fresh vegetables, fruit, and

fresh fruit had all increased while servings of French fries significantly decreased. The researchers did find differences by gender, reporting that females consumed more vegetables than males at post-test. They proposed that future interventions should make special considerations for male subjects but as psychosocial data was not collected, it is hard to know why there were gender differences and how those differences could be addressed.

University attendance represents a time of transition from adolescence into adulthood and independence, and some students may handle this transition better than others. Multiple studies have demonstrated that some weight gain is common during the college years (Matvienko et al., 2001; Levitski et al., 2004; Racette et al., 2005; Gropper et al., 2009; Wengreen & Moncur, 2009). However, weight changes are often variable (Matvienko et al., 2001; Anderson et al., 2003; Morrow et al., 2006; Provencher et al., 2008; Racette et al., 2008). This group remains understudied in terms of weight gain and successful intervention. Consequently, more research on personal factors contributing to college weight gain is warranted, in order to further understanding of the psychosocial aspects of eating behaviors and improve the success of dietary interventions for college students.

CHAPTER 3

PRIMARY AIMS

Study Rationale

Overweight young adults may have a more difficult transition to college life due to the added physical, social, and emotional burden of being larger than their peers. Obese and overweight teens may think more negatively of their appearance, believe that others have more negative opinions of them, be less satisfied with their lives, have a harder time making friends, and describe themselves as unhappy (Fonseca et al., 2009). They may also be more likely to engage in unhealthy weight control behaviors (Crow et al., 2006). Kasparek et al. (2008) reported that students entering college with higher initial body mass index (BMI) tended to gain more weight, so these students may be an at-risk population for college weight gain. Overweight college students have been found to have lower self-efficacy and motivation to maintain a healthy weight (Furia et al., 2009), suggesting that interventions may need to specifically target the unique needs of the overweight subgroup.

Few studies have investigated if and how social cognitive variables related to nutrition behaviors vary according to weight status. Rinderknecht & Smith (2004) found that at baseline, self-efficacy in Native American children ages 5-10 and adolescents ages 11-18 did not differ according to weight status. However, post-intervention dietary self-efficacy was significantly higher for overweight children, but not for normal-weight children or those at risk for overweight. Richman et al. (2001) explored how self-efficacy differed between middle-aged obese women enrolled in a weight-loss program and non-

obese women. At baseline, obese subjects had lower coping self-efficacy for situations related to food and eating compared to normal-weight subjects.

Some work has been done to elucidate the relationship between weight status and attitudes towards physical activity. Deforche et al. (2006) determined how perceived benefits and barriers differed in normal-weight, overweight, and obese adolescents and how activity levels were related to weight status. Normal-weight subjects participated in sports more than overweight and obese subjects, but there was no different in leisure activity between the groups. Overweight and obese subjects perceived more barriers to exercise (physical discomfort, not being good at it, insecure about appearance, etc.). Obese subjects also had less positive attitudes towards exercise. There were no differences among groups for most perceived benefits (social contact, competition, feeling good, improving health), but obese subjects rated pleasure as a benefit of physical activity lower than the other groups, and gave higher ratings to losing weight and looking better. Similarly, Miller & Miller (2010) found that overweight adults believed more than normal weight adults that exercise improves physical appearance and self-image. Furthermore, they were more hesitant to exercise at a fitness club because they felt more intimidated and embarrassed about exercising in general, exercising around younger people, exercising around fit individuals, and exercising around health club employees.

These results suggest that attitudes toward health-related behaviors may differ according to weight status; therefore, this factor may need to be taken into account when nutrition interventions are designed. Determining if and how these groups somehow differ in their attitudes and beliefs toward nutrition and health may provide insight into how they could be better targeted for weight gain prevention. This study may also help

identify ways to more accurately measure psychosocial variables in a college-aged population. Ultimately, this could contribute to the development of more successful programs aimed at helping students develop health behaviors that would benefit them during the college years and beyond.

Specific Aims

With the preceding information in mind, there were three specific aims of the current study. Psychometric properties (specifically, internal consistency and factor structure) of questionnaires administered at baseline to female freshmen participating in a weight gain prevention program were evaluated. The first aim was to evaluate internal consistency of the surveys using Cronbach's alpha. Second, factor structure was used to further analyze whether the items were inherently linked, as a measure of the validity of the composite scores or item grouping.

The third aim focused on whether scores for psychosocial variables differed among weight subgroups within the sample. Cross-sectional analyses were used to examine construct stability across weight categories, which helped determine the suitability of these questionnaires for measuring social cognitive variables (e.g., self-efficacy, outcome expectations, environment, self-regulation) related to nutrition in this population as a whole. This also yielded information about whether cognitive structures regarding nutrition and health differed by weight status. Based on previous findings of less positive attitudes toward exercise, it was expected that overweight subjects would have similarly negative perceptions regarding nutrition and health.

CHAPTER 4

METHODOLOGY

Data Acquisition from Project PEER (Peer education, Exercising, and Eating Right)

Project PEER was a study whose primary aim was to investigate whether a behavioral intervention focusing on self-efficacy attenuates weight gain in female college freshmen. The study was completed in two waves, to be followed by development of a general education course based on the outcomes. The first wave was completed between August, 2008 and April, 2009, while the second wave ran from August, 2009 through April, 2010.

Subject Recruitment

The recruitment goal for each wave was 150 subjects. Subjects were recruited via a mass e-mail message, and those who were interested replied with contact information. The research team screened potential participants over the telephone, excluding those who did not meet eligibility requirements. Eligibility requirements were as follows: females, 17-19 years old, non-smokers, full-time first-year students living on campus, free from chronic conditions that would affect ability to exercise or change diet (decisions were deferred to principal investigator but usually included heart abnormalities or bone or joint problem; medical clearance was required if a subject had such a condition), not taking medications that would change adiposity or psychological outcomes (subjects were not excluded if oral contraceptives were the only medications reported, but usage was noted; other decisions were deferred to principal investigator) sedentary or

recreationally active (not professionally or competitively), and at a BMI of 17.5-31.5. BMI was assessed using self-reported height and weight in the equation, BMI = weight in kilograms/(height in meters)^2, or BMI = weight in pounds/(height in inches)^2 X 703. Those who were eligible and still interested after an explanation of the study were scheduled for orientation sessions that took place during the first week of the fall semester.

At these orientation sessions potential subjects were given a more thorough explanation of the study's aims, benefits of involvement, and what they could expect as a participant. After this initial briefing, they were given an opportunity to leave if no longer interested; those who remained signed informed consent forms (see appendix A) in accordance with IRB regulations. Participants who were under 18 years old were required to obtain a parental signature before being allowed to continue. After signing the informed consent form, they were then scheduled for a baseline data collection appointment within two weeks of their orientation session.

During the time between the orientation session and the data collection appointment, participants completed online questionnaires through Survey Monkey. These questionnaires, which will be discussed later in further detail, included: self-efficacy to eat fruits, vegetables, lower-fat foods, and higher-calcium foods; outcome expectations for fruits and vegetables, low-fat foods, and calcium-rich foods; food environment; goals; the Weight Loss Efficacy Questionnaire; and Project EAT survey items. At the lab appointment, anthropometric data were collected in addition to data regarding dietary intake and physical activity. Subjects received compensation for completion of all measurements.

Anthropometrics

Anthropometric data recorded at baseline and used in the present analysis included height and weight. Height was measured using a Seca Model 240 wall-mounted stadiometer (Seca Corp., Hamburg, Germany). Subjects removed their shoes and socks, and a research assistant measured height to nearest hundredth of a centimeter. Weights were taken while subjects wore hospital gowns. Participants were weighed on a Scale-Tronix Model 5002 digital scale (Scale-Tronix Inc., Wheaton, Illinois), which had been calibrated beforehand to ensure accuracy. The averages of the height and weight trials were then used to calculate BMI (BMI = weight in kilograms/(height in meters)^2).

Questionnaire Adaptation

Prior to collection of anthropometric data, participants completed questionnaires online through Survey Monkey regarding food-related attitudes, perceptions, and beliefs. No questionnaires were developed specifically for Project PEER; most items were adapted or used verbatim from existing inventories.

Items for outcome expectations (appendix B) were adapted from Baranowski et al. (2000). In the *Gimme 5* study, these items only referred to fruits and vegetables as the intervention was aimed at improving fruit and vegetable intake in fourth and fifth graders. Example items included "if I eat fruits and vegetables every day, I will have more energy" and "if I eat fruits and vegetables every day, I will not enjoy eating that meal or snack." Answers presented were on a scale from 1-5, where 1 = I disagree very much and 5 = I agree very much. Baranowski and colleagues found that in their sample, Cronbach's α ranged from 0.76-0.81 for positive outcome expectations for fruits and vegetables,

depending on the year. For negative outcome expectations, internal consistency ranged from 0.51-0.58. For Project PEER's pilot study, these questions were updated for an older audience, and a section asking the same questions for lower-fat foods was added. For Project PEER, the same blocks of questions used in the pilot were used, and another set of the same items was used for calcium-rich foods.

Self-efficacy questions (appendix C) were adapted from Vereecken, Van Damme, & Maes (2005). In their original form, items for "difficult situations" and "making choices" only referred to fruits and vegetables, as these items were being developed for use in a study investigating fruit and vegetable intake in 11- and 12-year-old children in Belgium. Examples of difficult situations included self-efficacy to eat fruits or vegetables "when you don't feel like it" and "when you are not hungry." For Project PEER, most items for difficult situations were used. However, the situations "when you are not at home" and "when you are ill" were excluded, while "when you are REALLY hungry" and "when you are really busy with school" were added for relevance to the college population. In addition, these were presented for lower-fat foods and higher-calcium foods in addition to fruits and vegetables. Questions about selecting fruits and vegetables over other food items were made more specific for the population (for example, "Can you choose vegetables instead of French fries" rather than "I can choose vegetables instead of a snack"). Additional questions about making healthier choices were added for lower-fat foods and higher-calcium foods to complete the section. For all items, a 4-point scale was used, corresponding to answers of rarely/never, sometimes, often, and almost always. Vereecken et al. found α to be 0.86 for difficult situations for fruits, 0.91 for difficult situations for vegetables, and 0.78 for choosing fruits and vegetables over other items.

Clark et al. (1991) developed the Weight Efficacy Lifestyle Questionnaire (WELQ) for use with obese adults participating in a behavioral weight loss program. This 20-item survey asks subjects to rate their ability to resist eating during a variety of situations on a 10-point scale from not confident to very confident. Original Cronbach's α scores were 0.88, 0.83, 0.89, 0.84, and 0.79 for negative emotions, availability, social pressure, physical discomfort, and positive activities, respectively. This survey was also utilized for Project PEER (appendix D). Questions from the WELQ were not modified, and all items were used.

As described in the review of literature, the Project EAT study has focused on eating patterns in adolescents. The surveys used in Project EAT were developed using input from focus groups and a panel of experts, and were pilot tested (Neumark-Sztainer et al., 2003). These measures were demonstrated to have good test-retest reliability and internal consistency. For subscales used in the present study, internal consistency scores were 0.78, 0.77, 0.90, 0.79, 0.62, and 0.71 for weight concerns and control, perceived time constraints as a barrier to healthy eating, self-efficacy for making healthy food choices, self-efficacy for changing/maintaining eating patterns, perceived taste barriers to healthy eating, and concerns about healthy eating, respectively (N. Larson, personal communication, July 27, 2009). Apart from self-efficacy subscales, a 4-point scale was used and ranged from strongly disagree to strongly agree. For self-efficacy items, answers were on a 6-point scale and ranged from not at all sure to very sure. Select items from the questionnaire developed for Project EAT were included, and these questions were not changed. Although appendix E presents all of the questions taken from Project EAT that were administered to subjects through Survey Monkey, the current analysis was

limited to psychosocial items (e.g., perceived barriers, taste preferences for certain foods, self-efficacy related to healthy living and eating) that belonged to the constructs previously listed. Some items were not used if they were not relevant to the population or the college and dormitory environment, or if they pertained to outcomes unrelated to the study.

Food environment questions presented in appendix F were adapted for Project PEER based on the surveys developed by Doerksen (2008) for the Worksite Physical Activity and Nutrition Study conducted. These questions were modified to reflect the general university and college dormitory environment. Sample items included "I buy healthy foods to keep in my room" and "there is too much food available where I live." The scale ranged from 1-4 and corresponded to answers of rarely/never, sometimes, often, and almost always, respectively.

Finally, questions regarding goals (appendix G) were adapted from a scale also developed for the Worksite Physical Activity and Nutrition Study (Doerksen, 2008) and were modified to parallel the three main nutrition issues presented in outcome expectation and self-efficacy questions (fruits, vegetables, low-fat foods, high-calcium foods). This survey consisted of three general goal setting items (e.g., I have goals I've set for myself and lots of things I want to do) as well as three food-specific items (e.g., one food-related goal of mine is to eat at least 5 servings of fruits and vegetables each day). All items were on a 4-point scale ranging from rarely/never to almost always.

Preparation of Data for Analysis

Questionnaire data were exported from Survey Monkey into Microsoft Excel and

then moved to SPSS version 17.0 (SPSS Inc., Chicago, IL). Data for participants who did not meet eligibility requirements for analyses were then excluded.

Inclusion/Exclusion Criteria

Although most subjects still met inclusion requirements after anthropometric measurement in the lab, some subjects' BMI at baseline data collection were outside of the range used for phone-screening. From the first-wave data, one subject's BMI was below 17.5 while two subjects' BMI were above 31.5. From the second-wave data, three subjects' BMI were below 17.5 and two subjects' BMI were above 31.5. Their data were excluded from analyses to be consistent with initial eligibility requirements. Subjects were categorized into BMI groups (underweight, normal weight, and overweight/obese) based on National Institutes of Health classifications for adults (National Institutes of Health, 1998). These classifications were used as categorical values for the missing data analysis and to determine if survey responses varied according to weight status. Participants with BMI less than 18.5 were classified as underweight, those with BMI between 18.5-24.9 were normal weight, while subjects with BMI above 25 were categorized as overweight.

In addition to excluding data for those who did not meet BMI requirements, data were excluded for seven wave-1 and eight wave-2 subjects who completed online questionnaires but did not attend baseline data collection and were missing anthropometric information. After all exclusions, the total sample size from wave-1 baseline data was 146 subjects, while the total sample size at baseline for wave-2 was 122 subjects. Excluding data for a few participants could affect power to a small degree;

however, this issue was dealt with by combining first- and second-wave baseline data, to yield a sample size of approximately 300.

Comparison of Waves 1 and 2 Baseline Data

Baseline data for the two waves were compared using two-sample Kolmogorov-Smirnov tests. This test was selected as it makes no assumption regarding distribution and can be used when sample sizes are unequal (Kirkman, 1996). Data are sorted in ascending order and graphically displayed in a cumulative fraction plot. When both data sets for a given variable are displayed in the same plot, it is called the comparison cumulative fraction plot. The Kolmogorov-Smirnov statistic, *D*, is calculated as the largest vertical difference between the two curves. Each questionnaire item was compared according to wave; that is, for a given question, responses for participants from first-wave were considered to be one data set and were compared to all responses to the same item from second-wave. No items were significantly different according to wave, so the complete data sets for the two waves were combined. All further analyses were run on the combined data set.

Missing Data

Overall, the number of subjects missing data for a given question ranged from no items missing to a maximum of three missing. There were a total of 18 subjects in the combined baseline sample with missing data. Commonly, when less than 5% of subjects in a relatively large sample are missing data, these cases are deleted from the data set without significantly reducing power (Garson, 2008a). Eighteen cases represent about 7%

of the sample, so power may be slightly reduced if data are eliminated in order to only use complete cases. This also raises the possibility of bias if certain variables have an influence on whether or not a subject missed a question.

Little's Chi-Square is one statistical test that may be used to determine if the data are missing completely at random (MCAR); that is, whether or not categorical variables affect why the data is missing. This test groups subjects by whether or not they have missing data, and then utilizes t-tests of mean differences on key categorical variables to determine if the groups are significantly different. If they are not significantly different, then the data may be assumed to be MCAR, meaning that the distribution of missing values in the data set is random across all observations (Garson, 2008a). Since the null hypothesis for this test is that data are MCAR, any p-values less than 0.05 allow one to reasonably reject the null hypothesis and conclude that data are not MCAR, in which case the data would need to be dealt with accordingly.

Little's Chi-Square test was completed in SPSS utilizing items related to socioeconomic status, negative life events, BMI category, whether or not one is or has been a vegetarian, whether or not one is on a college dining plan, items pertaining to eating habits (e.g., how often one ate breakfast in the past week), and items regarding weight control as categorical values. The test strongly suggested that these categorical variables did not have an effect on whether or not data was missing (X^2=2468.521, DF=2507, p=0.704); thus, it was concluded that data were MCAR.

The easiest and least biased way to deal with data that are MCAR is to simply omit all cases with missing values, and to run analyses on the new, complete data set (Howell, 2009). However, as stated previously, deleting data altogether for 18 subjects

out of a sample of 268 could result in a loss of power. Therefore, listwise deletion (SPSS default procedure) was employed when a subject was missing data for a variable involved in a given analysis – that is, subjects who were missing data necessary for a certain analysis were only excluded from that analysis, and all available data were used.

Scales and Recoding

Some recoding was necessary to make certain questions from a section comparable to one another. In general, scales were recoded to make lower values associated with least positive answers and vice versa for higher values.

As presented to subjects, answers for outcome expectation questions ranged from 1-5 in terms of the following scale: 1 = strongly agree, 2 = agree a little, 3 = unsure/don't know, 4 = disagree a little, 5 = strongly disagree. After data importation to SPSS, the scale was reversed and participants' answers recoded for items that contained positive outcome expectations (e.g., if I ate foods low in fat every day, I would have more energy), in order to make the scale consistent in terms of positivity and negativity of answers. For example, strong disagreement with a positive outcome expectation was considered to be unfavorable. Conversely, strong disagreement with a negative outcome expectation was interpreted as favorable and comparable to strong agreement with a positive outcome expectation.

The scale for food environment questions ranged from 1-4, where 1 = rarely/never, 2 = sometimes, 3 = often, and 4 = almost always. As with outcome expectation questions, answers were recoded and the scale reversed so negative items could be compared with positive. For example, answering "almost always" for the item "I

buy not so healthy foods to keep in my room" could be considered negative in terms of a healthy food environment, while answering "almost always" to the item "I buy healthy foods to keep in my room" would correspond with improvement of the food environment. The scale was also reversed for the items "there is too much food available where I live" and "when I go out to eat, there is too much food served," as excess food availability could be considered to be detrimental to a healthy food environment.

For the Project EAT survey, the scale for questions relating to attitudes about healthy eating ranged from 1-4, where 1 = strongly disagree, 2 = disagree, 3 = agree, and 4 = strongly agree. The scale was reversed for all negatively worded items that were parts of questions 9 and 10 in order to make the scale run from least to most positive. This was not necessary for the items "milk tastes good to me," "I like the taste of dark bread," and "I like the taste of most fruits," due to their positive wording. Strongly agreeing with the statement "I like the taste of most fruits" indicates that the subject does not have a perceived taste preference barrier to eating fruit. Meanwhile, answering "strongly agree" to "I like the taste of fast foods" suggests that the taste preference for fast foods may be a barrier to healthy eating.

No recoding was necessary for the self-efficacy questionnaires, goals, or the WELQ. For self-efficacy and goal items, the scale ranged from 1-4, where 1 = rarely/never, 2 = sometimes, 3 = often, and 4 = almost always. For the WELQ, the scale ranged from 1-10, where 1 = not confident and 10 = very confident. Overall, if necessary, items were recoded so the positivity of answers in the context of healthy eating was consistent with scales from other questionnaires (from least positive to most positive).

Data Analysis

Descriptive Statistics

Prior to running descriptive statistics, data for each questionnaire were tested to determine distribution using the one-sample Kolmogorov-Smirnov test. The Kolmogorov-Smirnov statistic assesses goodness-of-fit according to an assumption about the data's distribution (Garson, 2008b); a p-value of less than 0.05 indicates that the null hypothesis (that the data do follow the assumed distribution pattern) can be reasonably rejected. For analysis of each item, the hypothetical assumption was that data were normally distributed. If data for a questionnaire tended to be normally distributed, the mean was reported and standard deviation used to describe spread. Parametric tests were utilized for investigating correlations. If data were non-normally distributed, nonparametric tests were employed, and interquartile range and median used to describe dispersion of data. Response frequencies were found for all items, regardless of distribution.

Principal Components Analysis

Exploratory principal components analysis (PCA) with varimax rotation was used to examine the underlying structure of questionnaire data. All items for each questionnaire were tested together. For the self-efficacy and outcome expectations questionnaires, this allowed for an exploration of how self-efficacy or outcome expectations for different food categories related to one another. In addition, all items for a food category (fruits and/or vegetables, lower-fat foods, higher-calcium foods) from the outcome expectations and self-efficacy scales were tested together, in order to identify

subscales and compare factor structures related to these food groups. All surveys were tested as a combined sample in addition to using weight category as an independent variable, in order to compare factor structures across BMI groups. Underweight subjects were not used for comparisons due to inadequate sample size (n=9). If applicable, composite scores were calculated and used in subsequent analyses to determine whether responses differed according to weight category. If items with different scales loaded onto the same component, answers were scaled to be consistent and composites then calculated.

Bartlett's test of sphericity and the Kaiser-Meyer-Olkin measure of sampling adequacy were first used to confirm data suitability for PCA. The null hypothesis of Bartlett's test is that the correlational matrix is an identity matrix, in which case PCA would not be appropriate; therefore, this hypothesis needed to be rejected. The Kaiser-Meyer-Olkin test helps determine whether PCA is appropriate based on partial correlations among variables; values must have been greater than 0.60 to proceed (Garson, 2010).

Scree plots and eigenvalues were used to determine the number of components that would be retained; in general, eigenvalues greater than one were used as a cut-off point. In addition, components were retained as long as at least two items loaded on the factor (Hatcher, 1994). Factor loadings of at least 0.40 were used to assign items to a factor (Neill, 2010). Items that cross-loaded at 0.32 or higher on two or more factors were assigned to the component with the higher factor loading if the difference between cross-loadings was approximately 0.2 or higher (Barrett et al., 2005). If an item was unable to be reasonably assigned to a factor, the item was removed and PCA run again to clarify the

structure. This process was repeated until an interpretable factor structure could be obtained. If factor structures differed according to weight category, or certain items were not consistent, these items were removed until a stable solution could be obtained, in order to identify variables that could be tested for differences according to weight group.

Internal Consistency

Cronbach's α was used to investigate internal consistency. Adequacy is widely considered to be a score of 0.70 or higher (Garson, 2008c), so this value was used as a rough cut-off for an acceptable α score. Internal consistency was calculated in two ways. First, original item groupings (if available) were used for comparison purposes. Second, internal consistency was tested using item groupings suggested by PCA. For outcome expectations, original groupings were based on positive and negative outcome expectations. For self-efficacy, items were originally grouped based on one's ability to eat each food group in difficult situations (e.g., when one is really hungry), and items were grouped based on one's ability to choose healthier options. Items from the WELQ were analyzed by grouping items into the following categories: negative emotions, availability, social pressure, physical discomfort, and positive activities. Items from the Project EAT survey were grouped by weight concern, perceived time constraints as a barrier to healthy eating, perceived taste barriers to healthy eating, concerns about healthy eating, self-efficacy for making healthy food choices, or self-efficacy for changing/maintaining eating patterns.

Composite Scores

When a set of related questions had good internal consistency (Cronbach's α approximately 0.7 or above), composite scores were generated by compute statements that totaled participants' answers for each set of questions and divided them by the number of items in the group to yield an average. If a subject was missing data for an item needed to calculate a composite score, the composite score was manually determined by adding answers for items that were available and taking the average. If items with different scales loaded onto the same component, answers were scaled to be consistent and composites then calculated.

Analysis of Differences According to Weight Category

Normal weight and overweight subjects' answers were compared using one-way analysis of variance (ANOVA) if normal distributions were evident, or using Mann-Whitney U if data were non-parametrically distributed. ANOVA is used to compare means according to subject classification, and assumes that data are normally distributed and that variance within in each group is the same. The ANOVA null hypothesis assumes that mean answers to questions do not significantly vary; for the present analysis, one who is overweight would have a similar answer to one who is of normal weight (McDonald, 2008). When data are normally distributed, the ratio of the mean between squares to the mean within squares, or the F-test, helps measure how much the means vary relative to variability within the samples. F-values larger than one indicate a greater probability that differences between group means are not due to chance (Stockburger, 2001).

The Mann-Whitney U test is more appropriate when data are not normally distributed (Garson, 2008b). Mann-Whitney U tests the assumption that two populations have the same distribution, but is usually interpreted as comparing population medians. Values are assigned ranks in ascending order (e.g., the smallest value would be given a rank of 1), and tied values are assigned an average rank. For each group, the sum of the ranks is calculated and used to determine the *U* statistic. This statistic represents the variance of the ranks according to groups with an adjustment for the number of tied values. The *U* statistic is compared to critical values that are calculated based on group size, and significance is estimated using the *Z* statistic.

All items that were not internally consistent when grouped were tested individually, and items that were internally consistent when grouped were tested through their resulting composite variables. Appropriate tests were used based on variable distributions.

CHAPTER 5

RESULTS

Principal Components Analysis: General Sample

Outcome Expectations

The PCA of outcome expectation items revealed a consistent two-component structure for all three food categories (tables 5-7). For each food group, positive outcome expectations loaded together while the second component included negative outcome expectations.

When all outcome expectation items were tested together, 8 components were extracted (table 8). Negative outcome expectations for the different food categories loaded onto three components. For all food categories, the items "I would not enjoy eating" and "I would have an upset stomach" loaded onto one factor, the item "the people I eat with would not enjoy eating with me" for each food group loaded together, and "my food would cost too much" for each food category also comprised a separate factor. The positive item "I would be less likely get cancer or heart disease" for each food category loaded onto one component. For calcium-rich foods, all other positive outcome expectations for calcium-rich foods loaded onto one component. Beside the item regarding cancer and heart disease, positive outcome expectations for fruits and vegetables broke into separate components. Items regarding weight control and energy levels from eating fruits and vegetables loaded onto one component, while items generally referring to feeling healthy loaded onto another. Component 3 included positive outcome expectations for lower-fat foods, with the exception of "I would have more

energy" and "I would be less likely to get cancer or heart disease." Cross-loading occurred for several items, but was more common for low-fat items (4 cross-loading items).

Self-Efficacy

Cross-loading was initially observed for one item within each food category (tables 14-17): "when you are REALLY hungry" for both fruits and lower-fat foods, "when you are NOT hungry" for vegetables, and "when there are no higher-calcium foods available." After removal of these items and PCA run again, it was evident that self-efficacy items for the different food categories did not have consistent structures (tables 18-21). For all food categories, items regarding motivation and food preferences loaded onto one component, although additional items were included in this component for some food types. Items related to hunger, availability, preparation time, being busy with school, and making healthier substitutions were less consistent and loaded onto different components for the different food categories.

Exploratory PCA of all self-efficacy items together revealed certain patterns (table 22). Items 1-4 and 6 for each food category (those that related to motivation and liking the food) tended to separately cluster together, with the exception of a few cross-loading items. Certain items common to the different food categories also tended to load together; for example, one component included the item related to availability for most food categories, while others contained items regarding degree of hunger. Items for making healthier choices broke into two components; one contained items for choosing fruits and vegetables over less healthy options, while the other contained items regarding choosing

lower-fat options. However, the item related to choosing lower-fat breads cross-loaded on the component containing items for choosing fruits and vegetables.

WELQ

The initial structure of the WELQ was comprised of 4 factors. However, PCA was run several times to elucidate the factor structure of the WELQ, as significant cross-loading was repeatedly observed (table 29). In particular, this included items regarding time off (eating on the weekends, at parties). The final factor structure for the WELQ included 2 components (table 30). Component 1 included items related to eating during trigger situations (such as emotional distress, when faced with temptation, etc.). Component 2 consisted of items regarding eating under social pressure.

Project EAT Questionnaire

The initial factor structure of the Project EAT questionnaire (table 34) contained only one cross-loading item (most unhealthy foods taste better than healthy foods). After this item's elimination, the factor structure of items utilized from Project EAT included 8 components (table 35). Component 1 related to perceived time constraints to eating healthy foods. This component also included two items related to attitudes about taste: "most vegetables taste bad" and "most healthy foods just don't taste that great." However, other items related to attitudes about the taste of healthier foods loaded onto component 3, which included items regarding liking the taste of fruits and dark bread. Component 3 also included self-efficacy items for eating recommended amounts of fruits, vegetables, and whole grains. Items related to dairy products (liking the taste of milk, self-efficacy to

consume recommended amounts of dairy products) loaded separately (component 6). Component 2 included items regarding self-efficacy to eat healthy foods when eating to distract oneself. Component 4 was comprised of three items relating to concern about health and eating healthy. Component 5 included items regarding concern about gaining weight and weight control practices. Component 7 included an item regarding the perceived healthiness of fast food and items for self-efficacy to limit fast food and soda. Component 8 included two items related to liking unhealthier foods (salty snacks, fast foods).

Food Environment

Three components were extracted from the food environment questionnaire (table 42). Component 1 consisted of items regarding the availability of healthy food within a controllable, personal domain (at home and in one's own room). Component 2 included items related to healthy food availability where one does not have control (where one lives at school and where one goes out to eat), as well as not having enough food available. Component 3 included two items regarding a perceived excess of food available, both where one lives and where one goes out to eat.

Nutrition Goals

Two components were extracted from the nutrition goals survey (table 46). Component 1 included more general goals, while component 2 included food-specific goals.

Principal Components Analysis: Comparisons of Normal-Weight and Overweight

With the exception of outcome expectations, different factor structures according to weight status were apparent for each questionnaire. Overweight subjects tended to have more items that cross-loaded and were subsequently removed. In particular, this was most evident for the WELQ and Project EAT questionnaires. Overweight subjects' final factor structures for self-efficacy, food environment, and the WELQ had more components than the normal-weight group, while structures for nutrition goals and Project EAT had fewer. In addition, different items cross-loaded according to weight group for certain questionnaires.

For self-efficacy, at least one cross-loading item was removed for each food category (tables 18-21). For both weight groups, items pertaining to hunger cross-loaded at least once. In addition, for overweight subjects the item "when you are really busy with school" cross-loaded for two food categories. For overweight subjects, the self-efficacy item referring to availability was not consistent in terms of the component on which it loaded for each food type. Self-efficacy for fruits, vegetables and lower-fat foods had a three-component structure for overweight participants, with items for choosing the food over other options typically loading separately from other items related to expending either mental or physical effort (eating the food when really hungry, when it takes time to prepare, etc.). Meanwhile, these items usually loaded onto one component for normal-weight subjects. As items pertaining to availability and hunger levels tended to cross-load or load onto different components for the different weight groups, they were removed to determine their impact on the analysis. After removal of these items, a clearer factor structure was revealed for each food group.

Self-efficacy for fruits and vegetables had the same factor structure (tables 23-24). One component included the items related to motivation (e.g., not feeling like it, you don't like to, you are tired of it), while the other included items regarding preparation effort and choosing fruits (or vegetables) over other snack items. The final factor solution for self-efficacy for lower-fat foods (table 25) was comprised of two factors; one contained items related to both motivation and preparation effort, while items for choosing lower-fat options loaded onto a separate component. For higher-calcium foods (table 26), the item regarding choosing lower-fat milk was ultimately removed as it loaded alone on a separate factor for overweight subjects. Then, after removal of problematic items related to availability and hunger levels, PCA was unable to proceed as the data were no longer multi-dimensional. Composite variables (table 48) were created for the aforementioned item groupings for each food category and used in comparison analyses if internally consistent.

For the WELQ, differences in loading patterns were observed between normal- and overweight subjects (table 30). Ultimately, the factor structure for normal-weight subjects contained 3 components. Component 1 related to emotional eating, component 2 related to social pressure, and component 3 related to trigger situations. A two-factor structure for overweight subjects was obtained, with one containing both emotional and trigger situations, and the other containing social pressure items.

For both groups, the following items were not part of their final factor structure: I can control my eating on the weekends, plus I can resist eating when I have to say "no" to others, when there are many different kinds of food available, when I have a headache, when I am reading, and when I feel uncomfortable. Although these items were removed

from the factor structure specific to the weight group, some were retained in the structure for the general sample. In addition, some items that were removed for the general sample were retained for the subgroups. For both groups, the following items initially cross-loaded (table 29): I can resist eating when I am watching TV, when I am reading, and when I am angry (or irritable). These items were removed to determine if a clearer factor structure would be revealed, and whether it would be the same for both normal-weight and overweight subjects. However, as these items were removed, many others cross-loaded, especially for overweight subjects. Once these items were removed, a consistent factor structure for the WELQ included two components (table 31). Similar to previous analyses, one component included items related to emotional eating while the other consisted of items regarding eating under social pressure. Comparisons were also run using composites based on these groupings if internally consistent.

For the Project EAT questionnaire, differences mostly related to taste preferences and corresponding self-efficacy items. For overweight subjects (table 39), it was notable that most items for liking healthy foods (fruits, whole grains, dairy foods, vegetables) were not part of the final factor structure due to low loadings or persistent cross-loading. For normal-weight subjects (table 37), items for liking healthy foods tended to fall together as a factor, and taste preferences for these foods tended to load with corresponding self-efficacy items for normal-weight subjects. Prior to its removal, it was evident that the item for self-efficacy to eat vegetables tended to load with self-efficacy to healthy foods when stressed, feeling down, or bored for overweight subjects (table 38). In contrast, for normal-weight subjects (table 36) self-efficacy to consume vegetables strongly loaded with self-efficacy to eat other healthy food (fruits, whole grains, etc.).

Another important difference was that two items that referred to skipping meals and weighing oneself often loaded with items regarding weight concern for normal-weight subjects, but did not consistently load with weight concern items for overweight subjects (tables 36-39). Again, removal items that cross-loaded or loaded differently was attempted to determine if a clearer factor structure could be obtained, but this was unsuccessful. However, as items were eliminated, several constructs did remain stable. Health concerns, weight concerns, and time barriers to eating healthy were the same for normal- and overweight subjects once problematic items were removed, but they differed slightly from original groupings. Health concerns did not contain the item related to fast food, time barriers did not contain the item "eating healthy meals just takes too much time," and weight concerns did not contain the items referring to weight control practices. These groupings were tested for internal consistency and used for comparison purposes if applicable.

For the food environment questionnaire, no items cross-loaded but factor structures differed. Three components were initially extracted from the food environment questionnaire in the general sample (table 42). For normal-weight, components paralleled those seen when PCA was run using all subjects: healthy food availability in one's personal domain, healthy food availability where it cannot be controlled, and perceived quantity of food. However, the item regarding not having enough food loaded with uncontrollable healthy food availability rather than perceived quantity. For overweight subjects, healthy food availability in both controllable and uncontrollable situations loaded together onto one component, while the other component contained all three items related to food quantity. Even after the item related to not having enough food was

removed, distinct factor structures for the two weight groups were maintained, but the item regarding healthy food availability at home then cross-loaded for both groups. Removal of this item resulted in cross-loading for the item regarding healthy food availability when one goes out to eat. Finally, the factor structure for both weight categories consisted of one component containing two items for perceived quantity of food available and one component containing three items for healthy food availability where one lives (table 43).

For the nutrition goals survey (table 46), items were split based on general goals and nutrition-related goals for normal-weight subjects, while for overweight subjects the scale was not multidimensional and no distinct factors were extracted.

Internal Consistency and Composite Scores

The PCA indicated that the factor structure of outcome expectation items included two components: one for positive outcome expectations and one for negative. These were the same groupings used by Baranowski et al. (2000), so internal consistency was tested accordingly (table 9). Internal consistency for positive outcome expectations regarding fruits and vegetables, low-fat foods, and calcium-rich foods were strong, while less so for negative outcome expectations for these food groups. Cronbach's α scores for positive outcome expectations were 0.81 (n=267), 0.87 (n=264), and 0.90 (n=266) for fruits & vegetables, lower-fat foods, and calcium-rich foods, respectively. For negative outcome expectations, Cronbach's α was 0.63 (n=268) for fruits & vegetables, 0.67 (n=267) for lower-fat foods, and 0.67 (n=266) for calcium-rich foods. . Cronbach's α could not be improved by removing any items and could still be considered reasonably consistent, so

all were retained.

Original groupings for self-efficacy questions were based on self-efficacy in difficult situations (for each food category) and ability to choose healthier options (table 27). Using these groupings, Cronbach's α values were 0.91 (n=267), 0.91 (n=267), 0.93 (n=265), and 0.93 (n=268) for eating fruits, vegetables, lower-fat foods, and higher-calcium foods in difficult situations, respectively. For items related to making healthier choices, α was 0.82 (n=267). Internal consistency was also good based on groupings suggested by PCA. For self-efficacy to eat fruits, α was 0.92 (n=268) and 0.77 (n=267) for components 1 and 2, respectively. For vegetables, α was 0.92 (n=268) for component 1, 0.79 (n=267) for component 2, and 0.86 (n=267) for component 3. For lower-fat foods, α was 0.93 (n=265) for component 1 and 0.75 (n=268) for component 2. For higher-calcium foods, α was 0.94 (n=268) and 0.81 (n=268) for components 1 and 2, respectively.

Internal consistency for WELQ constructs was high based on original groupings (table 32). Cronbach's α was 0.86 (n=268) for items related to negative emotions, 0.78 (n=268) for items related to availability, 0.82 (n=268) for items regarding social pressure, 0.76 (n=267) for items pertaining to physical discomfort, and 0.77 (n=267) for items regarding eating during positive activities. Groupings suggested by PCA also had strong internal consistency. Cronbach's α for items related to trigger situations was 0.90 (n=267), while α was 0.82 for items regarding social pressure.

Most original constructs within the Project EAT questionnaire had moderate to strong internal consistency (table 40). Cronbach’s α was 0.79 (n=266) for perceived time constraints as barriers to healthy eating. For self-efficacy to change or maintain one’s

eating habits to meet dietary recommendations, α was 0.71 (n=267). For perceived taste barriers to healthy eating, α was 0.68 (n=267). For concerns about healthy eating, α was 0.63 (n=268), but improved to 0.81 if the item regarding fast food restaurants being unhealthy was removed. Therefore, composite scores for this construct were calculated using only those three internally consistent items. In addition, as α for the taste barriers construct was only slightly less than the 0.70 cut-off, composites were still calculated. PCA revealed that the original weight concerns construct remained unchanged (component 5) and loaded onto component 5; Cronbach's α was 0.72 (n=268) for these items. Self-efficacy items to eat healthy foods when stressed, feeling down, or bored also clustered together (component 2) and the construct remained unchanged; α was 0.86 (n=267). Internal consistency was also good for component 1, which contained items regarding time constraints and attitudes about the taste of vegetables and healthy foods; Cronbach's α was 0.84 (n=265) for this grouping. Internal consistency was not as high for components 3, 6, 7, and 8, as α was 0.61 (n=268), 0.62 (n=268), 0.46 (n=267), and 0.56 (n=268), respectively. No items could be removed from components 6 or 8, as they only contained two items. However, α for component 7 improved to 0.52 when "foods from fast food restaurants are generally unhealthy" was deleted.

No published prior item groupings were available for food environment items, so only constructs suggested by PCA were used to calculate internal consistency (table 44). For component 1 (healthy food availability where one does not have control), α was 0.55 (n=268). However, α improved to 0.70 if the item "there is not enough food available where I live" was deleted. For component 2 (healthy food availability in one's personal domain), α was 0.68 (n=264). For component 3 (perceived quantity of food available), α

was 0.54 (n=267). As α scores were reasonable for healthy food availability where one does and does not have control (excluding the item regarding not having enough food), composite scores were calculated for these groupings. The excluded item, as well as the others regarding food quantity were used individually in subsequent tests.

Like the food environment questionnaire, no prior published groupings were available for the nutrition goals survey. Therefore, internal consistency was only tested on constructs suggested by PCA (table 47). Cronbach's α was 0.80 (n=268) when general goal items (I have goals I've set for myself and lots of things I want to do, the goals I've set for myself include a healthy lifestyle, and in particular, I have goals about the food I eat) were grouped together. α was 0.77 (n=267) for food-specific goals.

Finally, groupings for items part of factor structures that were consistent across weight groups had strong internal consistency with the exception of food environment constructs (table 48). Cronbach's α ranged from 0.73-0.93 for self-efficacy, WELQ, and Project EAT groupings, while food environment groupings did not exceed 0.55 and could not be improved by removing any items. Thus, composites were calculated for the former but not the latter constructs.

Composite Scores

Overall, composite scores for outcome expectations were high (table 9), corresponding with moderate to strong agreement with positive outcome expectations and moderate to strong disagreement with negative outcome expectations for all food groups.

Compared to outcome expectations, self-efficacy scores were less positive (table 27). For each food category, the frequency with which subjects said they would be able to

eat the food type during difficult situations was between sometimes and often. However, composite scores for variables including items related to making healthier choices tended to be higher, with subjects tending to answer that they could do so often. Composites based on PCA groupings in the general sample (table 27) as well as groupings stable across weight categories (table 48) also tended to be low and corresponded to only sometimes being able to eat the food when motivation is low and/or effort/time are required.

Based on the WELQ (table 32), subjects' abilities to resist eating were moderately high according to original groupings, including when experiencing negative emotions, when there is a higher availability of unhealthy options, when under social pressure, when experiencing physical discomfort, and during positive activities. However, ability to resist eating appeared to be strongest during physical discomfort and during positive activities. According to composite variables created from PCA components in the general sample (table 32) and those that were consistent for both weight groups (table 48), ability to resist eating was slightly positive for social situations but more so for trigger situations.

Composite scores varied in terms of positivity according to the different constructs within the Project EAT questionnaire (table 40). Scores for weight concern and weight control, perceived time constraints, self-efficacy for eating healthy foods when experiencing negative emotions, and taste preferences as barriers to healthy eating were only slightly positive. Higher scores were observed for self-efficacy to change/maintain healthy eating patterns and healthy eating concerns. PCA groupings that were consistent across weight categories again indicated high scores for healthy eating concerns, and

scores for time constraints were also positive. Scores for weight concern corresponded with agreement that one is worried about gaining weight.

Composite scores for healthy food availability in a controllable domain were slightly positive (table 44). Meanwhile, scores for healthy food availability in an uncontrollable domain were actually higher.

Finally, scores for general goals were positive (table 47), corresponding to having goals often, while food-specific goals were only set sometimes.

Analysis of Differences According to Weight Category

Few differences were seen across BMI groups when responses for individually tested items and composite variables were analyzed for differences according to weight status (table 49). Compared to normal-weight participants, overweight subjects had lower scores for weight concern and control (p=.037). As PCA suggested that this construct may be better compared across weight categories by only including items related to weight concern and excluding items for weight control behaviors, composites were also calculated without these items. Differences between weight categories for weight concern were more pronounced (p=.003). Overweight subjects also had lower self-efficacy to eat vegetables for component 2 derived from PCA (p=.048).

CHAPTER 6

DISCUSSION

One of the major purposes of this study was to evaluate the characteristics of questionnaires used in a weight gain intervention for female college freshmen. Specifically, internal consistency and principal components analysis were used to assess whether these surveys are appropriate for measurement of social cognitive variables related to nutrition in this population. A cross-sectional analysis was employed to determine whether psychosocial constructs related to nutrition and health were consistent across weight groups. This information was subsequently used to generate composite scores, so that attitudes and beliefs could be compared based on weight status, and ultimately identify potential discrepancies to target in future interventions.

Psychometric Properties of Questionnaires

Outcome Expectations

Internal consistency for fruit and vegetable outcome expectation items compared favorably to previously reported values (Baranowski et al., 2000), and high Cronbach's alpha scores were also observed for new sections on low-fat and calcium-rich foods; these results support the reliability of the outcome expectation scales. Factor structures for each food category were the same as previously reported - in both the general sample and across weight groups, reflecting a simple division of outcome expectations for healthy foods into positive and negative beliefs. This is in contrast to Bandura's assertion that outcome expectations typically fall into one of three categories: physical, social, and

self-evaluative (Bandura, 2004). Wojcicki, White, & McAuley (2009) found that these domains were upheld in a sample of older adults recruited for an exercise study. The results of the current study suggest that this may not be the case, which may have been due to population differences or because nutrition beliefs do not have the same structure as those regarding physical activity.

However, once all items were tested together using PCA, it was intriguing to see that certain negative outcome expectation items, given for each food category, loaded onto distinct components. This also occurred for the positive item regarding cancer and heart disease. These findings suggest that cognitions regarding physical health benefits and negative outcomes of consuming fruits & vegetables, low-fat foods, and calcium-rich foods may not be distinct. These items can be reliably grouped with other outcome expectations for the same food group, as evidenced by high Cronbach's α values during individual food group testing. However, the analysis of all outcome expectation items together implies that certain outcome expectations from the different food groups may relate more to each other. Thus, healthy foods in general may be perceived as preventing disease, and negative perceptions may be applied to these foods as whole.

Based on cross-loading patterns, it seems that questions may need to be more specific in the food types to which they refer.. Items for low-fat foods often cross-loaded with those for fruits and vegetables, perhaps because the population of interest understands that fruits and vegetables are low in fat. Subjects may interpret low-fat foods to mean foods that have been deliberately developed to be that way (such as granola bars, frozen yogurt, skim milk, frozen dinners, etc.), or foods that are inherently low in fat, such as fruits and vegetables, skinless chicken breast, etc.). Therefore, supplying

examples of the foods to which the researchers are referring may help subjects interpret questionnaire items more consistently. Likewise, cross-loading between low-fat and calcium-rich outcome expectation items may have been due to the fact that calcium-rich items were referred to as "calcium-rich, low-fat foods." One may want to consider that with the increase in calcium-fortified foods, "calcium-rich, low-fat foods" may now include food choices other than dairy or dairy alternatives like soy milk. Calcium-fortified foods may be widely used due to lactose intolerance, taste preferences, following a vegan diet, or other reasons (Larson et al., 2006). Again, giving examples of the foods in question, depending on intervention goals, may help make these items clearer.

Overall, scores for outcome expectations for fruits & vegetables, low-fat foods, and calcium-rich foods were quite high, suggesting that the benefits of a healthy diet are understood by this audience. Although Strong et al. (2008) used a different measure, they also found that college students tended to highly agree with positive items and disagree with negative items. Strong et al. also reported that social support scores for managing fat, fiber, and fruit and vegetable intake were relatively neutral. While specific items for these factors was not included in this study, outcome expectation items that referred to social outcomes (other people will think I'm healthy, other people will not enjoy eating with me) indicated that social support for consuming healthy foods was high, in contrast with their findings.

Self-Efficacy

Strong internal consistency was maintained for self-efficacy items based on original groupings. However, the factor structure of this questionnaire was slightly

different than previously found. Vereecken et al. (2005) found that all self-efficacy items for a given food category loaded together, while items for choosing fruits and vegetables over other options comprised a separate component. When all self-efficacy items were tested together in the present analysis, only certain items for a given food group loaded together as a component, while identical items for different food groups loaded together. It appears that subjects may hold more definite self-efficacy beliefs for the separate food categories regarding situations related to motivation and taste preferences. As with outcome expectations, clustering of identical self-efficacy items for each food category suggests that subjects may not have defined self-efficacy beliefs for varying food types in situations regarding availability and hunger. Interestingly, items related to availability and hunger tended to cross-load or load onto different components. Once these items were removed, factor structures more closely resembled those reported by Vereecken et al.; one component typically was comprised of items previously categorized as "difficult situations," while the other usually contained items for "making choices." For fruits and vegetables, however, the second component also included items related to going out of one's way, such that the factor related to both the physical effort of preparation and the mental effort of choosing a healthier item.

One may note that self-efficacy items for fruits and vegetables were separate, while outcome expectation items were combined for fruits and vegetables. Vereecken et al. reported that self-efficacy for fruits and vegetables did not highly correlate ($r = 0.52$). Meanwhile, they found a high Spearman's correlation ($r = 0.83$) between fruit and vegetable outcome expectations. Baranowski et al. (2000), from whom outcome expectations were adapted for this study, combined fruit and vegetable items in

accordance with Domel et al.'s (1995) findings during scale development. In contrast with Vereecken et al.'s findings, Spearman's rho for "difficult situations" for fruits and vegetables in this sample was 0.73 (p<.001). Thus, for self-efficacy to consume these items may differ in younger children (both Vereecken et al. and Baranowski et al.'s studies were conducted with fourth- and fifth-graders), but may become more similar as development progresses.

As previously mentioned, self-efficacy items for situations referring to availability and hunger did not always have strong loadings, or they did not consistently load with the same items. Availability of healthy foods may differ if one is referring to the dormitory, the general campus, when visiting one's parents, and so on. Consequently, self-efficacy items may need to be more specific regarding location. In terms of hunger, Hoefling & Strack (2010) found that food-deprived subjects were less likely than satiated subjects to choose a snack based on taste preferences, and were willing to eat anything offered. Therefore, when faced with no other options, healthier options such as fruits, vegetables, lower-fat foods, or higher-calcium foods may be eaten due to lack of choice and the desire to quell one's discomfort. However, college students may find themselves hungry between classes, and healthier items may not be available in perception or actuality (Nelson et al., 2009c). Furthermore, when hunger is an immediate concern, it is quite likely that less healthy options will be available. Nelson & Story (2009) found that university students kept a variety of snack items and beverages in their rooms, many of which were less healthy choices (e.g., sweetened beverages, salty snacks). Dormitory cafeterias and local fast food restaurants often include a wide array of options, some of which may be viewed as more attractive and are harder to resist, such as fried foods or ice

cream (Nelson et al., 2009c). Items related to hunger levels and availability may be improved by addressing distinct situations rather than assuming similarity. Greaney et al. (2009) conducted online focus groups with college students to identify common barriers and enablers that affect ability to maintain weight. They reported that females often described temptation, lack of discipline, being bored, and being stressed as barriers to consuming a healthy diet. Therefore, self-efficacy items pertaining to these factors could be added to the scale in order to tap into barriers that may affect dietary behavior.

Overall, self-efficacy scores were low to moderate; most composite scores corresponded to only being able to consume the food "sometimes" during difficult situations. Scores were higher for making healthier choices and corresponded to being able to pick the healthier option at least "often." Based on all groupings, self-efficacy scores for vegetables and higher-calcium foods appeared to be lower than others, especially compared to self-efficacy for lower-fat foods. Elevated self-efficacy for lower-fat foods compared to vegetables is consistent with Strong et al.'s (2008) finding that college students had lower self-efficacy for increasing fruits and vegetables compared to decreased fat. In addition, self-efficacy to reduce sugar was higher and to increase fiber was lower, but these issues were not included in the present study. Lack of planning may, in part, contribute to lower intakes of healthful foods, as they also found a significantly positive association between self-efficacy for regulation one's diet and intake of fiber and whole grains. Targeting self-efficacy and helping students develop strategies to overcome barriers and plan ahead may help them consume an overall healthier diet. In terms of increasing calcium intake, Larson et al. (2006) found that in adolescent girls, self-efficacy to make healthful food choices was an important factor positively associated with

calcium intake. Thus, inclusion of strategies to raise self-efficacy for higher-calcium foods in nutrition interventions could lead to improved calcium intake in female college students. Meeting the daily recommendations for calcium may contribute to the achievement of peak bone mass in early adulthood, lowering the risk for future development of osteoporosis (Anderson & Rondano, 1996).

WELQ

Although the WELQ has been cited as a tool to measure ability to maintain a healthy weight as related to self-efficacy to resist eating (Fontaine & Cheskin, 1997; Richman et al., 2001; Warziski et al., 2008; Webber et al., 2010), it may not be reliable for this use, as-written, in female college students. Unfortunately, neither Richman et al., Warziski et al., nor Webber et al. cited reliability testing. Fontaine & Cheskin reported Cronbach's α values of 0.84, 0.79, 0.83, 0.83, 0.73, and 0.92 for availability, negative emotions, social pressure, physical discomfort, and positive activities, respectively, in a sample of obese adults seeking weight loss treatment. While internal consistencies of constructs within the WELQ were comparable based on those found by Clark et al. (1991) and Fontaine & Cheskin (1997), the proposed five-factor structure was not duplicated in PCA; rather, a four-factor structure was initially extracted, but was eventually pared down to a two-factor solution. Although Clark et al. found that the negative emotions and physical discomfort constructs were distinct, these items often loaded together in the current analysis and could be termed as trigger situations. It was not surprising that the two consistent factors related to social pressure and trigger situations (including emotional eating), as they may be particularly relevant to young

adults transitioning into an independent and often stressful lifestyle (Kandiah et al., 2006; Cluskey & Grobe, 2009). Greaney et al. (2009) found that females were more likely than males to associate stress with overeating, and Kandiah et al. (2006) reported that 81% of female college students (n=272) answered yes to the question "do you experience a change in appetite when stressed" and 63% of those subjects had an increase in appetite rather than a decrease. The stability of the emotional eating construct in this study suggests that this is an issue regardless of weight. In terms of social situations, Greaney et al. found that females were more likely than males to believe that social situations interfered with one's ability to maintain a healthy weight. Cluskey & Grobe's (2009) study suggested that lack of support may contribute to the difficulty of consuming a healthy diet during college. The consistency of most social pressure items in this analysis continues to reinforce that the association between social situations and eating is well-developed. Interestingly, composite scores for the WELQ tended to be slightly positive with regards to social pressure and negative emotions. However, scores for the social situation construct obtained from PCA were the lowest observed, suggesting that social support could be improved. Availability scores were also comparatively lower, supporting Greaney et al.'s finding that more females than males said they had a difficult time controlling their food intake, especially if they were on an unlimited cafeteria meal plan. Students may therefore benefit from learning strategies to prevent grazing and/or overeating when palatable foods are available, such as in dormitory cafeterias or in one's room when studying.

One must note that this questionnaire was developed with a sample of older, obese women participating in a weight loss program. Certain constructs such as

availability and positive activities did not hold in the present study, and items from one construct would load with related items from another. For example, items that referred to physical discomfort often loaded with items for negative emotions. An important issue related to the social pressure construct was the inconsistency of the situations "when I am at a party" and "on the weekends." While for older adults these social situations may revolve around food, college students are more likely to be consuming excess alcohol than food in these settings. In a qualitative study by Nelston et al. (2009a), drinking alcohol emerged as a perceived contributor to weight gain. Students reported that not only do they consume excess calories from alcohol, but they also tend to eat before going out to ensure that more alcohol can be consumed. Moreover, students claim that fast food is commonly eaten after a night of drinking. Indeed, Lloyd-Richardson et al. (2008) found that late-night eating occurred more commonly after students had been drinking alcohol, and included larger portions of energy-dense foods. Binge-drinking has been associated with overall poorer diet, unhealthy weight control behaviors, and increased risk of weight gain (Lloyd-Richardson et al., 2008; Nelson et al., 2009c). WELQ items may need to be more specific in terms of social situations that college students typically encounter.

Although Fontaine & Cheskin (1997) found strong internal consistency for WELQ subscales, a composite score for all WELQ items (also internally consistent) failed to predict weight loss in obesity treatment. They proposed that the WELQ alone may not be an adequate measure of self-efficacy to maintain a healthy weight, as it only refers to resisting eating in difficult situations and does not consider self-efficacy for other factors (including skills like reading food labels) that have been shown to be

associated with successful weight management. Moreover, the WELQ was adapted based on surveys used to measure self-efficacy to abstain from addictive behaviors such as smoking and alcoholism, and self-efficacy to maintain or lose weight may not be appropriately assessed from an addiction perspective (Fontaine & Cheskin, 1997).

Project EAT

As with other questionnaires, internal consistency was comparable to previous values (N. Larson, personal communication, July 27th, 2009). Several original constructs were maintained during PCA, including healthy eating concerns, weight control, and self-efficacy to eat healthy during negative emotions. However, items related to taste barriers, self-efficacy to change or maintain eating patterns, and time constraints did not load in the same patterns. Interestingly, items referring to liking the taste of vegetables and healthy foods loaded with items for time constraints. This could be explained by the fact that if one does not like the taste of these foods, she may be more likely to rationalize that healthier foods (including vegetables) take too much time to prepare and eat. Research has shown that college students' diets are typically low in both fruits and vegetables (Anding, Suminski, & Boss, 2001; Butler et al., 2004; Racette et al., 2005; Racette et al., 2008; Brunt et al., 2008; Pliner & Saunders, 2008). In particular, Brunt et al. (2008) found that while college students' fruit consumption was low, vegetable intake may be lower than fruit intake. Greaney et al.(2009) found that students reported that the time constraints of being a student interfered with their ability to eat a healthy diet; the results of this study imply that perceived time barriers may affect vegetable consumption more than other foods. In contrast, scores for the time constraints construct were actually quite

positive, but these items referred to healthy foods in general. Thus, addressing time management and planning skills may be a way to help students overcome this barrier to consuming a healthy foods, especially vegetables.

Taste barriers, as measured by the original grouping, appeared to be a bigger issue as scores were more on the negative side. However, the composite variable for this concept, based on PCA, included items regarding the perceived tastiness of unhealthy foods compared to healthier foods, as well as liking the taste of fast foods and salty snacks. PCA indicated that the former item cross-loaded, while liking the taste of unhealthier foods actually comprised a factor distinct from liking healthier foods. While one may certainly agree that fast foods taste good, this may not necessarily preclude eating a generally healthy diet. Therefore, the taste barriers construct may be flawed for the purpose of measuring barriers to eating healthy. Meanwhile, PCA indicated that the items for liking fruits and whole grains loaded with self-efficacy to consume these items as well as self-efficacy to consume vegetables. The apparent relationship between self-efficacy and taste preferences can be likened to the issue with vegetables and time constraints. While one may perceive that she does not have time to eat vegetables if she does not like vegetables, the opposite could be said for liking a food. Enjoying the taste of fruits and whole grains may contribute to students eating these items more often, thereby increasing their self-efficacy to maintain these eating patterns.

Food Environment

As mentioned before, no prior published information was available regarding food environment items' reliability. The current study demonstrated adequate internal

consistency for components related to perceived healthy food availability where one does not have control and for perceived healthy food availability where one does have some control. It was notable that the latter grouping included the item regarding healthy food availability at home, which did not load with the item about healthy food availability where one lives. This suggests that in the current sample, "home" was still thought of as one's parents' house, rather than one's accommodations at school. Another problem was observed with the item "there is too little food available where I live," which did not load with other items related to food quantity. This item may hint at food security issues rather than being comparable with the item "there is too much food available" when reverse-coded.

Inadequate internal consistency of food quantity items may have been due to differences in people's perception of their environment. For example, a wide array of food options and large quantity of food could encourage overeating in one person, while another may take advantage of the variety and find healthy options (Greaney et al., 2009). Intriguingly, composite scores for healthy food availability where one does have control were lower than those for healthy food availability where one does not. Nelson & Story (2009) found that parents often bought less healthful food for their children to keep in dormitory rooms. In a qualitative study (Nelson et al., 2009b), students reported receiving care packages from their parents, which often contained "junk food." Due to the lack of storage space, students also reported keeping mostly shelf-stable foods that could be heated in a microwave (Ramen noodles, ready-to-heat meals like macaroni and cheese). In addition, Strong et al. (2008) found that students do not tend to keep fresh produce in their rooms due to quick spoilage. In contrast with positive perceptions of the food

environment in the current sample, college students generally describe their food environment as being conducive to weight gain and say that unhealthy foods are more readily available and more affordable than healthy ones (Strong et al., 2008; Greaney et al., 2009; Nelson et al., 2009c). As data for the current study was collected soon after students arrived on campus, these responses may not be comparable to beliefs reported by students in previous research, who had likely already lived in the college environment for some time (and may have been experiencing the weight-related consequences).

Goals

As with food environment items, no previously published research utilized those for goals. PCA indicated two underlying subscales, one more related to general goals and the other related to food-specific goals. Most subjects had goals often, including living a healthy lifestyle. However, subjects were not as positive specifically about goals related to healthy foods overall. More specifically, subjects only sometimes had goals to eat five servings per day of fruits and vegetables and three daily servings of calcium-rich foods; meanwhile, eating lower-fat foods was a goal more often. Previous research appears to be mixed regarding nutrition goals in college students. Greaney et al.(2009) found that "almost all" of their participants in online focus groups had goals to improve their diet. Meanwhile, Strong et al. (2008) reported that students seldom used strategies to regulate their fat intake and occasionally used self-regulation as a way to improve their intake of fiber, fruits, and vegetables. As previously discussed, self-efficacy for planning and tracking has been associated with healthier diet in college students (Strong et al., 2008), so incorporating goal-setting and other self-monitoring strategies

should be included in nutrition interventions for this group. Furthermore, care should be taken to guide participants in setting attainable goals, as achievement could lead to improved self-efficacy for the process.

Differences According to Weight Status

An important finding of this study was that factor structure differences were evident for most questionnaires. Out of twenty WELQ items, only seven were consistent enough that they could be retained and used for comparisons between normal- and overweight subjects. Uniquely problematic items for overweight subjects were those that could be construed as referring to physical or emotional pain ("I can resist eating when I am uncomfortable" and "when I am in pain"), so the meaning of these items could be made clearer. Overweight subjects also tended to have vastly different loading patterns than normal-weight subjects, and these patterns often did not make sense. Furthermore, significant cross-loading was common.

Recently, much research has focused on the issue of dietary restraint, an issue that was not considered in the present study. Restrained eaters tend to be chronically dieting and are often successful at modulating their dietary intake, but they are also prone to more lapses (Herman & Polivy, 1980). Studies have shown that restrained eaters are more sensitive to food cues and often overeat in response to heightened cravings and temptation (Fedoroff, Polivy, & Herman, 1997, 2003; Jansen & Van den Hout, 1991; Papies & Hamstra, 2010). Moreover, these effects have been found to be stronger in overweight and obese people compared to normal-weight (Saelens & Epstein, 1996; Davis, Strachan, & Berkson, 2004). Ouwehand & Papies (2010) have suggested that the

reduced ability of overweight restrained eaters to resist when encountering environmental cues may lead to temporary inhibition of restraint; in turn, this may lower ability to self-regulate and in the long-run, perpetuate a cycle of overeating. While one may truly believe that she can resist eating during certain situations, these intentions may be forgotten in the face of temptation. With this in mind, it is possible that WELQ items are not capturing information that translates to actual ability to resist eating in certain situations. Furthermore, level of dietary restraint and differences in restraint by situation and food availability may have been a contributing factor to the instability of the WELQ. Several studies have shown that restraint differs according to situation, and especially in response to stress (Schotte et al., 1990; Heatherton et al., 1991; Cools et al., 1992; Greeno & Wing, 1994; Tanofsky-Kraff et al., 2000; Wardle et al., 2000). College students classified living away from home and classified as restrained eaters have been found to gain more weight during the first year of college (Pliner & Saunders, 2008), so this issue is of particular interest for the population at hand. Freshman students at the University of Illinois, specifically, are required to reside at university certified housing. In the future, collecting information on dietary restraint could help identify participants who may be at higher risk and determine whether cognitions regarding nutrition differ according to dietary restraint.

It may also be useful to determine if food preferences change during stressful situations. Kandiah et al. (2006) found that when stressed, college students consumed more sweet foods and mixed dishes like casseroles, pizza, and sandwiches that are often high in fat. WELQ scores for composites related to emotional eating, trigger situations and social pressure were lower compared to other scores, but still slightly positive. In

addition, Project EAT items for self-efficacy to eat healthy foods during negative emotions were on the positive side. It would be of interest to determine how these factors relate to appetite and food preferences when stressed.

Self-efficacy items pertaining to availability for specific food groups tended to have different loading patterns according to weight status. This may be related to differences seen in the food environment questionnaire, for which two notable structure differences for overweight subjects. First, the item regarding not having enough food loaded with other items pertaining to food quantity. Second, all items referring to availability of healthy foods regardless of location loaded on one factor. Overweight status has been associated with more frequent fast food consumption in adults (Bowman & Vineyard, 2004; Liebman 2004). Larson et al. (2009) found that unhealthy food availability at home was associated with fast food intake. It is possible that overweight students think of healthy food availability in more general terms, perhaps because sub-environments are similar. This may be traced to familial eating norms; the family is a critical influence on behaviors, beliefs, and values (Noble, 1997), and parents likely make the majority of food-related purchases for the home (Story et al., 2002). Overweight students may have a more "obesogenic" food environment (Birch & Anzman, 2010), encompassing the home, as unhealthy foods may be more commonly available, as well as outside food sources if they are frequented more often. Future interventions could include strategies on recruiting social support from one's family and how participants can broach the topic of food availability with their parents, in order to modify their environment to be conducive to weight loss or management. Interestingly, composite scores related to social support and healthy food availability were not significantly different between

weight groups. However, due to apparent differences in perceptions of the food environment, composite scores may not have been measuring the same thing for overweight and normal-weight subjects. Differences may actually exist, but they may not have been captured by this questionnaire. Furthermore, varied views of the food environment may have contributed to loading pattern deviations in self-efficacy related to food availability.

Self-efficacy to consume healthier foods may also be impacted by taste preferences, as evidenced by loading patterns in the Project EAT questionnaire. An intriguing difference had to do with taste preferences for healthy foods; while for normal-weight subjects, items for liking fruits, whole grains, and milk tended to load with corresponding items for self-efficacy to eat these foods, for overweight subjects items for liking these foods loaded together onto one component and self-efficacy items for these foods tended to load together on another factor. For normal-weight subjects, liking healthier foods may be more associated with self-efficacy to consume them, which may translate into a greater likelihood of actually eating these foods. For overweight subjects, though, it appears that liking these foods is less closely related to self-efficacy beliefs.

Vegetables may be of particular importance for overweight students. In addition to the relationship between the aforementioned relationship between liking vegetables and time constraints, the Project EAT item for self-efficacy to consume vegetables was related to self-efficacy to consume healthy foods when stressed, feeling down, or bored for overweight subjects. Stress eating in female college students has been found to be associated with decreased intake of balanced "meal-type" foods, including vegetables (Oliver & Wardle, 1999) as well as increased consumption of comfort foods such as

casseroles, pizza, and fast foods (Kandiah et al, 2006) as previously mentioned. Based on present results, if an overweight student is unlikely to eat healthy foods during stressful situations, this may be even more true for vegetables compared to other healthy foods. This is supported by the current finding that overweight students had lower self-efficacy to eat vegetables for the composite including items related to stress and time constraints (when you are REALLY hungry, when you are really busy with school, and when it is a lot of work to peel/cut/prepare). Although this difference only just reached significance ($p=.048$), it does hint that differences in self-efficacy for vegetables exist. Thus, strategies to increase self-efficacy and alter perceptions of time constraints may help improve vegetable intake in overweight subjects.

Significant cross-loading for items related to weight control behaviors (skipping meals, weighing oneself often) was unique for overweight subjects. However, these items loaded strongly with those regarding weight concern for normal-weight subjects, which suggests that using these strategies may be more commonly associated with being overly concerned about one's weight. For overweight subjects, thinking about being thinner and worrying about gaining weight may not necessarily be related to weight habits that border on being unhealthy. Furthermore, the meaning of these items may not be obvious, especially in the context of involvement with a study that focuses on preventing college weight gain. For example one item referring to weighing oneself, often could be construed as positive and being related to a person simply wanting to watch her weight, but it could also be an indication of an eating disorder. On the other hand, avoiding the scale could be a reflection of a more positive attitude toward health and reliance on other indicators of health (such as how one's clothes fit or level of physical fitness) rather than

the number on the scale. However, not weighing oneself often may be due to denial of a weight problem. In the same way, thinking a lot about being thinner may be more related to eating disorders for normal-weight girls than for overweight, for whom this may reflect an awareness of their size as unhealthy.

While differences according to weight status were found for the original weight concern and control construct, once items regarding weight control behaviors were removed from the composite score, internal consistency improved and differences became much more significant ($p=.037$ for weight concern and control compared to $p=.003$ for only weight concern). Both groups were concerned about their weight, but overweight subjects were significantly more so. Thus, overweight participants may have been more cognizant of their size and the possibility of further weight gain. This is consistent with previous research demonstrating that overweight teenagers accurately perceived themselves as overweight and reported that they care about controlling their weight (Neumark-Sztainer et al., 2002). Normal-weight adolescent girls also cared about their weight: about 64% said they wanted to be less than their current weight. This study also found a high prevalence of binge eating and extreme weight control behaviors. Social and academic pressures in the university setting can contribute to stress levels and increase the prevalence of eating disturbances in this population (Berg et al., 2009), so health-related interventions with this group would likely benefit from addressing body satisfaction and realistic diet and weight goals.

Differences were also evident in the factor structure for items pertaining to goals. Goal-setting was multidimensional for normal-weight subjects, while a one-factor solution resulted for overweight subjects. While general and food-specific goals may be

distinct for normal-weight subjects, the same cannot be said for those who are overweight. This suggests that for the latter group, goal setting to attain dietary changes may not be a common enough practice for it to be distinct from general goals. This is in accordance with previous findings that overweight college students reported less use of self-regulation as a strategy to control their weight (Kitsantas, 2000). Previous research has demonstrated that engaging in self-monitoring is associated with greater weight loss and successful weight maintenance (Taylor et al., 1991; Baker & Kirschenbaum, 1993; Kitsantas, 2000). Incorporation of goal-setting may therefore improve the effectiveness of weight gain interventions, especially for overweight participants.

One of the more intriguing findings of this study was the general lack of composite score differences according to weight status. Differences in self-efficacy for vegetables when effort must be made only just reached significance, and besides this difference, no others were detected. Previous studies comparing self-efficacy according to weight have been mixed, possibly due to population differences. Richman et al. (2001) reported that middle-aged obese women had lower coping self-efficacy for situations related to food than normal-weight women. In children, Rinderknecht & Smith (2004) found that at baseline, self-efficacy to choose healthful options did not differ by BMI status either in children aged 5-10 or adolescents aged 11-18. Meanwhile, Furia et al. (2009) reported that self-efficacy to maintain a healthy weight was lower in overweight college students compared to their normal-weight counterparts. Overweight subjects were also significantly more concerned about their weight. Neumark-Sztainer et al. (1997) reported that overweight Native American teens were significantly more concerned about their weight, consistent with current findings. It was surprising that no other differences

were found, though, based on previous suggestions that overweight and obese adolescents have differing perceptions about barriers to physical activity (Deforche et al., 2006). It was expected that overweight subjects would have similarly low perceptions of barriers to healthy eating, lower self-efficacy, and so on. Interestingly, outcome expectations did not differ by weight status, which is consistent with Deforche et al.'s finding that overweight and obese teens had similar expectations of the benefits of physical activity. It may be that the perceived advantages and disadvantages of engaging in healthier behaviors may be generally understood, as opposed to more personal beliefs like self-efficacy to engage in these actions.

Unfortunately, little cross-sectional research comparing weight groups has been conducted. Furthermore, no studies could be found comparing factor structures of questionnaires used to compare subjects when classified by weight status. Part of the reason why differences were not detected in this study may have been due to varying factor structures. Scales may not have been properly constructed so that items had the same meaning for all subjects. Therefore, psychosocial variables may not have been adequately measured in order to make valid comparisons.

Limitations

Overall in this sample, internal consistency compared favorably with original groupings for the various constructs within surveys, but PCA demonstrated that in the general sample, underlying structures of questionnaires tended to diverge from previously reported conceptual organizations. Furthermore, factor structures often differed across weight groups. While Cronbach's α met or exceeded adequacy requirements for

groupings originally tested, these results should be interpreted with caution. Cronbach's α tends to increase as the number of items increase (Garson, 2008c); therefore, scores may be misleading due to the inclusion of problematic items in calculations based on original groupings. Therefore, while high Cronbach's α values suggest that certain subscales may be reliably considered as a construct score, these composites may not necessarily be valid. It may be more accurate to rely on composite scores calculated based on groupings indicated by PCA, as they are likely more indicative of cognitive structures in the current sample. Nevertheless, to be thorough, weight status comparisons were conducted using composites generated based both on original groupings and those suggested by PCA, as well as for items that could not reliably be considered part of any construct. Unfortunately, even groupings suggested by PCA are not entirely free from bias. The present analysis was purely exploratory, and the procedure often required the researcher to make judgments regarding which items were most problematic and which should be removed first.

Despite the exhaustive analysis of composite scores, very few differences between normal-weight and overweight were observed. Social desirability bias is a common problem with behavioral studies, including those involving health behaviors (Kristiansen & Harding, 1984). Subjects may act in a certain way or answer questions based on what they believe to be socially acceptable. In terms of dietary behaviors, under-reporting of energy intake (Hebert et al., 2001; Hebert et al., 2002) is one example of a way that subjects may alter information about their habits. A similar effect may have occurred in the current study, with social desirability possibly biasing subjects' answers. Steps were taken to ensure privacy and reduce pressure, as subjects were allowed to fill out

questionnaires online and on their own time. However, social desirability bias remains a possible confounding factor.

Although the current study was conducted using baseline data, which was collected soon after students arrived on campus, participants may have already begun to make lifestyle adjustments. Cluskey & Grobe (2009) found that having healthful habits prior to college was related to having support systems and a more structured routine, and students with healthier lifestyles before college were more likely to maintain these habits. Unfortunately, participants were not asked about prior or current lifestyle and health habits; it may have been useful to explore the relationships between these factors and beliefs toward nutrition and health.

Due to issues with sampling, results of this study may not necessarily be generalized to the college population as a whole. The sample was, in effect, self-selected; all incoming female freshmen were recruited by e-mail, and those who responded were likely already concerned about their health and weight. No information was collected regarding course of study, so health-related majors (e.g., human nutrition, dietetics, kinesiology, community health, etc.) were not excluded. Furthermore, participants were not screened for eating disorders. This may have contaminated results and limits the generalizability of results to all female college students. Participants were also not screened for other mental disorders, such as depression. As the relationship between depression and emotional eating (Davis, 2004) has been previously demonstrated, lack of information regarding this condition may affect interpretability of the WELQ, which contained items related to emotional eating.

The issue of self-selection was reflected in item distributions, as the majority were

skewed toward positive answers. Thus, due to the lack of normal distribution, results using these tools may not be relevant to the general population. Other issues that limit generalizability include the fact that subjects were predominantly Caucasian and recruited from a large, public university in the Midwest, so results may not be applicable to all ethnicities or to students in other regions of the United States or other countries. Comparisons were not made for ethnic categories, and due to small sample size, comparisons could not be made for underweight subjects. Moreover, due to the cross-sectional nature of the study, causality cannot be assumed. In addition, as information about dietary behavior was not included it is unknown whether differences in psychosocial items according to weight status contribute to differences in eating patterns.

CHAPTER 7

CONCLUSIONS AND FUTURE DIRECTIONS

The first objective of this study was to evaluate the reliability of questionnaires administered at baseline to female freshmen participating in a weight gain prevention program. Based on this analysis, scales for outcome expectations and self-efficacy as well as the Project EAT and WELQ surveys are likely reliable for use with female college freshmen, as they had good internal consistency based on previously published groupings. Nutrition goal items also had good internal consistency based on groupings suggested by PCA but food environment items were not reliable and therefore require additional development and testing.

The second objective of the study was to investigate the validity of previous groupings by comparing these with groupings yielded through PCA. Subscales for outcome expectations and most constructs for self-efficacy and Project EAT items were the same or similar compared to those previously described. This indicates that these groupings are likely valid reflections of constructs in this sample. However, WELQ groupings as suggested by PCA were quite different than those previously published, so these groupings may not be valid for this population. Items may need to be grouped differently in order to obtain a more reliable measure. In addition to validity, this analysis yielded information regarding how these questionnaires could be improved to address the concerns of this population. Psychosocial questionnaires may better address concerns of this population by incorporating such issues as social pressure, emotional eating, food availability, and alcohol use.

The third objective of the study was to compare the psychometric properties of questionnaires among weight subgroups within the sample. Only a few composite scores were significantly different according to BMI. More obvious differences were seen through PCA, with factor structures differing by BMI for each questionnaire except for OE. The general lack of composite score differences by weight status may have been a reflection that scales were not valid for comparisons by BMI category due to varying influences on health cognitions and behaviors.

In assessing the baseline mean and median data, it was apparent that this sample of freshman women had overall positive attitudes towards nutrition and health. In particular, scores were very positive regarding outcome expectations. However, the finding that self-efficacy scores were less positive supports Project PEER's aim to focus on this variable. Self-efficacy and goal scores for fruits, vegetables and higher-calcium foods tended to be lower than for lower-fat foods. Project EAT scores were less positive regarding taste barriers, as were WELQ scores for emotional eating, social pressure, and trigger situations. Social situations, emotional eating, and food availability are barriers consistently found to hinder healthy eating patterns in college students. Thus, incorporating strategies in interventions to overcome barriers and recruit support may be helpful to improve self-efficacy in this group.

While the present study contributes to a growing body of literature investigating social cognitive variables related to diet in college students, additional research is needed. One of the most intriguing findings of this study was that normal- and overweight females may have different cognitive patterns regarding healthy foods and preventive health behavior. More research is needed in this area to confirm the existence of these

differences and to determine how to address them in weight management programs. Using additional statistical techniques such as confirmatory factor analysis and structural equation modeling may be more informative and could be used to test hypotheses more objectively (Costello & Osborne, 2005). Importantly, the relationships between social cognitive variables and dietary behaviors for normal- and overweight students need to be examined further, while considering possible influences such as alcohol use, dietary restraint, and disordered eating behaviors. Ultimately, this could increase the effectiveness of interventions aimed at improving student health.

REFERENCES

Anderson, D.A., Shapiro, J.R., & Lundgren, J.D. (2003). The freshman year of college as a critical period for weight gain: an initial evaluation. *Eating Behaviors, 4*(4), 363-367.

Anderson, E.S., Winett, R.A., & Wojcik, J.R. (2007). Self-regulation, self-efficacy, outcome expectations, and social support: Social cognitive theory and nutrition behavior. *Annals of Behavioral Medicine, 34*(3), 304-312.

Anderson, J.J., & Rondano, P.A. (1996). Peak bone mass development of females: Can young adult women improve their peak bone mass? *Journal of the American College of Nutrition, 15*(6), 570-574.

Anding, J.D., Suminski, R.R., & Boss, L. (2001). Dietary intake, body mass index, exercise, and alcohol: Are college women following the dietary guidelines for Americans? *Journal of American College Health, 49*(4), 167-171.

Australian Institute of Health and Welfare. (2003). *Are all Australians gaining weight? Differentials in overweight and obesity among adults, 1989-90 to 2001*. Retrieved from http://www.aihw.gov.au/publications/index.cfm/title/9652. Accessed November 10, 2010.

Baker, R.C. & Kirschenbaum, D.S. (1993) Self-monitoring may be necessary for successful weight control. *Behavior Therapy, 24*(3), 377-394.

Ball, K., MacFarlane, A., Crawford, D., Savige, G., Andrianopoulos, N., & Worsley, A. (2009). Can social cognitive theory constructs explain socio-economic variations in adolescent eating behaviours? A mediation analysis. *Health Education Research, 24*(3), 496-506.

Bandura, A., & Schunk, D. H. (1981). Cultivating competence, self efficacy, and intrinsic interest through proximal self-motivation. *Journal of Personality and Social Psychology, 41*(3), 586-598.

Bandura, A. (1986). *Social Foundations of Thought and Action: a Social Cognitive Theory*. Englewood Cliffs, NJ: Prentice Hall.

Bandura, A. (1997). *Self-Efficacy: The Exercise of Control.* New York, NY: W.H. Freeman.

Bandura, A. (2004). Health promotion by social cognitive means. *Health Education & Behavior, 31*(2), 143-164.

Baranowski, T., Davis, M., Resnicow, K., Baranowski, J., Doyle, C., Lin, L.S., Smith, M., & Wang, D.Q.T. (2000). Gimme 5 fruit, juice, and vegetables for fun and health: Outcome evaluation. *Health Education & Behavior, 27*(1), 96-111.

Barrett, L., Plotnikoff, R.C., Raine, K., & Anderson, D. (2005). Development of measures of organizational leadership for health promotion. *Health Education and Behavior,* 32(2), 195-207.

Bell, A.C., Ge, K., & Popkin, B.M. (2001). Weight gain and its predictors in Chinese adults. *International Journal of Obesity and Related Metabolic Disorders, 25*(7), 1079-1086.

Berg, K.C., Frazier, P., & Sherr, L. (2009). Change in eating disorder attitudes and behavior in college women: Prevalence and predictors. *Eating Behaviors, 10*(3), 137-142.

Birch, L.L., & Anzman, S.L. (2010). Learning to eat in an obesogenic environment: a developmental systems perspective on childhood obesity. *Child Development Perspectives, 4*(2), 138-143.

Bowman, S.A., & Vinyard, B.T. (2004). Fast food consumption of U.S. adults: Impact on energy and nutrient intakes and overweight status. *Journal of the American College of Nutrition, 23*(2), 163-168.

Brunt, A., Rhee, Y., & Zhong, L. (2008). Differences in dietary patterns among college students according to body mass index. *Journal of American College Health, 56*(6), 629-634.

Butler, S.M., Black, D.R., Blue, C.I., & Gretebeck, R.J. (2004). Change in diet, physical activity, and body weight in female college freshman. *American Journal of Health Behaviors, 28*(1), 24-32.

Cerin, E., Barnett, A., & Baranowski, T. (2009). Testing theories of dietary behavior change in youth using the mediating variable model with intervention programs. *Journal of Nutrition Education and Behavior, 41*(5), 309-318.

Chang, M., Brown, R.L., Baumann, L.J., & Nitzke, S.A. (2008). Self-efficacy and dietary fat reduction behaviors in obese African-American and White mothers. *Obesity, 16*(5), 992-1001.

Clark M.M., Abrams, D.B., Niaura, R.S., Eaton, C.A., & Rossi, J.S. (1991). Self-efficacy in weight management. *Journal of Consulting and Clinical Psychology. 59*(5), 739–744.

Cluskey, M., & Grobe, D. (2009). College weight gain and behavior transitions: Male and female differences. *Journal of the American Dietetic Association, 109*(2), 325-329.

Contento, I.R., Randell, J.S., & Basch, C.E. (2002). Review and analysis of evaluation measures used in nutrition education intervention research. *Journal of Nutrition Education and Behavior, 34*(1), 2-25.

Cools, J., Schotte, D.E., & McNally, R.J. (1992). Emotional arousal and overeating in restrained eaters. *Journal of Abnormal Psychology, 101*(2), 348-351.

Cortina, J.M. (1993). What is coefficient alpha? An examination of theory and applications. *Journal of Applied Psychology, 78*(1), 98-104.

Costello, A.B., & Osborne, J.W. (2005). Best practices in exploratory factor analysis: four recommendations for getting the most from your analysis. *Practical Assessment, Research, and Evaluation, 10*(7), 1-9.

Crombie, A.P., Ilich, J.Z., Dutton, G.R., Panton, L.B., & Abood, D.A. (2009). The freshman weight gain phenomenon revisited. *Nutrition Reviews, 67*(2), 83-94.

Cronbach, L.J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika, 16*(3), 297-334.

Crow, S., Eisenberg, M.E., Story, M., & Neumark-Sztainer, D. (2006). Psychosocial and behavioral correlates of dieting among overweight and non-overweight adolescents. *Journal of Adolescent Health, 38*(5), 569-574.

Cullen, K.W., Baranowski, T., Owens, E., Marsh, T., Rittenberry, L., & de Moor, C. (2003). Availability, accessibility, and preferences for fruit, 100% fruit juice, and vegetables influence children's dietary behavior. *Health Education and Behavior, 30*(5), 615-626.

Cusatis, D.C., & Shannon, B.M. (1996). Influences on adolescent eating behavior. *Journal of Adolescent Health, 18*(1), 27-34.

Davis, C., Strachan, S., & Berkson, M. (2004). Sensitivity to reward. Implications for overeating and overweight. *Appetite, 42*(2), 131-138.

de Nooijer, J., de Vet, E., Brug, J., & de Vries, N.K. (2006). Do implementation intentions help to turn good intentions into higher fruit intakes? *Journal of Nutrition Education and Behavior, 38*(1), 25-29.

DeWolfe, J.A., & Shannon B.M. (1993). Factors affecting fat consumption of university students - testing a model to predict eating behavior change. *Journal of the Canadian Dietetic Association, 54*(3), 132-137.

Deforche, B.I., de Bourdeaudhuij, I.M., & Tanghe, A.P. (2006). Attitude toward physical activity in normal-weight, overweight and obese adolescents. *Journal of Adolescent Health, 38*(5), 560-568.

Dimitrov, D.M. (2010). Testing for factorial invariance in the context of construct validation. *Measurement and Evaluation in Counseling and Development, 43*(2), 121-149.

Doerksen, S. (2008). *Worksite physical activity and nutrition.* Retrieved from ProQuest Digital Dissertations. (AAT 3337750)

Domel, S.B., Baranowski, T., Davis, H.C., Thompson, W.O., Leonard, S.B., & Baranowski, J. (1995). A measure of outcome expectations for fruit and vegetable consumption among 4th and 5th grade children - reliability and validity. *Health Education Research, 10*(1), 65-72.

Driskell, J. A., Kim, Y.N., & Goebel, K.J. (2005). Few differences found in the typical eating and physical activity habits of lower-level and upper-level university students. *Journal of the American Dietetic Association, 105*(5), 798-801.

Fedoroff, I.C., Polivy, J., & Herman, C.P. (1997). The effect of pre-exposure to food cues on the eating behavior of restrained and unrestrained eaters. *Appetite, 28*(1), 33-47.

Fedoroff, I.C., Polivy, J., & Herman, C.P. (2003). The specificity of restrained versus unrestrained eaters' responses to food cues. General desire to eat, or craving for the cued food? *Appetite, 41*(1), 7-13.

Fonseca, H., Matos, M.G., Guerra, A., & Pedro, J.G. (2009). Are overweight and obese adolescents different from their peers? *International Journal of Pediatric Obesity, 4*(3), 166-174.

Fontaine, K.R., & Cheskin, L.J. (1997). Self-efficacy, attendance, and weight loss in obesity treatment. *Addictive Behaviors, 22*(4), 567-570.

Franko, D.L., Cousineau, T.M., Trant, M., Green, T.C., Rancourt, D., Thompson, D., Ainscough, J., Mintz, L.B., & Ciccazzo, M. (2008). Motivation, self-efficacy, physical activity and nutrition in college students: Randomized controlled trial of an internet-based education program. *Preventive Medicine, 47*(4), 369-377.

Furia, A.C., Lee, R.E., Strother, M.L., & Huang, T.T. (2009). College students' motivation to achieve and maintain a healthy weight. *American Journal of Health Behavior, 33*(3), 256-263.

Garson, G.D. (2008a). "Data Imputation for Missing Values," from *Statnotes: Topics in Multivariate Analysis*. Retrieved from http://faculty.chass.ncsu.edu/garson/PA765/statnote.htm. Accessed November 10, 2010.

Garson, G.D. (2008c). "Scales and Standard Measures," from *Statnotes: Topics in Multivariate Analysis*. Retrieved from http://faculty.chass.ncsu.edu/garson/PA765/statnote.htm. Accessed November 10, 2010.

Garson, G.D. (2008b). "Tests for Two Independent Samples: Mann-Whitney U, Wald-Wolfowitz Runs, Kolmogorov-Smirnov Z, & Moses Extreme Reactions Tests," from *Statnotes: Topics in Multivariate Analysis*. Retrieved from http://faculty.chass.ncsu.edu/garson/PA765/statnote.htm. Accessed November 10, 2010.

Garson, G.D. (2010). "Factor Analysis," from *Statnotes: Topics in Multivariate Analysis*. Retrieved from http://faculty.chass.ncsu.edu/garson/PA765/statnote.htm. Accessed November 10, 2010.

Gleason, P.M., Harris, J., Sheean, P.M., Boushey, C.J., & Bruemmer, B. (2010). Publishing nutrition research: Validity, reliability, and diagnostic test assessment in nutrition-related research. *Journal of the American Dietetic Association, 110*(3), 409-419.

Gollwitzer, P. (1999). Implementation intentions. *American Psychologist, 54*(7), 493-503.

Granner, M.L., Sargent, R.G., Calderon, K.S., Hussey, J.R., Evans, A.E., & Watkins, K.W. (2004). Factors of fruit and vegetable intake by race, gender, and age among young adolescents. *Journal of Nutrition Education and Behavior, 36*(4), 173-180.

Greaney, M.L., Less, F.D., White, A.A., Dayton, S.F., Riebe, D., Blissmer, B., Shoff, S., Walsh, J.R., & Greene, G.W. (2009). College students' barriers and enablers for healthful weight management: a qualitative study. *Journal of Nutrition Education and Behavior, 41*(4), 281-286.

Greeno, C.G., & Wing, R.R. (1994). Stress-induced eating. *Psychological Bulletin, 115*(3), 444-464.

Gropper, S.S., Simmons, K.P., Gaines, A., Drawdy, K., Saunders, D., Ulrich, P., & Connell, L.J. (2009). The freshman 15 - a closer look. *Journal of American College Health, 58*(3), 223-231.

Ha, E., & Caine-Bish, N. (2009). Effect of nutrition intervention using a general nutrition course for promoting fruit and vegetable consumption among college students. *Journal of Nutrition Education and Behavior, 41*(2), 103-109.

Hatcher, L. (1994). *A Step-by-Step Approach To Using The SAS System for Factor Analysis and Structural Equation Modeling*. Cary, NC: The SAS Institute Inc.

Heatherton, T.F., Herman, C.P., & Polivy, J. Effects of physical threat and ego threat on eating behaviour. *Journal of Personality and Social Psychology, 60*(1), 138-143.

Hebert, J.R., Peterson, K.E., Hurley, T.G., Stoddard, A.M., Cohen, N., Field, A.E., & Sorensen, G. (2001). The effect of social desirability trait on self-reported dietary measures among multi-ethnic female health center employees. *Annals of Epidemiology, 11*(6), 417-427.

Hebert, J.R., Ebbeling, C.B., Matthews, C.E., Hurley, T.G., Ma, Y.S., Druker, S., & Clemow, L. (2002). Systematic errors in middle-aged women's estimates of energy intake: Comparing three self-report measures to total energy expenditure from doubly labeled water. *Annals of Epidemiology, 12*(8), 577-586.

Herman, C.P., & Polivy, J. (1980). Restrained eating. In A.J. Stunkard (Ed.), *Obesity.* Philadelphia, PA: Saunders.

Hoefling, A., & Strack, F. (2010). Hunger induced changes in food choice. When beggars cannot be choosers even if they are allowed to choose. *Appetite, 54*(3), 603-606.

Howell, D.C. (2009). *Treatment of Missing Data*. Retrieved from http://www.uvm.edu/~dhowell/StatPages/More_Stuff/Missing_Data/Missing.html Accessed November 10, 2010.

Jansen, A., & Van den Hout, M.A. (1991). On being led into temptation. Counter-regulation of dieters after smelling a pre-load. *Addictive Behaviors, 16*(5), 247-253.

Kandiah, J., Yake, M., Jones, J., & Meyer, M. (2006). Stress influences appetite and comfort food preferences in college women. *Nutrition Research, 26*(3), 118-123.

Kasparek, D.G., Corwin, S.J., Valois, R.F., Sargent, R.G., & Morris, R.L. (2008). Selected health behaviors that influence college freshman weight change. *Journal of American College Health, 56*(4), 437-444.

Kirkman, T.W. (1996). "Kolmogorov-Smirnov test," from *Statistics to use*. Retrieved from http://www.physics.csbsju.edu/stats/ Accessed November 10, 2010.

Kitsantas, A. (2000). The role of self-regulation strategies and self-efficacy perceptions in successful weight loss maintenance. *Psychology and Health, 15*(6), 811-820.

Kristiansen, C.M., & Harding, C.M. (1984). The social desirability of preventive health behavior. *Public Health Reports, 99(4)*, 384-388.

Larson, N.I., Story, M., & Wall, M. (2006). Calcium and dairy intakes of adolescents are associated with their home environment, taste preferences, personal health beliefs, and meal patterns. *Journal of the American Dietetic Association, 106*(11), 1816-1824.

Levitsky, D.A., Halbmaier, C.A., & Mrdjenovic, G. (2004). The freshman weight gain: A model for the study of the epidemic of obesity. *International Journal of Obesity and Related Metabolic Disorders, 28*(11), 1435-1442.

Liebman, M., Pelican, S., Moore, S.A., Holmes, B., Wardlaw, M.K., Melcher, L.M., Raidl, M., Wheeler, B., & Haynes, G.W. (2006). Dietary intake-, eating behavior-, and physical activity-related determinants of high body mass index in the 2003 Wellness IN the Rockies cross-sectional study. *Nutrition Research, 26*(3), 111-117.

Lloyd-Richardson, E.E., Lucero, M.L., DiBello, J.R., Jacobson, A.E., & Wing, R.R. (2008). The relationship between alcohol use, eating habits, and weight change in college freshmen. *Eating Behaviors, 9*(4), 504-508.

Lombard, C.B., Deeks, A.A., & Teede, H.J. (2009). A systematic review of interventions aimed at the prevention of weight gain in adults. *Public Health Nutrition, 12*(11) 2236-2246.

Markowitz, J.T., Butryn, M.L., & Lowe, M.R. (2008). Perceived deprivation, restrained eating and susceptibility to weight gain. *Appetite, 51*(3), 720-722.

Matvienko, O., Lewis, D.S., & Schafer, E. (2001). A college nutrition science course as an intervention to prevent weight gain in female college freshmen. *Journal of Nutrition Education, 33*(2), 95-101.

McDonald, J.H. (2009). *Handbook of Biological Statistics* (2nd ed.). Baltimore, MD: Sparky House Publishing.

Miller, W.C., & Miller, T.A. (2010). Attitudes of overweight and normal weight adults regarding exercise at a health club. *Journal of Nutrition Education and Behavior, 42*(1), 2-9.

Mitchell, M.L., & Jolley, J.M. (2010). *Research Design Explained* (7th ed.). Belmont, CA: Wadsworth.

Morrow, M.L., Heesch, K.C., Dinger, M.K., Hull, H.R., Kneehans, A.W., Fields, D.A. (2006). Freshman 15: Fact or fiction? *Obesity, 14*(8), 1438-1443.

National Health Service, Information Centre for Health and Social Care. (2006). *Statistics on obesity, physical activity, and diet: England, 2006*. Retrieved from http://www.ic.nhs.uk/statistics-and-data-collections/health-and-lifestyles/obesity/statistics-on-obesity-physical-activity-and-diet-england-2006. Accessed November 10, 2010.

National Institutes of Health. (1998). Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults [PDF file]. Retrieved from http://www.nhlbi.nih.gov/guidelines/obesity/ob_gdlns.htm. Accessed November 10, 2010.

Neill, J. (2010). *Exploratory factor analysis: Survey research & design in psychology* [PowerPoint slides]. Retrieved from http://www.slideshare.net/jtneill/exploratory-factor-analysis. Accessed November 10, 2010.

Nelson, M.C., Story, M., Larson, N.I., Neumark-Sztainer, D., & Lytle, L.A. (2008). Emerging adulthood and college-aged youth: an overlooked age for weight-related behavior change. *Obesity, 16*(10), 2205-2211.

Nelson, M.C., Lust, K., Story, M., & Ehlinger, E. (2009a). Alcohol use, eating patterns, and weight behaviors in a university population. *American Journal of Health Behavior, 33*(3), 227-237.

Nelson, M.C., & Story, M. (2009b). Food environments in university dorms: 20,000 calories per dorm room and counting. *American Journal of Preventive Medicine, 36*(6), 523-526.

Nelson, M.C., Kocos, R., Lytle, L.A., & Perry, C.L. (2009c). Understanding the perceived determinants of weight-related behaviors in late adolescence: a qualitative analysis among college youth. *Journal of Nutrition Education and Behavior, 41*(4), 287-292.

Neumark-Sztainer, D., Story, M., Resnick, M.D., & Blum, R.W. (1997). Psychosocial concerns and weight control behaviors among overweight and non-overweight Native American adolescents. *Journal of the American Dietetic Association, 97*(6), 598-604.

Neumark-Sztainer, D., Story, M., Hannan, P.J., Perry, C.L., & Irving, L.M. (2002). Weight-related concerns and behaviors among overweight and non-overweight adolescents: Implications for preventing weight-related disorders. *Archives of Pediatrics and Adolescent Medicine, 156*(2), 171-178.

Neumark-Sztainer, D., Wall, M., Perry, C., & Story, M. (2003). Correlates of fruit and vegetable intake among adolescents: Findings from Project EAT. *Preventive Medicine, 37*(3), 198-208.

Noar, S.M., & Zimmerman, R.S. (2005). Health behavior theory and cumulative knowledge regarding health behaviors: are we moving in the right direction? *Health Education Research, 20*(3), 275-290.

Noble, R.E. (1997). The incidence of parental obesity in overweight individuals. *International Journal of Eating Disorders*, *22*(3), 265-271.

Nothwehr, F. & Yang, J. (2007). Goal setting frequency and the use of behavioral strategies related to diet and physical activity. *Health Education Research, 22*(4), 532-538.

Ogden, C.L., Carroll, M.D., Curtin, L.R., McDowell, M.A., Tabak, C.J., & Flegal, K.M. (2006). Prevalence of overweight and obesity in the United States, 1999-2004. *Journal of the American Medical Association, 295*(13), 1549-1555.

Oliver, G., & Wardle, J. (1999). Perceived effects of stress on food choice. *Physiology and Behavior, 66*(3), 511-515.

Ouwehand, C., & Papies, E.K. (2010). Eat it or beat it. The differential effects of food temptations on overweight and normal-weight restrained eaters. *Appetite*, *55*(1), 56-60.

Papies, E.K., & Hamstra, P. (2010). Goal priming and eating behavior. Enhancing self-regulation by environmental cues. *Health Psychology, 29*(4), 384-388.

Patrick, H., & Nicklas, T.A. (2005). A review of family and social determinants of children's eating patterns and diet quality. *Journal of the American College of Nutrition, 24*(2), 83-92.

Pliner, P., & Saunders, T. (2008). Vulnerability to freshman weight gain as a function of dietary restraint and residence. *Physiology and Behavior, 93*(1), 76-82.

Provencher, V., Polivy, J., Wintre, M.G., Pratt, M.W., Pancer, S.M., Birnie-Lefcovitch, S., & Adams, G.R. (2008). Who gains or who loses weight? Psychosocial factors among first-year university students. *Physiology and Behavior, 96*, 135-141.

Racette, S.B., Deusinger, S.S., Strube, M.J., Highstein, G.R., & Deusinger, R.H. (2005). Weight changes, exercise, and dietary patterns during freshman and sophomore years of college. *Journal of American College Health, 53*(6), 245-251.

Racette, S.B., Deusinger, S.S., Strube, M.J., Highstein, G.R., & Deusinger, R.H. (2008). Changes in weight and health behaviors from freshman through senior year of college. *Journal of Nutrition Education and Behavior, 40*(1), 39-42.

Rensvold, R.B., & Cheung, G.W. (1998). Testing measurement models for factorial invariance: a systematic approach. *Educational and Psychological Measurement, 58*(6), 1017-1034.

Richman, R.M., Loughnan, G.T., Droulers, A.M., Steinbeck, K.S., & Caterson, I.D. (2001). Self-efficacy in relation to eating behaviour among obese and non-obese women. *International Journal of Obesity, 25*(6), 907-913.

Rinderknecht, K., & Smith, C. (2004). Social cognitive theory in an after-school nutrition intervention for urban Native American youth. *Journal of Nutrition Education and Behavior, 36*(6), 298-304.

Rosamond, W., Flegal, K., Furie, K., Go, A., Greenlund, K., Haase, N., Hailpern, S.M., Ho, M., Howard, V., Kissela, B., Kittner, S., Lloyd-Jones, D., McDermott, M., Meigs, J., Moy, C., Nichol, G., O'Donnell, C., Roger, V., Sorlie, P., Steinberger, J., Thom, T., Wilson, M., & Hong, Y. (2008). Heart disease and stroke statistics - 2008 update: a report from the American Heart Association Statistics Committee and Stroke Statistics Committee. *Circulation, 117*(4), e25-e146.

Saelens, B.E., & Epstein, L.H. (1996). Reinforcing value of food in obese and non-obese women. *Appetite, 27*(1), 41-50.

Schotte, D.E., Cools, J., & McNally, R.J. (1990). Film-induced negative affect triggers overeating in restrained eaters. *Journal of Abnormal Psychology, 99*(3), 317-320.

Shaikh, A.R., Yaroch, A.L., Nebeling, L., Yeh, M., & Resnicow, K. (2008). Psychosocial predictors of fruit and vegetable consumption in adults: a review of the literature. *American Journal of Preventive Medicine, 34*(6), 535-543.

Shannon B., Bagby R., Wang M.Q., & Trenkner, L. (1990). Self-efficacy: a contributor to the explanation of eating behavior. *Health Education Research 5*(4), 395-407.

Sheeshka, J.D., Woolcott, D.M., & MacKinnon, N.J. (1993). Social cognitive theory as a framework to explain intentions to practice healthy eating behaviors. *Journal of Applied Social Psychology, 23*(19), 1547-1573.

Stockburger, D.W. (2001). *Introductory Statistics: Concepts, Models, and Applications*. Mason, Ohio: Atomic Dog Publishing.

Story, M., Neumark-Sztainer, D., & French, S. (2002). Individual and environmental influences on adolescent eating behaviors. *Journal of the American Dietetic Association, 102*(3), S40-S51.

Strecher, V.J., DeVellis, B.M., Becker, M.H., & Rosenstock, I.M. (1986). The role of self-efficacy in achieving health behavior change. *Health Education Quarterly, 13*(1), 73-91.

Strong, K.A., Parks, S.L., Anderson, E., Winett, R., & Davy, B.M. (2008). Weight gain prevention: Identifying theory-based targets for health behavior change in young adults. *Journal of the American Dietetic Association, 108*(10), 1708-1715.

Tanofsky-Kraff, M., Wilflet, D.E., & Spurrell, E. (2000). Impact of interpersonal and ego-related stress on restrained eaters. *International Journal of Eating Disorders, 27*(4), 411-418.

Taylor, C.B., Agras, W.S., Losch, M., Plante, T.G., & Burnette, K. (1991). Improving the effectiveness of computer-assisted weight loss. *Behavior Therapy, 22*(2), 229-236.

Tuuri, G., Zanovec, M., Silverman, L., Geaghan, J., Solmon, M., Holston, D., Guarino, A., Roy, H., & Murphy, E. (2009). "Smart Bodies" school wellness program increased children's knowledge of healthy nutrition practices and self-efficacy to consume fruit and vegetables. *Appetite, 52*(2), 445-451.

U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. (2008). *Overweight and Obesity: Trends.* Retrieved from http://www.cdc.gov/nccdphp/dnpa/obesity/trend/index.htm. Accessed November 10, 2010

Vereecken, C.A., Van Damme, W., & Maes, L. (2005). Measuring attitudes, self-efficacy, and social and environmental influences on fruit and vegetable consumption of 11- and 12-year-old children: Reliability and validity. *Journal of the American Dietetic Association, 105*(2), 257-261.

Wardle, J., Steptoe, A., Oliver, G., & Lipsey, Z. (2000). Stress, dietary restraint and food intake. *Journal of Psychosomatic Research, 48*(2), 195-202.

Warziski, M.T., Sereika, S.M., Styn, M.A., Music, E., & Burke, L.E. (2008). Changes in self-efficacy and dietary adherence: the impact on weight loss in the PREFER study. *Journal of Behavioral Medicine, 31*(1), 81-92.

Webber, K.H., Gabriele, J.M., Tate, D.F., & Dignan, M.B. (2010). The effect of a motivational intervention on weight loss is moderated by level of baseline controlled motivation. *International Journal of Behavioral Nutrition and Physical Activity, Available at* http://www.ijbnpa.org/content/7/1/4. Accessed November 10, 2010.

Wengreen, H.J., & Moncur, C. (2009). Change in diet, physical activity, and body weight among young-adults during the transition from high school to college. *Nutrition Journal, Available at* http://www.nutritionj.com/content/8/1/32. Accessed November 10, 2010.

Wojcicki, T.R., White, S.M., & McAuley, E. (2009). Assessing outcome expectations in older adults: the multidimensional Outcome Expectations for Exercise Scale. *Journal of Gerontology: Psychological Sciences, 64*(1), 33-40.

World Health Organization. (2004). *Obesity: Preventing and Managing the Global Epidemic: Report of a WHO Consultations. WHO Technical Report Series* no. 894. Geneva: WHO; available at http://www.who.int/nutrition/publications/obesity/en/index.html. Accessed November 10, 2010.

TABLES

Table 1

Baseline Anthropometric Data: Descriptive Statistics

Group Weight Classification	Group BMI[1] Range	n	Mean Height (cm); SD[2]	Mean Weight (kg); SD[2]	Mean BMI; SD[2]	Median BMI	BMI IQR[3] 25th, 75th
Underweight	17.51-18.45	9	168.29; 6.77	51.42; 3.48	18.15; 0.32	18.26	17.90, 18.42
Normal	18.54-24.88	194	165.00; 6.55	59.17; 6.41	21.71; 1.66	21.71	20.40, 23.07
Overweight	25.03-31.11	65	163.58; 7.13	72.88; 8.26	27.16; 1.60	26.66	25.77, 28.3
All	17.51-31.11	268	164.77; 6.74	62.23; 9.21	22.91; 2.97	22.40	20.61, 24.84

[1]BMI=body mass index, (kg/m^2)
[2]SD=standard deviation
[3]IQR=interquartile range; 25th = 25th percentile; 75th = 75th percentile

Table 2

Outcome Expectations for Fruits and Vegetables: Descriptive Statistics

Item		Type[1]	n	Scale[2] (n; valid %)					Median	IQR[3] 25th, 75th
				1	2	3	4	5		
1	I would have more energy	P	268	1; 0.4	4; 1.5	33; 12.3	108; 40.3	122; 45.5	4.00	4.00, 5.00
2	I would be able to keep my weight where I want it	P	268	4; 1.5	7; 2.6	29; 10.8	101; 37.7	127; 47.4	4.00	4.00, 5.00
3	I would feel that I am being good to myself by eating healthy	P	268	1; 0.4	0; 0	8; 3.0	68; 25.4	191; 71.3	5.00	4.00, 5.00
4	Other people would think I am healthy	P	268	0; 0	4; 1.5	27; 10.1	94; 35.1	143; 53.4	5.00	4.00, 5.00
5	I would not enjoy eating	N	268	9; 3.4	33; 12.3	39; 14.6	103; 38.4	84; 31.3	4.00	3.00, 5.00
6	I would have an upset stomach	N	268	2; 0.7	9; 3.4	40; 14.9	90; 33.6	127; 47.4	4.00	4.00, 5.00
7	My food would cost too much	N	268	13; 4.9	56; 20.9	66; 24.6	80; 29.9	53; 19.8	3.00	2.00, 4.00
8	The people I eat with would not enjoy eating with me	N	268	7; 2.6	19; 7.1	35; 13.1	81; 30.2	126; 47.0	4.00	4.00, 5.00
9	I would be less likely to get cancer or heart disease	P	267	1; 0.4	7; 2.6	39; 14.6	103; 38.6	117; 43.8	4.00	4.00, 5.00
10	I would be a good example for my friends and family	P	268	2; 0.7	5; 1.9	14; 5.2	105; 39.2	142; 53.0	5.00	4.00, 5.00

[1] Item types: P=positive; N=negative

[2] For items 1-4 and 9-10: 1=strongly disagree, 2=disagree a little, 3=unsure/don't know, 4=agree a little, 5=strongly agree. For items 5-8: 1=strongly agree, 2=agree a little, 3=unsure/don't know, 4=disagree a little, 5=strongly disagree

[3] IQR=interquartile range; 25th = 25th percentile; 75th = 75th percentile

Table 3

Outcome Expectations for Low-Fat Foods: Descriptive Statistics

Item		Type[1]	n	Scale[2] (n; valid %)					Median	IQR[3] 25th, 75th
				1	2	3	4	5		
1	I would have more energy	P	267	1; 0.4	13; 4.9	44; 16.5	104; 39.0	105; 39.3	4.00	4.00, 5.00
2	I would be able to keep my weight where I want it	P	268	1; 0.4	10; 3.7	15; 5.6	98; 36.6	144; 53.7	5.00	4.00, 5.00
3	I would feel that I am being good to myself by eating healthy	P	267	3; 1.1	5; 1.9	10; 3.7	88; 33.0	161; 60.3	5.00	4.00, 5.00
4	Other people would think I am healthy	P	267	2; 0.7	13; 4.9	25; 9.4	103; 38.6	124; 46.4	4.00	4.00, 5.00
5	I would not enjoy eating	N	267	7; 2.6	50; 18.7	51; 19.0	96; 36.0	63; 23.6	4.00	3.00, 4.00
6	I would have an upset stomach	N	268	4; 1.5	14; 5.2	51; 19.0	101; 37.7	98; 36.6	4.00	3.00, 5.00
7	My food would cost too much	N	268	8; 3.0	63; 23.5	84; 31.3	68; 25.4	45; 16.8	3.00	3.00, 4.00
8	The people I eat with would not enjoy eating with me	N	268	5; 1.9	22; 8.2	38; 14.2	102; 38.1	101; 37.7	4.00	4.00, 5.00
9	I would be less likely to get cancer or heart disease	P	267	4; 1.5	6; 2.2	45; 16.9	104; 39.0	108; 40.4	4.00	4.00, 5.00
10	I would be a good example for my friends and family	P	267	2; 0.7	10; 3.7	18; 6.7	111; 41.6	126; 47.2	4.00	4.00, 5.00

[1] Item types: P=positive; N=negative

[2] For items 1-4 and 9-10: 1=strongly disagree, 2=disagree a little, 3=unsure/don't know, 4=agree a little, 5=strongly agree. For items 5-8: 1=strongly agree, 2=agree a little, 3=unsure/don't know, 4=disagree a little, 5=strongly disagree

[3] IQR=interquartile range; 25th = 25th percentile; 75th = 75th percentile

Table 4

Outcome Expectations for Calcium-Rich Foods: Descriptive Statistics

Item		Type[1]	n	Scale[2] (n; valid %)					Median	IQR[3] 25th, 75th
				1	2	3	4	5		
1	I would have more energy	P	268	4; 1.5	5; 1.9	37; 13.8	110; 41.0	112; 41.8	4.00	4.00, 5.00
2	I would be able to keep my weight where I want it	P	267	3; 1.1	12; 4.5	46; 17.2	114; 42.7	92; 34.5	4.00	4.00, 5.00
3	I would feel that I am being good to myself by eating healthy	P	268	2; 0.7	5; 1.9	16; 6.0	115; 42.9	130; 48.5	4.00	4.00, 5.00
4	Other people would think I am healthy	P	268	1; 0.4	17; 6.3	35; 13.1	112; 41.8	103; 38.4	4.00	4.00, 5.00
5	I would not enjoy eating	N	268	2; 0.7	26; 9.7	50; 18.7	113; 42.2	77; 28.7	4.00	3.00, 5.00
6	I would have an upset stomach	N	267	3; 1.1	12; 4.5	67; 25.1	95; 35.6	90; 33.7	4.00	3.00, 5.00
7	My food would cost too much	N	267	2; 0.7	48; 18.0	91; 34.1	77; 28.8	49; 18.4	3.00	3.00, 4.00
8	The people I eat with would not enjoy eating with me	N	268	2; 0.7	16; 6.0	45; 16.8	89; 33.2	116; 43.3	4.00	4.00, 5.00
9	I would be less likely to get cancer or heart disease	P	267	2; 0.7	2; 0.7	56; 21.0	123; 46.1	84; 31.5	4.00	4.00, 5.00
10	I would be a good example for my friends and family	P	268	0; 0	9; 3.4	26; 9.7	118; 44.0	115; 42.9	4.00	4.00, 5.00

[1] Item types: P=positive; N=negative

[2] For items 1-4 and 9-10: 1=strongly disagree, 2=disagree a little, 3=unsure/don't know, 4=agree a little, 5=strongly agree. For items 5-8: 1=strongly agree, 2=agree a little, 3=unsure/don't know, 4=disagree a little, 5=strongly disagree

[3] IQR=interquartile range; 25th = 25th percentile; 75th = 75th percentile

Table 5

Outcome Expectations for Fruits and Vegetables: Factor Loadings

Item	General Sample		Normal-weight		Overweight	
	Comp[1] 1	Comp 2	Comp 1	Comp 2	Comp 1	Comp 2
I would have more energy	.716		.711		.735	
I would be able to keep my weight where I want it	.747		.720		.774	
I would feel that I am being good to myself by eating healthy	.756		.776		.730	
Other people would think I am healthy	.672		.680		.666	
I would not enjoy eating		.716		.646		.798
I would have an upset stomach		.762		.770		.779
My food would cost too much		.676		.705		.542
The people I eat with would not enjoy eating with me		.588		.553		.548
I would be less likely to get cancer or heart disease	.647		.621		.676	
I would be a good example for my friends and family	.764		.724		.841	

[1]Comp=Component

Table 6

Outcome Expectations for Low-Fat Foods: Factor Loadings

Item	General Sample		Normal-weight		Overweight	
	Comp[1] 1	Comp 2	Comp 1	Comp 2	Comp 1	Comp 2
I would have more energy	.727		.701		.795	
I would be able to keep my weight where I want it	.822		.855		.826	
I would feel that I am being good to myself by eating healthy	.857		.877		.790	
Other people would think I am healthy	.793		.756		.873	
I would not enjoy eating		.682		.720		.556
I would have an upset stomach		.686		.671		.699
My food would cost too much		.738		.734		.675
The people I eat with would not enjoy eating with me		.672		.658		.722
I would be less likely to get cancer or heart disease	.638		.620		.691	
I would be a good example for my friends and family	.790		.790		.783	

[1]Comp=Component

Table 7

Outcome Expectations for Calcium-Rich Foods: Factor Loadings

Item	General Sample		Normal-weight		Overweight	
	Comp[1] 1	Comp 2	Comp 1	Comp 2	Comp 1	Comp 2
I would have more energy	.812		.803		.855	
I would be able to keep my weight where I want it	.841		.860		.818	
I would feel that I am being good to myself by eating healthy	.861		.863		.903	
Other people would think I am healthy	.834		.816		.890	
I would not enjoy eating		.725		.707		.708
I would have an upset stomach		.735		.765		.560
My food would cost too much		.738		.756		.735
The people I eat with would not enjoy eating with me		.596		.570		.605
I would be less likely to get cancer or heart disease	.754		.761		.739	
I would be a good example for my friends and family	.714		.677		.853	

[1]Comp=Component

Table 8

Outcome Expectations: Rotated Component Matrix of All Items

Item[1]	Component							
	1	2	3	4	5	6	7	8
FV1				.708				
FV2				.705				
FV3								.687
FV4								.750
FV5			.639					
FV6			.743					
FV7							.852	
FV8						.862		
FV9					.750			
FV10					.375			.547
LF1			.503	.461				
LF2			.739					
LF3			.816					
LF4			.653					

[1]FV=fruits & vegetables, LF=low-fat foods, CR=calcium-rich foods. 1=I would have more energy, 2=I would be able to keep my weight where I want it, 3=I would feel that I am being good to myself by eating healthy, 4=Other people would think I am healthy, 5=I would not enjoy eating, 6=I would have an upset stomach, 7=My food would cost too much, 8=The people I eat with would not enjoy eating with me, 9=I would be less likely to get cancer or heart disease, 10=I would be a good example for my friends and family.

Table 8 (cont.)

Item	Component							
	1	2	3	4	5	6	7	8
LF5		.643						
LF6		.607	.485					
LF7							.866	
LF8						.878		
LF9					.782			
CR5		.632						
CR6		.718						
CR7							.814	
CR8						.848		
CR9					.674			
CR10	.729							

[1]FV=fruits & vegetables, LF=low-fat foods, CR=calcium-rich foods. 1=I would have more energy, 2=I would be able to keep my weight where I want it, 3=I would feel that I am being good to myself by eating healthy, 4=Other people would think I am healthy, 5=I would not enjoy eating, 6=I would have an upset stomach, 7=My food would cost too much, 8=The people I eat with would not enjoy eating with me, 9=I would be less likely to get cancer or heart disease, 10=I would be a good example for my friends and family.

Table 9

Outcome Expectations: Internal Consistency and Composite Score Analyses

Grouping	Items[1]	n; Cronbach's α	Composite n	Composite Median[2]	IQR[3] 25th-75th
Positive items for fruits & vegetables	1, 2, 3, 4, 9, 10	267; 0.81	268	4.50	4.00, 4.83
Positive items for low-fat foods		264; 0.87		4.33	4.00, 4.83
Positive items for calcium-rich foods		266; 0.90		4.17	3.83, 4.83
Negative items for fruits & vegetables	5, 6, 7, 8	268; 0.63		4.00	3.50, 4.50
Negative items for low-fat foods		267; 0.67		3.75	3.25, 4.25
Negative items for calcium-rich foods		266; 0.67		3.88	3.50, 4.25

[1] Items: 1=I would have more energy; 2=I would be able to keep my weight where I want it; 3=I would feel that I am being good to myself by eating healthy; 4=Other people would think I am healthy; 5=I would not enjoy eating; 6=I would have an upset stomach; 7=My food would cost too much; 8=The people I eat with would not enjoy eating with me; 9=I would be less likely to get cancer or heart disease; 10=I would be a good example for my friends and family

[2]Composite median on a scale from 1-5, where 1 is least positive and 5 is most positive.

[3]IQR=interquartile range; 25th = 25th percentile; 75th = 75th percentile

Table 10

Self-Efficacy for Fruits: Descriptive Statistics

Item	Type[1]	n	Scale[2] (n; valid %)				Median	IQR[3] 25th, 75th
			1	2	3	4		
You don't feel like eating fruits	DS	268	48; 17.9	79; 29.5	66; 24.6	75; 28.0	3.00	2.00, 4.00
You don't like to eat fruits	DS	268	77; 28.7	80; 29.9	42; 15.7	69; 25.7	2.00	1.00, 4.00
You are tired of eating fruit	DS	268	68; 25.4	84; 31.3	58; 21.6	58; 21.6	2.00	1.00, 3.00
You don't have time to eat fruit	DS	268	72; 26.9	79; 29.5	55; 20.5	62; 23.1	2.00	1.00, 3.00
There is no fruit available	DS	268	106; 39.6	97; 36.2	40; 14.9	25; 9.3	2.00	1.00, 2.00
There is no fruit that you like	DS	268	92; 34.3	94; 35.1	40; 14.9	42; 15.7	2.00	1.00, 3.00
When you are NOT hungry	DS	268	58; 21.6	123; 45.9	56; 20.9	31; 11.6	2.00	2.00, 3.00
When you are REALLY hungry	DS	268	11; 4.1	57; 21.3	73; 27.2	127; 47.4	3.00	2.00, 4.00
When you are really busy with school	DS	267	16; 6.0	96; 36.0	87; 32.6	68; 25.5	3.00	2.00, 4.00
When it is a lot of work to peel/cut/prepare	DS	268	50; 18.7	130; 48.5	51; 19.0	37; 13.8	2.00	2.00, 3.00
Can you choose fruit instead of sweets?	MC	268	4; 1.5	68; 25.4	113; 42.2	83; 31.0	3.00	2.00, 4.00
Can you choose fruits instead of salty snacks?	MC	268	8; 3.0	70; 26.1	106; 39.6	84; 31.3	3.00	2.00, 4.00

[1] Item types: DS=difficult situation, MC=making choices. Prompt for difficult situation questions: Suppose you decided to eat FRUITS every day, or more fruits every day to meet the suggested amounts to be healthy. Would you succeed when...

[2] Scale for all items: 1=rarely/never, 2=sometimes, 3=often, 4=almost always

[3] IQR= interquartile range; 25th = 25th percentile; 75th = 75th percentile

Table 11

Self-Efficacy for Vegetables: Descriptive Statistics

Item	Type[1]	n	Scale[2] (n; valid %)				Median	IQR[3] 25th, 75th
			1	2	3	4		
You don't feel like eating vegetables	DS	268	50; 18.7	99; 36.9	69; 25.7	50; 18.7	2.00	2.00, 3.00
You don't like to eat vegetables	DS	268	65; 24.3	99; 36.9	56; 20.9	48; 17.9	2.00	2.00, 3.00
You are tired of eating vegetables	DS	268	59; 22.0	114; 42.5	54; 20.1	41; 15.3	2.00	2.00, 3.00
You don't have time to eat vegetables	DS	268	57; 21.3	109; 40.7	55; 20.5	47; 17.5	2.00	2.00, 3.00
There are no vegetables available	DS	268	124; 46.3	88; 32.8	35; 13.1	21; 7.8	2.00	1.00, 2.00
There are no vegetables that you like	DS	268	73; 27.2	117; 43.7	45; 16.8	33; 12.3	2.00	1.00, 3.00
When you are NOT hungry	DS	268	75; 28.0	118; 44.0	52; 19.4	23; 8.6	2.00	1.00, 3.00
When you are REALLY hungry	DS	268	15; 5.6	68; 25.4	88; 32.8	97; 36.2	3.00	2.00, 4.00
When you are really busy with school	DS	268	28; 10.4	123; 45.9	71; 26.5	46; 17.2	2.00	2.00, 3.00
When it is a lot of work to peel/cut/prepare	DS	267	59; 22.1	131; 49.1	51; 19.1	26; 9.7	2.00	2.00. 3.00
Can you choose vegetables instead of French fries?	MC	267	28; 10.5	82; 30.7	73; 27.3	84; 31.5	3.00	2.00, 4.00
Can you choose vegetables instead of salty snacks?	MC	268	19; 7.1	95; 35.4	95; 35.4	59; 22.0	3.00	2.00, 3.00

[1] Item types: DS=difficult situation, MC=making choices. Prompt for difficult situation questions: Suppose you decided to eat VEGETABLES every day, or more vegetables every day to meet the suggested amounts to be healthy. Would you succeed when...

[2] For all items: 1=rarely/never, 2=sometimes, 3=often, 4=almost always

[3] IQR=interquartile range; 25th = 25th percentile; 75th = 75th percentile

Table 12

Self-Efficacy for Lower-Fat Foods: Descriptive Statistics

Item	Type[1]	n	Scale[2] (n; valid %)				Median	IQR[3] 25th, 75th
			1	2	3	4		
You don't feel like eating lower-fat foods	DS	268	35; 13.1	104; 38.8	77; 28.7	52; 19.4	2.00	2.00, 3.00
You don't like to eat lower-fat foods	DS	268	47; 17.5	103; 38.4	70; 26.1	48; 17.9	2.00	2.00, 3.00
You are tired of eating lower-fat foods	DS	268	50; 18.7	111; 41.4	62; 23.1	45; 16.8	2.00	2.00, 3.00
You don't have time to eat lower-fat foods	DS	268	49; 18.3	112; 41.8	57; 21.3	50; 18.7	2.00	2.00, 3.00
There are no lower-fat foods available	DS	268	106; 39.6	96; 35.8	42; 15.7	24; 9.0	2.00	1.00, 2.00
There are no lower-fat foods that you like	DS	268	69; 25.7	112; 41.8	51; 19.0	36; 13.4	2.00	1.00, 3.00
When you are NOT hungry	DS	267	70; 26.2	118; 44.2	47; 17.6	32; 12.0	2.00	1.00, 3.00
When you are REALLY hungry	DS	268	14; 5.2	77; 28.7	84; 31.3	93; 34.7	3.00	2.00, 4.00
When you are really busy with school	DS	267	21; 7.9	133; 49.8	69; 25.8	44; 16.5	2.00	2.00, 3.00
When it is a lot of work to prepare	DS	267	53; 19.9	136; 50.9	48; 18.0	30; 11.2	2.00	2.00, 3.00

[1] Item types: DS=difficult situation, MC=making choices. Prompt for difficult situation questions: Suppose you decided to eat LOWER-FAT FOODS every day, or more lower-fat foods every day to meet the suggested amounts to be healthy. Would you succeed when...

[2] For all items: 1=rarely/never, 2=sometimes, 3=often, 4=almost always

[3] IQR=interquartile range; 25th = 25th percentile; 75th = 75th percentile

Table 12 (cont.)

Item	Type[1]	n	Scale[2] (n; valid %)				Median	IQR[3] 25th, 75th
			1	2	3	4		
Can you choose lower-fat milk instead of 2% or whole milk?	MC	268	33; 12.3	28; 10.4	41; 15.3	166; 61.9	4.00	3.00, 4.00
Can you choose lower-fat cheese (mozzarella from skim milk) instead of higher-fat cheeses (Cheddar)?	MC	268	13; 4.9	56; 20.9	63; 23.5	136; 50.7	4.00	2.00, 4.00
Can you choose lower-fat meats (whole meats, skinless poultry, fish) instead of higher- fat meats (hamburgers and dishes made with hamburger, hot dogs, brauts)?	MC	268	14; 5.2	62; 23.1	74; 27.6	118; 44.0	3.00	2.00, 4.00
Can you choose lower-fat breads (pretzels, toast) instead of higher-fat breads (chips, muffins, donuts)?	MC	268	7; 2.6	64; 23.9	78; 29.1	119; 44.4	3.00	2.00, 4.00

[1] Item types: DS=difficult situation, MC=making choices. Prompt for difficult situation questions: Suppose you decided to eat LOWER-FAT FOODS every day, or more lower-fat foods every day to meet the suggested amounts to be healthy. Would you succeed when...
[2] For all items: 1=rarely/never, 2=sometimes, 3=often, 4=almost always
[3] IQR=interquartile range; 25th = 25th percentile; 75th = 75th percentile

Table 13

Self-Efficacy for Higher-Calcium Foods: Descriptive Statistics

Item	Type[1]	n	Scale[2] (n; valid %)				Median	IQR[3] 25th, 75th
			1	2	3	4		
You don't feel like eating higher-calcium foods	DS	268	39; 14.6	101; 37.7	72; 26.9	56; 20.9	2.00	2.00, 3.00
You don't like to eat higher-calcium foods	DS	268	56; 20.9	104; 38.8	58; 21.6	50; 18.7	2.00	2.00, 3.00
You are tired of eating higher-calcium foods	DS	268	55; 20.5	112; 41.8	55; 20.5	46; 17.2	2.00	2.00, 3.00
You don't have time to eat higher-calcium foods	DS	268	56; 20.9	113; 42.2	54; 20.1	45; 16.8	2.00	2.00, 3.00
There are no higher-calcium foods available	DS	268	114; 42.5	90; 33.6	36; 13.4	28; 10.4	2.00	1.00, 2.00
There are no higher-calcium foods that you like	DS	268	74; 27.6	123; 45.9	41; 15.3	30; 11.2	2.00	1.00, 3.00
When you are NOT hungry	DS	268	80; 29.9	119; 44.4	43; 16.0	26; 9.7	2.00	1.00, 3.00
When you are REALLY hungry	DS	268	16; 6.0	67; 25.0	87; 32.5	98; 36.6	3.00	2.00, 4.00
When you are really busy with school	DS	268	22; 8.2	137; 51.1	61; 22.8	48; 17.9	2.00	2.00, 3.00
When it is a lot of work to prepare	DS	268	55; 20.5	135; 50.4	49; 18.3	29; 10.8	2.00	2.00, 3.00

[1] Item types: DS=difficult situation. Prompt for difficult situation questions: Suppose you decided to eat HIGHER-CALCIUM FOODS every day, or more higher-calcium foods every day to meet the suggested amounts to be healthy. Would you succeed when...

[2] For all items: 1=rarely/never, 2=sometimes, 3=often, 4=almost always

[3] IQR=interquartile range; 25th = 25th percentile; 75th = 75th percentile

Table 14

Self-Efficacy for Fruits: Initial Factor Loadings

Item	General Sample		Normal-weight		Overweight			
	Comp[1] 1	Comp 2	Comp 1	Comp 2	Comp 1	Comp 2	Comp 3	Comp 4
You don't feel like eating fruits	.878		.886		.742			
You don't like to eat fruits	.882		.877		.853			
You are tired of eating fruit	.864		.874		.890			
You don't have time to eat fruit	.838		.812		.872			
There is no fruit available	.551		.586					.688
There is no fruit that you like	.780		.786		.785			
When you are NOT hungry		.498	.389	.447				.888
When you are REALLY hungry	.390	.506		.585			.836	
When you are really busy with school		.666		.698		.515	.489	
When it is a lot of work to peel/cut/prepare		.619		.580		.735		
Can you choose fruit instead of sweets?		.847		.851		.722		
Can you choose fruits instead of salty snacks?		.741		.727		.852		

[1]Comp=Component

Table 15

Self-Efficacy for Vegetables: Initial Factor Loadings

Item	General Sample			Normal-weight		Overweight		
	Comp[1] 1	Comp 2	Comp 3	Comp 1	Comp 2	Comp 1	Comp 2	Comp 3
You don't feel like eating vegetables	.825			.853		.772		
You don't like to eat vegetables	.866			.847		.919		
You are tired of eating vegetables	.848			.870		.885		
You don't have time to eat vegetables	.746			.760		.712		
There are no vegetables available	.654			.637		.690		
There are no vegetables that you like	.802			.791		.879		
When you are NOT hungry	.438	.494		.546			.657	
When you are REALLY hungry		.780		.418	.389		.879	
When you are really busy with school		.818			.755		.816	
When it is a lot of work to peel/cut/prepare		.711			.691		.747	
Can you choose vegetables instead of French fries?			.881		.773			.911
Can you choose vegetables instead of salty snacks?			.866		.768			.912

[1]Comp=Component

Table 16

Self-Efficacy for Lower-Fat Foods: Initial Factor Loadings

Item[1]	General Sample		Normal-weight		Overweight			
	Comp[2] 1	Comp 2	Comp 1	Comp 2	Comp 1	Comp 2	Comp 3	Comp 4
You don't feel like eating LF foods	.824		.829		.899			
You don't like to eat LF foods	.816		.817		.881			
You are tired of eating LF foods	.841		.838		.760			
You don't have time to eat LF foods	.846		.860		.715			
There are no LF foods available	.738		.750			.720		
There are no LF foods that you like	.843		.862		.713			
When you are NOT hungry	.645		.666			.788		
When you are REALLY hungry	.489	.387	.464	.404	.749			
When you are really busy with school	.771		.768		.625	.537		
When it is a lot of work to peel/cut/prepare	.694		.671			.799		

[1]Item: LF=lower-fat
[2]Comp=Component

Table 16 (cont.)

Item[1]	General Sample		Normal-weight		Overweight			
	Comp[2] 1	Comp 2	Comp 1	Comp 2	Comp 1	Comp 2	Comp 3	Comp 4
Can you choose LF milk instead of 2% or whole milk?		.743		.755				.864
Can you choose LF cheese (mozzarella from skim milk) instead of higher fat cheeses (cheddar)?		.804		.806			.779	
Can you choose LF meats (whole meats, skinless poultry, fish) instead of higher fat meat (hamburgers and dishes made with hamburger, hot dogs, brats)?		.728		.708			.825	
Can you choose LF breads (pretzels, toast) instead of higher fat breads (chips, muffins, donuts)?		.649		.612			.820	

[1]Item: LF=lower-fat
[2]Comp=Component

Table 17

Self-Efficacy for Higher-Calcium Foods: Initial Factor Loadings

Item	General Sample		Normal-weight		Overweight	
	Comp[1] 1	Comp 2	Comp 1	Comp 2	Comp 1	Comp 2
You don't feel like eating higher-calcium foods	.866		.787		.913	
You don't like to eat higher-calcium foods	.910		.881		.911	
You are tired of eating higher -calcium foods	.883		.881		.846	
You don't have time to eat higher-calcium foods	.744		.744		.856	
There are no higher-calcium foods available	.520	.530	.738			.746
There are no higher-calcium foods that you like	.698		.808		.707	
When you are NOT hungry		.722	.477	.458		.848
When you are REALLY hungry		.543		.761	.504	.383
When you are really busy with school		.848		.863		.808
When it is a lot of work to peel/cut/prepare		.827		.752		.843

[1]Comp=Component

Table 18

Self-Efficacy for Fruits: Final Factor Structure

Item	General Sample		Normal-weight		Overweight		
	Comp[1] 1	Comp 2	Comp 1	Comp 2	Comp 1	Comp 2	Comp 3
You don't feel like eating fruits	.881		.887		.810		
You don't like to eat fruits	.885		.879		.889		
You are tired of eating fruit	.868		.877		.905		
You don't have time to eat fruit	.840		.815		.887		
There is no fruit available	.547		.592				.748
There is no fruit that you like	.781		.789		.722		
When you are NOT hungry		.518	*	*			.857
When you are REALLY hungry	*	*		.602	*	*	*
When you are really busy with school		.630		.702	*	*	*
When it is a lot of work to peel/cut/prepare		.619		.575		.744	
Can you choose fruit instead of sweets?		.846		.854		.763	
Can you choose fruits instead of salty snacks?		.765		.726		.807	

[1]Comp=Component
* denotes that item was removed

Table 19

Self-Efficacy for Vegetables: Final Factor Structure

Item	General Sample			Normal-weight		Overweight		
	Comp[1] 1	Comp 2	Comp 3	Comp 1	Comp 2	Comp 1	Comp 2	Comp 3
You don't feel like eating vegetables	.830			.853		.772		
You don't like to eat vegetables	.871			.847		.919		
You are tired of eating vegetables	.851			.873		.885		
You don't have time to eat vegetables	.752			.761		.712		
There are no vegetables available	.657			.642		.690		
There are no vegetables that you like	.807			.793		.879		
When you are NOT hungry	*	*	*	.550			.657	
When you are REALLY hungry		.812		*	*		.879	
When you are really busy with school		.811			.727		.816	
When it is a lot of work to peel/cut/prepare		.695			.687		.747	
Can you choose vegetables instead of French fries?			.875		.789			.911
Can you choose vegetables instead of salty snacks?			.865		.786			.912

[1]Comp=Component
* denotes that item was removed

Table 20

Self-Efficacy for Lower-Fat Foods: Final Factor Structure

Item[1]	General Sample		Normal-weight		Overweight		
	Comp[2] 1	Comp 2	Comp 1	Comp 2	Comp 1	Comp 2	Comp 3
You don't feel like eating LF foods	.824		.831		.894		
You don't like to eat LF foods	.818		.821		.866		
You are tired of eating LF foods	.845		.842		.729		
You don't have time to eat LF foods	.846		.861		.703		
There are no LF foods available	.744		.752			.769	
There are no LF foods that you like	.848		.868		.698		
When you are NOT hungry	.647		.667			.781	
When you are REALLY hungry	*	*	*	*	.772		
When you are really busy with school	.768		.768		*	*	*
When it is a lot of work to peel/cut/prepare	.698		.676			.785	
Can you choose LF milk instead of 2% or whole milk?		.747		.765	*	*	*
Can you choose LF cheese (mozzarella from skim milk) instead of higher fat cheeses (cheddar)?		.802		.798			.831
Can you choose LF meats (whole meats, skinless poultry, fish) instead of higher fat meat (hamburgers and dishes made with hamburger, hot dogs, brats)?		.737		.719			.828
Can you choose LF breads (pretzels, toast) instead of higher fat breads (chips, muffins, donuts)?		.662		.626			.813

[1]Item: LF=lower-fat
[2]Comp=Component
* denotes that item was removed

Table 21

Self-Efficacy for Higher-Calcium Foods: Final Factor Structure

Item	General Sample		Normal-weight		Overweight	
	Comp[1] 1	Comp 2	Comp 1	Comp 2	Comp 1	Comp 2
You don't feel like eating higher-calcium foods	.868		.780		.905	
You don't like to eat higher-calcium foods	.912		.879		.910	
You are tired of eating higher-calcium foods	.885		.880		.855	
You don't have time to eat higher-calcium foods	.747		.748		.858	
There are no higher-calcium foods available	*	*	.754			.753
There are no higher-calcium foods that you like	.705		.814		.712	
When you are NOT hungry		.701	*	*		.847
When you are REALLY hungry		.597		.799	*	*
When you are really busy with school		.860		.852		.808
When it is a lot of work to peel/cut/prepare		.817		.730		.848

[1]Comp=Component
* denotes that item was removed

Table 22

Self-Efficacy: Rotated Component Matrix of All Items

Item[1]	Component									
	1	2	3	4	5	6	7	8	9	10
F1	.827									
F2	.830									
F3	.808									
F4	.725									
F5									.693	
F6	.628									
F7								.784		
F8					.684					
F9				.400	.474					
F10				.739						
V1	.457						.621			
V2							.646			
V3							.608			
V4							.510			
V5									.764	
V6							.504			
V7								.736		
V8					.753					
V9				.573	.451					
V10				.811						
LF1			.661							
LF2			.640							
LF3			.674							

[1]Item: F=fruits, V=vegetables, LF=lower-fat foods, HC=higher-calcium foods, MC=making choices. For F, V, LF, and HC: 1=You don't feel like eating [category], 2=You don't like to eat [category], 3=You are tired of eating [category], 4=You don't have time to eat [category], 5=There are no [category] available, 6=There are no [category] that you like, 7=When you are NOT hungry, 8=When you are REALLY hungry, 9=When you are really busy with school, 10=When it is a lot of work to peel/cut/prepare. For MC: 1=Can you choose fruit instead of sweets, 2=Can you choose fruits instead of salty snacks, 3=Can you choose vegetables instead of salty snacks, 4=Can you choose vegetables instead of French fries, 5=Can you choose LF milk instead of 2% or whole milk, 6=Can you choose LF cheese (mozzarella from skim milk) instead of higher-fat cheeses (cheddar), 7=Can you choose LF meats (whole meats, skinless poultry, fish) instead of higher-fat meat (hamburgers and dishes made with hamburger, hot dogs, brats), 8=Can you choose LF breads (pretzels, toast) instead of higher-fat breads (chips, muffins, donuts).

Table 22 (cont.)

Item[1]	Component									
	1	2	3	4	5	6	7	8	9	10
LF4			.657							
LF5			.502						.492	
LF6			.631							
LF7								.686		
LF8					.689					
LF9			.597							
LF10				.683						
CR1	.454	.629								
CR2		.658								
CR3	.450	.642								
CR4		.692								
CR5		.580							.514	
CR6		.639								
CR7		.523						.667		
CR8					.688					
CR9		.590								
CR10		.622		.578						
MC1						.737				
MC2						.724				
MC3						.626				
MC4						.725				
MC5										.793
MC6										.745
MC7										.707
MC8						.421				.551

[1]Item: F=fruits, V=vegetables, LF=lower-fat foods, HC=higher-calcium foods, MC=making choices. For F, V, LF, and HC: 1=You don't feel like eating [category], 2=You don't like to eat [category], 3=You are tired of eating [category], 4=You don't have time to eat [category], 5=There are no [category] available, 6=There are no [category] that you like, 7=When you are NOT hungry, 8=When you are REALLY hungry, 9=When you are really busy with school, 10=When it is a lot of work to peel/cut/prepare. For MC: 1=Can you choose fruit instead of sweets, 2=Can you choose fruits instead of salty snacks, 3=Can you choose vegetables instead of salty snacks, 4=Can you choose vegetables instead of French fries, 5=Can you choose LF milk instead of 2% or whole milk, 6=Can you choose LF cheese (mozzarella from skim milk) instead of higher-fat cheeses (cheddar), 7=Can you choose LF meats (whole meats, skinless poultry, fish) instead of higher-fat meat (hamburgers and dishes made with hamburger, hot dogs, brats), 8=Can you choose LF breads (pretzels, toast) instead of higher-fat breads (chips, muffins, donuts).

Table 23

Self-Efficacy for Fruits: Consistent Factor Structure across Weight Categories

Item	General Sample		Normal-weight		Overweight	
	Comp[1] 1	Comp 2	Comp 1	Comp 2	Comp 1	Comp 2
You don't feel like eating fruits	.895		.910		.827	
You don't like to eat fruits	.894		.896		.873	
You are tired of eating fruit	.874		.881		.890	
You don't have time to eat fruit	.841		.812		.894	
There is no fruit available	*	*	*	*	*	*
There is no fruit that you like	.779		.772		.738	
When you are NOT hungry	*	*	*	*	*	*
When you are REALLY hungry	*	*	*	*	*	*
When you are really busy with school		.630		.657		.669
When it is a lot of work to peel/cut/prepare		.623		.585		.745
Can you choose fruit instead of sweets?		.861		.868		.780
Can you choose fruits instead of salty snacks?		.788		.776		.803

[1]Comp=Component

* denotes that item was removed

Table 24

Self-Efficacy for Vegetables: Consistent Factor Structure across Weight Categories

Item	General Sample		Normal-weight		Overweight	
	Comp[1] 1	Comp 2	Comp 1	Comp 2	Comp 1	Comp 2
You don't feel like eating vegetables	.866		.881		.817	
You don't like to eat vegetables	.891		.873		.935	
You are tired of eating vegetables	.866		.876		.885	
You don't have time to eat vegetables	.761		.753		.733	
There are no vegetables available	*	*	*	*	*	*
There are no vegetables that you like	.794		.764		.867	
When you are NOT hungry	*	*	*	*	*	*
When you are REALLY hungry	*	*	*	*	*	*
When you are really busy with school		.699		.737		.706
When it is a lot of work to peel/cut/prepare		.707		.698		.766
Can you choose vegetables instead of French Fries?		.826		.790		.870
Can you choose vegetables instead of salty snacks?		.829		.786		.880

[1]Comp=Component
* denotes that item was removed

Table 25

Self-Efficacy for Lower-Fat Foods: Consistent Factor Structure across Weight Categories

Item	General Sample		Normal-weight		Overweight	
	Comp[1] 1	Comp 2	Comp 1	Comp 2	Comp 1	Comp 2
You don't feel like eating lower-fat foods			.870		.839	
You don't like to eat lower-fat foods			.862		.849	
You are tired of eating lower-fat foods			.865		.875	
You don't have time to eat lower-fat foods			.868		.824	
There are no lower-fat foods available	*	*	*	*	*	*
There are no lower-fat foods that you like			.844		.820	
When you are NOT hungry	*	*	*	*	*	*
When you are REALLY hungry	*	*	*	*	*	*
When you are really busy with school			.777		.814	
When it is a lot of work to prepare			.673		.709	
Can you choose lower-fat milk instead of 2% or whole milk?	*	*	*	*	*	*
Can you choose lower-fat cheese (mozzarella from skim milk) instead of higher-fat cheeses (cheddar)?				.771		.842
Can you choose lower-fat meats (whole meats, skinless poultry, fish) instead of higher-fat meat (hamburgers and dishes made with hamburger, hot dogs, brats)?				.777		.848
Can you choose lower-fat breads (pretzels, toast) instead of higher-fat breads (chips, muffins, donuts)?				.743		.810

[1]Comp=Component
* denotes that item was removed

Table 26

Self-Efficacy for Higher-Calcium Foods: Consistent Factor Structure across Weight Categories

Item	General Sample		Normal-weight		Overweight	
	Comp[1] 1	Comp 2	Comp 1	Comp 2	Comp 1	Comp 2
You don't feel like eating higher-calcium foods	One component extracted: solution could not be rotated		One component extracted: solution could not be rotated		One component extracted: solution could not be rotated	
You don't like to eat higher-calcium foods						
You are tired of eating higher-calcium foods						
You don't have time to eat higher-calcium foods						
There are no higher-calcium foods available						
There are no higher-calcium foods that you like						
When you are NOT hungry						
When you are REALLY hungry						
When you are really busy with school						
When it is a lot of work to peel/cut/prepare						

[1]Comp=Component

Table 27

Self-Efficacy: Internal Consistency and Composite Score Analyses

Grouping[1]	Items[2]	n; Cronbach's α	Composite n	Composite Median[3]	IQR[4] 25th-75th
DSFruits	1-10	267; 0.90	268	2.30	1.90, 2.90
DSVegetables	1-10	267; 0.91		2.10	1.90, 2.70
DSLowerFat	1-10	265; 0.93		2.20	1.90, 2.80
DSHigherCalcium	1-10	268; 0.93		2.15	1.80, 2.70
Making choices	11-18	267; 0.82		3.00	2.63, 3.50
PCAFruits1: Low motivation	1-6	268; 0.92		2.17	1.50, 3.00
PCAFruits2: Physical/mental effort	7, 9-12	267; 0.77		2.60	2.20, 3.00
PCAVegetables1: Low motivation	1-6	268; 0.92		2.00	1.67, 2.79
PCAVegetables2: Physical effort	8-10	267; 0.79		2.33	2.00, 3.00
PCAVegetables3: Mental effort	13, 14	267; 0.86		3.00	2.00, 3.50
PCALowerFat1: Low motivation/physical effort	1-7, 9, 10	265; 0.93		2.11	1.78, 2.78
PCALowerFat2: Mental effort	15-18	268; 0.75		3.25	2.50, 3.94
PCAHigherCalcium1: Low motivation	1-4, 6	268; 0.94		2.10	1.80, 3.00
PCAHigherCalcium2: Physical effort	7-10	268; 0.81		2.25	2.00, 3.00

[1]Grouping: DS=difficult situations, PCA=principal components analysis
[2]Items: 1=You don't feel like eating [category]; 2=You don't like to eat [category]; 3=You are tired of eating [category]; 4=You don't have time to eat [category], 5=There is no [category] available, 6=There is no [category] that you like; 7=When you are NOT hungry; 8=When you are REALLY hungry; 9=When you are really busy with school; 10=When it is a lot of work to peel/cut/prepare; 11=Can you choose fruits instead of salty snacks; 12=Can you choose fruit instead of sweets; 13=Can you choose vegetables instead of salty snacks; 14=Can you choose vegetables instead of French fries; 15=Can you choose lower-fat milk instead of 2% or whole milk; 16=Can you choose lower-fat cheese (mozzarella from skim milk) instead of higher-fat cheeses (cheddar); 17=Can you choose lower-fat meats (whole meats, skinless poultry, fish) instead of higher-fat meats (hamburgers and dishes made with hamburger, hot dogs, brats); 18=Can you choose lower-fat breads (pretzels, toast) instead of higher-fat breads (chips, muffins, donuts)
[3] Composite median on a scale from 1-4, where 1=rarely/never, 2=sometimes, 3=often, 4=almost always.
[4] IQR=interquartile range; 25th = 25th percentile; 75th = 75th percentile

Table 28

Weight Efficacy Lifestyle Questionnaire: Descriptive Statistics

Item[1]	n	Scale (n; valid %); 1= Not confident, 10 = Very confident										Median	IQR[2] 25th-75th
		1	2	3	4	5	6	7	8	9	10		
1 (NE)	268	8; 3.0	4; 1.5	15; 5.6	24; 9.0	37; 13.8	33; 12.3	27; 10.1	44; 16.4	29; 10.8	47; 17.5	7.00	5.00, 9.00
2 (A)	268	4; 1.5	4; 1.5	16; 6.0	21; 7.8	29; 10.8	49; 18.3	49; 18.3	43; 16.0	24; 9.0	29; 10.8	7.00	5.00, 8.00
3 (SP)	268	2; 0.7	5; 1.9	12; 4.5	19; 7.1	27; 10.1	36; 13.4	41; 15.3	43; 16.0	35; 13.1	48; 17.9	7.00	6.00, 9.00
4 (PD)	268	4; 1.5	6; 2.2	15; 5.6	19; 7.1	41; 15.3	54; 20.1	27; 10.1	41; 15.3	29; 10.8	32; 11.9	6.00	5.00, 8.00
5 (PA)	267	2; 0.7	5; 1.9	9; 3.4	20; 7.5	43; 16.1	31; 11.6	39; 14.6	33; 12.4	33; 12.4	52; 19.5	7.00	5.00, 9.00
6 (NE)	268	4; 1.5	11; 4.1	29; 10.8	40; 14.9	32; 11.9	36; 13.4	32; 11.9	32; 11.9	19; 7.1	33; 12.3	6.00	4.00, 8.00
7 (A)	268	8; 3.0	10; 3.7	35; 13.1	44; 16.4	43; 16.0	34; 12.7	37; 13.8	26; 9.7	14; 5.2	17; 6.3	5.00	4.00, 7.00
8 (SP)	268	5; 1.9	4; 1.5	19; 7.1	34; 12.7	31; 11.6	29; 10.8	30; 11.2	27; 10.1	41; 15.3	48; 17.9	7.00	5.00, 9.00
9 (PD)	267	5; 1.9	3; 1.1	6; 2.2	15; 5.6	12; 4.5	23; 8.6	42; 15.7	47; 17.6	42; 15.7	72; 27.0	8.00	7.00, 10.00
10 (PA)	268	2; 0.7	0; 0	2; 0.7	3; 1.1	9; 3.4	21; 7.8	38; 14.2	47; 17.5	45; 16.8	101; 37.7	9.00	7.00, 10.00

[1]Prompt for all items except for 2: I can resist eating when... 1=I am anxious (nervous), 2=I can control my eating on the weekends, 3=I have to say "no" to others, 4=I feel physically run down, 5=I am watching TV, 6=I am depressed (or down), 7=there are many different kinds of food available, 8=I feel it's impolite to refuse a second helping, 9=I have a headache, 10=I am reading, 11=I am angry (or irritable), 12=I am at a party, 13=others are pressuring me to eat, 14=I am in pain, 15=just before going to bed, 16=I have experienced failure, 17=high-calorie foods are available, 18=I think others will be upset if I don't eat, 19=I feel uncomfortable, 20=I am happy. NE=negative emotions, A=availability, SP=social pressure, PD=physical discomfort, PA=positive activities

[2]IQR=interquartile range; 25th = 25th percentile; 75th = 75th percentile

Table 28 (cont.)

Item[1]	n	Scale (n; valid %); 1= Not confident, 10 = Very confident										Median	IQR[2] 25th-75th
		1	2	3	4	5	6	7	8	9	10		
11 (NE)	268	2; 0.7	3; 1.1	6; 2.2	19; 7.1	17; 6.3	26; 9.7	36; 13.4	39; 14.6	46; 17.2	74; 27.6	8.00	6.00, 10.00
12 (A)	268	3; 1.1	9; 3.4	19; 7.1	35; 13.1	30; 11.2	39; 14.6	40; 14.9	25; 9.3	30; 11.2	38; 14.2	6.00	5.00, 9.00
13 (SP)	268	4; 1.5	8; 3.0	20; 7.5	32; 11.9	37; 13.8	42; 15.7	32; 11.9	35; 13.1	28; 10.4	30; 11.2	6.00	5.00, 8.00
14 (PD)	268	0; 0	1; 0.4	7; 2.6	16; 6.0	16; 6.0	22; 8.2	35; 13.1	45; 16.8	37; 13.8	89; 33.2	8.00	7.00, 10.00
15 (PA)	268	3; 1.1	2; 0.7	12; 4.5	19; 7.1	24; 9.0	25; 9.3	33; 12.3	44; 16.4	38; 14.2	68; 25.4	8.00	6.00, 10.00
16 (NE)	268	3; 1.1	9; 3.4	13; 4.9	25; 9.3	39; 14.6	38; 14.2	31; 11.6	39; 14.6	24; 9.0	47; 17.5	7.00	5.00, 9.00
17 (A)	268	3; 1.1	4; 1.5	8; 3.0	16; 6.0	36; 13.4	40; 14.9	39; 14.6	46; 17.2	30; 11.2	46; 17.2	7.00	5.25, 9.00
18 (SP)	268	2; 0.7	6; 2.2	14; 5.2	37; 13.8	27; 10.1	30; 11.2	42; 15.7	41; 15.3	29; 10.8	40; 14.9	7.00	5.00, 9.00
19 (PD)	268	1; 0.4	4; 1.5	3; 1.1	23; 8.6	17; 6.3	33; 12.3	42; 15.7	35; 13.1	46; 17.2	64; 23.9	8.00	6.00, 9.00
20 (PA)	268	3; 1.1	0; 0	2; 0.7	9; 3.4	14; 5.2	34; 12.7	35; 13.1	45; 16.8	47; 17.5	79; 29.5	8.00	7.00, 10.00

[1]Prompt for all items except for 2: I can resist eating when... 1=I am anxious (nervous), 2=I can control my eating on the weekends, 3=I have to say "no" to others, 4=I feel physically run down, 5=I am watching TV, 6=I am depressed (or down), 7=there are many different kinds of food available, 8=I feel it's impolite to refuse a second helping, 9=I have a headache, 10=I am reading, 11=I am angry (or irritable), 12=I am at a party, 13=others are pressuring me to eat, 14=I am in pain, 15=just before going to bed, 16=I have experienced failure, 17=high-calorie foods are available, 18=I think others will be upset if I don't eat, 19=I feel uncomfortable, 20=I am happy. NE=negative emotions, A=availability, SP=social pressure, PD=physical discomfort, PA=positive activities

[2]IQR=interquartile range; 25th = 25th percentile; 75th = 75th percentile

Table 29

Weight Efficacy Lifestyle Questionnaire: Initial Factor Loadings

	General Sample				Normal-weight				Overweight			
Comp[2] → Item ↓	1	2	3	4	1	2	3	4	1	2	3	4
1	.729				.687					.711		
2	.518	.351	.398		.617						.700	
3	.488	.551			.559	.557				.688		
4	.745				.752					.808		
5			.655		.398		.658		.507		.575	
6	.718				.723				.696			
7			.628			.446	.541		.715			
8		.653				.642					.577	
9				.755				.703				.805
10				.669			.469	.593			.551	.665
11	.603			.477	.500			.579		.595		.432
12	.423	.596				.646			.633			
13		.784				.796			.388	.387	.538	
14	.508			.600				.661				.686
15			.659				.686		.684			
16	.761				.713				.721			
17			.653				.628		.811			
18		.819				.823					.678	
19	.582				.485			.478	.430	.605		
20		414	.590	.412			.675				.659	

[1]Item: Prompt for all items except for 2: I can resist eating when... 1=I am anxious (nervous), 2=I can control my eating on the weekends, 3=I have to say "no" to others, 4=I feel physically run down, 5=I am watching TV, 6=I am depressed (or down), 7=there are many different kinds of food available, 8=I feel it's impolite to refuse a second helping, 9=I have a headache, 10=I am reading, 11=I am angry (or irritable), 12=I am at a party, 13=others are pressuring me to eat, 14=I am in pain, 15=just before going to bed, 16=I have experienced failure, 17=high-calorie foods are available, 18=I think others will be upset if I don't eat, 19=I feel uncomfortable, 20=I am happy.
[2]Comp=Component

Table 30

Weight Efficacy Lifestyle Questionnaire: Final Factor Structure

	General Sample		Normal-weight			Overweight	
Component →	1	2	1	2	3	1	2
Item[1] ↓							
... I am anxious (nervous)	.729		.768			.716	
I can control my eating on the weekends	*	*	*	*	*	*	*
... I have to say "no" to others	*	*	*	*	*	*	*
... I feel physically run down	.736		.722			.713	
... I am watching TV	.603				.657	*	*
... I am depressed (or down)	.817		.745			.815	
... there are many different kinds of food available		.606	*	*	*	*	*
... I feel it's impolite to refuse a second helping		.804		.686			.789
... I have a headache	*	*	*	*	*	*	*
... I am reading	*	*	*	*	*	*	*
... I am angry (or irritable)	.718		.721			.662	
... I am at a party	*	*		.709		.730	
... others are pressuring me to eat		.732		.783		*	*
... I am in pain	*	*	.626			*	*
... just before going to bed	.648				.730	.695	
... I have experienced failure	.853		.791			.838	
... high-calorie foods are available	*	*			.672	.701	
... I think others will be upset if I don't eat		.859		.828			.813
... I feel uncomfortable	.677		*	*	*	*	*
... I am happy	*	*			.684		.678

[1]Item: Prompt for all items except for 2: I can resist eating when...
* denotes that item was removed

Table 31

Weight Efficacy Lifestyle Questionnaire: Consistent Factor Structure across Weight Categories

	General Sample		Normal-weight		Overweight	
Component →	1	2	1	2	1	2
Item[1] ↓						
... I am anxious (nervous)	.766		.760		.752	
I can control my eating on the weekends	*	*	*	*	*	*
... I have to say "no" to others	*	*	*	*	*	*
... I feel physically run down	.778		.766		.822	
... I am watching TV	*	*	*	*	*	*
... I am depressed (or down)	.842		.852		.741	
... there are many different kinds of food available	*	*	*	*	*	*
... I feel it's impolite to refuse a second helping		.805		.766		.860
... I have a headache	*	*	*	*	*	*
... I am reading	*	*	*	*	*	*
... I am angry (or irritable)	*	*	*	*	*	*
... I am at a party	*	*	*	*	*	*
... others are pressuring me to eat		.753		.785		.628
... I am in pain	*	*	*	*	*	*
... just before going to bed	*	*	*	*	*	*
... I have experienced failure	.857		.860		.793	
... high-calorie foods are available	*	*	*	*	*	*
... I think others will be upset if I don't eat		.883		.877		.880
... I feel uncomfortable	*	*	*	*	*	*
... I am happy	*	*	*	*	*	*

[1]Item: Prompt for all items except for 2: I can resist eating when...
* denotes that item was removed

Table 32

Weight Efficacy Lifestyle Questionnaire: Internal Consistency and Composite Score Analyses

Grouping	Items[1]	n; Cronbach's α	Composite n	Composite Median[2]	IQR[3] 25th, 75th
Negative Emotions	1, 6, 11, 16	268; 0.86	268	6.75	5.50, 8.25
Availability	2, 7, 12, 17	268; 0.78		6.38	5.25, 7.50
Social Pressure	3, 8, 13, 18	268; 0.82		6.75	5.25, 8.25
Physical Discomfort	4, 9, 14, 19	267; 0.76		7.50	6.25, 8.75
Positive Activities	5, 10, 15, 20	267; 0.77		7.75	6.75, 9.00
All items	1-20	266; 0.94		6.90	5.91, 8.10
PCAWELQ1: Trigger Situations	1, 4-6, 11, 15, 16, 19	267; 0.90		7.00	5.75, 8.50
PCAWELQ2: Social Situations	7, 8, 13, 18	268; 0.82		6.25	5.00, 7.69

[1]Items: Prompt for all items except for 2: I can resist eating when... 1=I am anxious (nervous), 2=I can control my eating on the weekends, 3=I have to say "no" to others, 4=I feel physically run down, 5=I am watching TV, 6=I am depressed (or down), 7=there are many different kinds of food available, 8=I feel it's impolite to refuse a second helping, 9=I have a headache, 10=I am reading, 11=I am angry (or irritable), 12=I am at a party, 13=others are pressuring me to eat, 14=I am in pain, 15=just before going to bed, 16=I have experienced failure, 17=high-calorie foods are available, 18=I think others will be upset if I don't eat, 19=I feel uncomfortable, 20=I am happy.

[2]Composite median on a scale from 1 to 10, where 1 is least positive and 10 is most positive.

[3] IQR=interquartile range; 25th = 25th percentile; 75th = 75th percentile

Table 33

Project EAT: Descriptive Statistics

Item		Type[1]	n	Scale[2] (n; valid %)				Median	IQR[3] 25th, 75th
				1	2	3	4		
9a	I like the taste of potato chips and other salty snack foods.	PTB	268	73; 27.2	148; 55.2	35; 13.1	12; 4.5	2.00	1.00; 2.00
9b	Milk tastes good to me.	PTB	268	29; 10.8	40; 14.9	92; 34.3	107; 39.9	3.00	2.00. 4.00
9c	Most unhealthy foods taste better than healthy foods.	PTB	268	25; 9.3	102; 38.1	113; 42.2	28; 10.4	3.00	2.00, 3.00
9d	I think a lot about being thinner.	WC	268	84; 31.3	108; 40.3	55; 20.5	21; 7.8	2.00	1.00, 3.00
9e	I am too busy to eat healthy foods.	PTC	267	7; 2.6	33; 12.4	144; 53.9	83; 31.1	3.00	3.00, 4.00
9f	I like the taste of most fruits.	PTB	268	1; 0.4	13; 4.9	79; 29.5	175; 65.3	4.00	3.00, 4.00
9g	I am worried about gaining weight.	WC	268	113; 42.2	122; 45.5	24; 9.0	9; 3.4	2.00	1.00, 2.00
9h	I am too rushed in the morning to eat a healthy breakfast.	PTC	268	20; 7.5	78; 29.1	109; 40.7	61; 22.8	3.00	2.00, 3.00

[1] Item types: PTB=perceived taste barriers to healthy eating, WC=weight concerns, PTC=perceived time constraints as a barrier to healthy eating

[2] For items 9b, 9f, and 9j: 1=strongly disagree, 2=disagree a little, 3=agree a little, 4=strongly agree. For 11a-12f: 1= not at all confident, 6=very confident. For all other items: 1=strongly agree, 2=agree a little, 3=disagree a little, 4=strongly disagree.

[3] IQR=interquartile range; 25th = 25th percentile; 75th = 75th percentile

Table 33 (cont.)

Item		Type[1]	n	Scale[2] (n; valid %)				Median	IQR[3] 25th, 75th
				1	2	3	4		
9i	I don't have time to think about eating healthy.	PTC	267	6; 2.2	28; 10.5	150; 56.2	83; 31.1	3.00	3.00, 4.00
9j	I like the taste of dark bread .	PTB	268	11; 4.1	24; 9.0	124; 46.3	109; 40.7	3.00	3.00, 4.00
9k	I like the taste of fast foods .	PTB	268	38; 14.2	125; 46.6	62; 23.1	43; 16.0	2.00	2.00, 3.00
10a	People my age don't need to be concerned about their eating habits.	HEC	268	3; 1.1	11; 4.1	97; 36.2	157; 58.6	4.00	3.00, 4.00
10b	At this point in my life, I am not very concerned about my health.	HEC	268	2; 0.7	22; 8.2	116; 43.3	128; 47.8	3.00	3.00, 4.00
10c	People my age don't need to worry about their health.	HEC	268	0; 0	4; 1.5	104; 38.8	160; 59.7	4.00	3.00, 4.00
10d	Eating healthy meals just takes too much time.	PTC	268	1; 0.4	28; 10.4	125; 46.6	114; 42.5	3.00	3.00, 4.00
10e	Most vegetables taste bad.	PTC	268	3; 1.1	36; 13.4	100; 37.3	129; 48.1	3.00	3.00, 4.00
10f	I sometimes skip meals since I am concerned about my weight.	WC	268	8; 3.0	40; 14.9	108; 40.3	112; 41.8	3.00	3.00, 4.00
10g	Most healthy foods just don't taste that great.	PTB	267	4; 1.5	32; 12.0	116; 43.4	115; 43.1	3.00	3.00, 4.00
10h	I weigh myself often.	WC	268	19; 7.1	72; 26.9	114; 42.5	63; 23.5	3.00	2.00, 3.00
10i	Foods from fast food restaurants are generally unhealthy.	HEC	268	13; 4.9	5; 1.9	102; 38.1	148; 55.2	4.00	3.00, 4.00

[1] Item types: PTB=perceived taste barriers to healthy eating, WC=weight concerns, PTC=perceived time constraints as a barrier to healthy eating

[2] For items 9b, 9f, and 9j: 1=strongly disagree, 2=disagree a little, 3=agree a little, 4=strongly agree. For 11a-12f: 1= not at all confident, 6=very confident. For all other items: 1=strongly agree, 2=agree a little, 3=disagree a little, 4=strongly disagree.

[3] IQR=interquartile range; 25th = 25th percentile; 75th = 75th percentile

Table 33 (cont.)

Item		Type[1]	n	Scale[2] (n; valid %)						Median	IQR[3] 25th, 75th
				1	2	3	4	5	6		
11a	If you wanted to, how sure are you that you could eat healthy foods when you are stressed out?	HF	267	14; 5.2	34; 12.7	51; 19.1	60; 22.5	59; 22.1	49; 18.4	4.00	3.00, 5.00
11b	If you wanted to, how sure are you that you could eat healthy foods when you are feeling down?	HF	267	19; 7.1	38; 14.2	61; 22.8	57; 21.3	47; 17.6	45; 16.9	4.00	3.00, 5.00
11c	If you wanted to, how sure are you that you could eat healthy foods when you are bored?	HF	267	14; 5.2	32; 12.0	60; 22.5	47; 17.6	63; 23.6	51; 19.1	4.00	3.00, 5.00
12a	How confident are you that you could change or maintain your eating patterns so that you could eat at least two servings per day of fruit?	CEP	268	1; 0.4	5; 1.9	18; 6.7	43; 16.0	62; 23.1	139; 51.9	6.00	4.25, 6.00
12b	How confident are you that you could change or maintain your eating patterns so that you could eat at least three servings per day of vegetables?	CEP	268	2; 0.7	14; 5.2	30; 11.2	48; 17.9	63; 23.5	111; 41.4	5.00	4.00, 6.00

[1] Item types: HF=self-efficacy for eating healthy foods, CEP=self-efficacy for changing/maintaining eating patterns

[2] For items 9b, 9f, and 9j: 1=strongly disagree, 2=disagree a little, 3=agree a little, 4=strongly agree. For 11a-12f: 1= not at all confident, 6=very confident. For all other items: 1=strongly agree, 2=agree a little, 3=disagree a little, 4=strongly disagree.

[3] IQR=interquartile range; 25th = 25th percentile; 75th = 75th percentile

Table 33 (cont.)

Item		Type[1]	n	Scale[2] (n; valid %)						Median	IQR[3] 25th, 75th
				1	2	3	4	5	6		
12c	How confident are you that you could change or maintain your eating patterns so that you could eat at least three servings per day of dairy foods?	CEP	268	3; 1.1	3; 1.1	24; 9.0	50; 18.7	57; 21.3	131; 48.9	5.00	4.00, 6.00
12d	How confident are you that you could change or maintain your eating patterns so that you could eat at least three servings per day of whole grains?	CEP	268	1; 0.4	8; 3.0	13; 4.9	47; 17.5	64; 23.9	135; 50.4	6.00	4.00, 6.00
12e	How confident are you that you could change or maintain your eating patterns so that you could limit soda pop to one can per day or less?	CEP	268	4; 1.5	7; 2.6	10; 3.7	17; 6.3	31; 11.6	199; 74.3	6.00	5.00, 6.00
12f	How confident are you that you could change or maintain your eating patterns so that you could limit eating at fast food restaurants to once per week or less?	CEP	267	1; 0.4	4; 1.5	7; 2.6	24; 9.0	42; 15.7	189; 70.8	6.00	5.00, 6.00

[1] Item types: HF=self-efficacy for eating healthy foods, CEP=self-efficacy for changing/maintaining eating patterns

[2] For items 9b, 9f, and 9j: 1=strongly disagree, 2=disagree a little, 3=agree a little, 4=strongly agree. For 11a-12f: 1= not at all confident, 6=very confident. For all other items: 1=strongly agree, 2=agree a little, 3=disagree a little, 4=strongly disagree.

[3] IQR=interquartile range; 25th = 25th percentile; 75th = 75th percentile

Table 34

Project EAT: Initial Factor Loadings for General Sample

Item	Component								
	1	2	3	4	5	6	7	8	9
I like the taste of potato chips and other salty snack foods.						.751			
Milk tastes good to me.							.788		
Most unhealthy foods taste better than healthy foods.	.404	.439				.484			
I think a lot about being thinner.					.805				
I am too busy to eat healthy foods.	.776								
I like the taste of most fruits.		.494							
I am worried about gaining weight.					.794				
I am too rushed in the morning to eat a healthy breakfast.	.606								
I don't have time to think about eating healthy.	.672								
I like the taste of dark bread (e.g., whole wheat).		.644							
I like the taste of fast foods (e.g., McDonald's).						.756			
People my age don't need to be concerned about their eating habits.				.824					
At this point in my life, I am not very concerned about my health.				.725					
People my age don't need to worry about their health.				.837					
Eating healthy meals just takes too much time.	.699								
Most vegetables taste bad.	.671								
I sometimes skip meals since I am concerned about my weight.					.661				
Most healthy foods just don't taste that great.	.693								
I weigh myself often.					.651				
Foods from fast food restaurants are generally unhealthy.									.523

Table 34 (cont.)

Item	Component								
	1	2	3	4	5	6	7	8	9
If you wanted to, how sure are you that you could eat healthy foods when you are… stressed out?			.791						
… feeling down?			.779						
… bored?			.793						
How confident are you that you could change or maintain your eating habits so that you could… eat at least two servings per day of fruit?		.728							
… eat at least three servings per day of vegetables?		.713							
… eat at least three servings per day of dairy foods (e.g., milk, cheese, yogurt)?								.797	
… eat at least three servings per day of whole grains (e.g., dark bread, cereals like Cheerios)?		.578							
… limit soda pop to one can per day or less?									.721
… limit eating at fast food restaurants to once per week or less?									.651

Table 35

Project EAT: Final Factor Loadings for General Sample

Item	Component							
	1	2	3	4	5	6	7	8
I like the taste of potato chips and other salty snack foods.								.776
Milk tastes good to me.						.795		
Most unhealthy foods taste better than healthy foods.	*	*	*	*	*	*	*	*
I think a lot about being thinner.					.813			
I am too busy to eat healthy foods.	.771							
I like the taste of most fruits.			.478					
I am worried about gaining weight.					.802			
I am too rushed in the morning to eat a healthy breakfast.	.610							
I don't have time to think about eating healthy.	.667							
I like the taste of dark bread (e.g., whole wheat).			.654					
I like the taste of fast foods (e.g., McDonald's).								.743
People my age don't need to be concerned about their eating habits.				.826				
At this point in my life, I am not very concerned about my health.				.722				
People my age don't need to worry about their health.				.836				
Eating healthy meals just takes too much time.	.699							
Most vegetables taste bad.	.682							

* denotes that item was removed

Table 35 (cont.)

Item	Component							
	1	2	3	4	5	6	7	8
I sometimes skip meals since I am concerned about my weight.					.657			
Most healthy foods just don't taste that great.	.709							
I weigh myself often.					.637			
Foods from fast food restaurants are generally unhealthy.							.477	
If you wanted to, how sure are you that you could eat healthy foods when you are… stressed out?		.795						
… feeling down?		.787						
… bored?		.794						
How confident are you that you could change or maintain your eating habits so that you could… eat at least two servings per day of fruit?			.744					
… eat at least three servings per day of vegetables?			.716					
… eat at least three servings per day of dairy foods (e.g., milk, cheese, yogurt)?						.792		
… eat at least three servings per day of whole grains (e.g., dark bread, cereals like Cheerios)?			.586					
… limit soda pop to one can per day or less?							.745	
… limit eating at fast food restaurants to once per week or less?							.661	

Table 36

Project EAT: Initial Factor Loadings for Normal-Weight Subjects

Item	Component								
	1	2	3	4	5	6	7	8	9
I like the taste of potato chips and other salty snack foods.						.739			
Milk tastes good to me.								.863	
Most unhealthy foods taste better than healthy foods.	.413	.449				.445			
I think a lot about being thinner.					.812				
I am too busy to eat healthy foods.	.800								
I like the taste of most fruits.							.645		
I am worried about gaining weight.					.828				
I am too rushed in the morning to eat a healthy breakfast.	.645								
I don't have time to think about eating healthy.	.657								
I like the taste of dark bread (e.g., whole wheat).		.632							
I like the taste of fast foods (e.g., McDonald's).						.777			
People my age don't need to be concerned about their eating habits.				.804					
At this point in my life, I am not very concerned about my health.				.746					
People my age don't need to worry about their health.				.835					
Eating healthy meals just takes too much time.	.737								

Table 36 (cont.)

Item	Component								
	1	2	3	4	5	6	7	8	9
Most vegetables taste bad.	.703								
I sometimes skip meals since I am concerned about my weight.					.585				
Most healthy foods just don't taste that great.	.682								
I weigh myself often.					.605				
Foods from fast food restaurants are generally unhealthy.									.869
If you wanted to, how sure are you that you could eat healthy foods when you are… stressed out?			.806						
… feeling down?			.789						
… bored?			.811						
How confident are you that you could change or maintain your eating habits so that you could… eat at least two servings per day of fruit?		.754							
… eat at least three servings per day of vegetables?		.770							
… eat at least three servings per day of dairy foods (e.g., milk, cheese, yogurt)?								.796	
… eat at least three servings per day of whole grains (e.g., dark bread, cereals like Cheerios)?		.565							
… limit soda pop to one can per day or less?							.549		.484
… limit eating at fast food restaurants to once per week or less?							.615		

Table 37

Project EAT: Final Factor Loadings for Normal-Weight Subjects

Item	Component								
	1	2	3	4	5	6	7	8	9
I like the taste of potato chips and other salty snack foods.								.764	
Milk tastes good to me.						.868			
Most unhealthy foods taste better than healthy foods.	*	*	*	*	*	*	*	*	*
I think a lot about being thinner.					.813				
I am too busy to eat healthy foods.	.801								
I like the taste of most fruits.							.757		
I am worried about gaining weight.					.835				
I am too rushed in the morning to eat a healthy breakfast.	.650								
I don't have time to think about eating healthy.	.659								
I like the taste of dark bread (e.g., whole wheat).			.642						
I like the taste of fast foods (e.g., McDonald's).								.767	
People my age don't need to be concerned about their eating habits.				.798					
At this point in my life, I am not very concerned about my health.				.753					
People my age don't need to worry about their health.				.836					
Eating healthy meals just takes too much time.	.736								

* denotes that item was removed

Table 37 (cont.)

Item	Component								
	1	2	3	4	5	6	7	8	9
Most vegetables taste bad.	.704								
I sometimes skip meals since I am concerned about my weight.					.582				
Most healthy foods just don't taste that great.	.686								
I weigh myself often.					.606				
Foods from fast food restaurants are generally unhealthy.									.929
If you wanted to, how sure are you that you could eat healthy foods when you are… stressed out?		.831							
… feeling down?		.814							
… bored?		.801							
How confident are you that you could change or maintain your eating habits so that you could… eat at least two servings per day of fruit?				.742					
… eat at least three servings per day of vegetables?				.757					
… eat at least three servings per day of dairy foods (e.g., milk, cheese, yogurt)?						.804			
… eat at least three servings per day of whole grains (e.g., dark bread, cereals like Cheerios)?				.564					
… limit soda pop to one can per day or less?	*	*	*	*	*	*	*	*	*
… limit eating at fast food restaurants to once per week or less?							.569		

* denotes that item was removed

Table 38

Project EAT: Initial Factor Loadings for Overweight Subjects

Item	Component							
	1	2	3	4	5	6	7	8
I like the taste of potato chips and other salty snack foods.							.552	-.493
Milk tastes good to me.				.511		.382	-.349	
Most unhealthy foods taste better than healthy foods.	.463				.374			-.454
I think a lot about being thinner.			.837					
I am too busy to eat healthy foods.						695		
I like the taste of most fruits.					.562			
I am worried about gaining weight.			.816			.		
I am too rushed in the morning to eat a healthy breakfast.					.458	.581		
I don't have time to think about eating healthy.						.746		
I like the taste of dark bread (e.g., whole wheat).					.752			
I like the taste of fast foods (e.g., McDonald's).							.689	
People my age don't need to be concerned about their eating habits.		.771						
At this point in my life, I am not very concerned about my health.		.690						
People my age don't need to worry about their health.		.824						
Eating healthy meals just takes too much time.	.528							

Table 38 (cont.)

Item	Component							
	1	2	3	4	5	6	7	8
Most vegetables taste bad.	.608							
I sometimes skip meals since I am concerned about my weight.			.558	.425				
Most healthy foods just don't taste that great.	.626							
I weigh myself often.			.562	.418				
Foods from fast food restaurants are generally unhealthy.								.817
If you wanted to, how sure are you that you could eat healthy foods when you are… stressed out?	.775							
… feeling down?	.832							
… bored?	.709							
How confident are you that you could change or maintain your eating habits so that you could… eat at least two servings per day of fruit?				.612				
… eat at least three servings per day of vegetables?	.663				.461			
… eat at least three servings per day of dairy foods (e.g., milk, cheese, yogurt)?				.818				
… eat at least three servings per day of whole grains (e.g., dark bread, cereals like Cheerios)?				.682				
… limit soda pop to one can per day or less?		.747						
… limit eating at fast food restaurants to once per week or less?							.743	

Table 39

Project EAT: Final Factor Loadings for Overweight Subjects

Item	Component					
	1	2	3	4	5	6
I like the taste of potato chips and other salty snack foods.						.706
Milk tastes good to me.	*	*	*	*	*	*
Most unhealthy foods taste better than healthy foods.	*	*	*	*	*	*
I think a lot about being thinner.				.873		
I am too busy to eat healthy foods.					.731	
I like the taste of most fruits.	*	*	*	*	*	*
I am worried about gaining weight.				.922		
I am too rushed in the morning to eat a healthy breakfast.					.739	
I don't have time to think about eating healthy.					.684	
I like the taste of dark bread (e.g., whole wheat).	*	*	*	*	*	*
I like the taste of fast foods (e.g., McDonald's).						.662
People my age don't need to be concerned about their eating habits.	.789					
At this point in my life, I am not very concerned about my health.	.683					
People my age don't need to worry about their health.	.833					
Eating healthy meals just takes too much time.	*	*	*	*	*	*

* denotes that item was removed

Table 39 (cont.)

Item	Component							
	1	2	3	4	5	6	7	8
Most vegetables taste bad.		.647						
I sometimes skip meals since I am concerned about my weight.	*	*	*	*	*	*	*	*
Most healthy foods just don't taste that great.	*	*	*	*	*	*	*	*
I weigh myself often.	*	*	*	*	*	*	*	*
Foods from fast food restaurants are generally unhealthy.	*	*	*	*	*	*	*	*
If you wanted to, how sure are you that you could eat healthy foods when you are… stressed out?		.772						
… feeling down?		.905						
… bored?		.665						
How confident are you that you could change or maintain your eating habits so that you could… eat at least two servings per day of fruit?			.681					
… eat at least three servings per day of vegetables?	*	*	*	*	*	*	*	*
… eat at least three servings per day of dairy foods (e.g., milk, cheese, yogurt)?			.879					
… eat at least three servings per day of whole grains (e.g., dark bread, cereals like Cheerios)?			.786					
… limit soda pop to one can per day or less?	.741							
… limit eating at fast food restaurants to once per week or less?								.684

* denotes that item was removed

Table 40

Project EAT: Internal Consistency and Composite Score Analyses

Grouping	Items[1]	n; Cronbach's α	Composite n	Composite Median[2]	IQR[3] 25th, 75th
Weight concerns and control	9d, 9g, 10f, 10h	268; 0.72	268	2.50	2.00, 2.94
Time constraints	9e, 9h, 9i, 10d	266; 0.79		3.00	2.75, 3.50
Self-efficacy to eat healthy during negative emotions	11a-c	267; 0.86		4.00	3.00, 5.00
Self-efficacy to change/maintain eating patterns	12a-f	267; 0.71		5.33	4.67, 5.83
Taste barriers	9a-c, 9f, 9j, 9k, 10e, 10g	267; 0.68		2.86	2.57, 3.29
Healthy eating concerns	10a-c, i	268; 0.63 (.81 if 10i deleted)		3.67	3.00, 4.00

[1]Items: Prompt for 9 and10: How strongly do you agree with the following statements? 9a=I like the taste of potato chips and other salty snack foods, 9b=Milk tastes good to me, 9c=Most unhealthy foods taste better than healthy foods, 9d=I think a lot about being thinner, 9e=I am too busy to eat healthy foods, 9f=I like the taste of most fruits, 9g=I am worried about gaining weight, 9h=I am too rushed in the morning to eat a healthy breakfast, 9i=I don't have time to think about eating healthy, 9j=I like the taste of dark bread (e.g., whole wheat,) 9k=I like the taste of fast foods (e.g., McDonald's), 10a=People my age don't need to be concerned about their eating habits, 10b=At this point in my life, I am not very concerned about my health, 10c=People my age don't need to worry about their health, 10d=Eating healthy meals just takes too much time, 10e=Most vegetables taste bad, 10f=I sometimes skip meals since I am concerned about my weight, 10g=Most healthy foods just don't taste that great, 10h=I weigh myself often, 10i=Foods from fast food restaurants are generally unhealthy. Prompt for 11a-c: If you wanted to, how sure are you that you could eat healthy foods when you are… 11a=stressed out, 11b=feeling down, 11c=bored. Prompt for 12a-f: How confident are you that you could change or maintain your eating patterns so that you could… 12a=eat at least two servings per day of fruit, 12b=eat at least three servings per day of vegetables, 12c=eat at least three servings per day of dairy foods (e.g., milk, cheese, yogurt), 12d=eat at least three servings per day of whole grains (e.g., dark bread, cereals like Cheerios), 12e=limit soda pop to one can per day or less, 12f= limit eating at fast food restaurants to once per week or less.

[2]For self-efficacy to change/maintain eating patterns and self-efficacy to eat healthy during negative emotions, scale is from 1 to 6, where 1 is least positive and 6 is most positive. For all other composites, scale is from 1 to 4, where 1 is least positive and 4 is most positive.

[3]IQR=interquartile range; 25th = 25th percentile; 75th = 75th percentile

Table 40 (cont.)

Grouping	Items[1]	n; Cronbach's α	Composite n	Composite Median[2]	IQR[3] 25th, 75th
PCAProjectEAT1: Time and taste barriers	9e, 9h, 9i; 10d, 10e, 10g	265; 0.84		3.17	2.83, 3.67
PCAProjectEAT2: Self-efficacy to eat healthy during negative emotions	11a-c	267; 0.86		4.00	3.00, 5.00
PCAProjectEAT3: Liking and self-efficacy to eat healthy foods	9f, 9j, 12a, 12b, 12d	268; 0.61			
PCAProjectEAT4: Healthy eating concerns	10a-c	268; 0.81		3.67	3.00, 4.00
PCAProjectEAT5: Weight concerns and control	9d, 9g, 10f, 10h	268; 0.72		2.50	2.00, 2.94
PCAProjectEAT6: Liking and self-efficacy to consume milk	9b, 12c	268; 0.62			
PCAProjectEAT7: Fast food attitudes	10i, 12e, 12f	267; 0.46			
PCAProjectEAT8: Liking fast foods and salty snack foods	9a, 9k	268; 0.56			

[1]Items: Prompt for 9 and10: How strongly do you agree with the following statements? 9a=I like the taste of potato chips and other salty snack foods, 9b=Milk tastes good to me, 9c=Most unhealthy foods taste better than healthy foods, 9d=I think a lot about being thinner, 9e=I am too busy to eat healthy foods, 9f=I like the taste of most fruits, 9g=I am worried about gaining weight, 9h=I am too rushed in the morning to eat a healthy breakfast, 9i=I don't have time to think about eating healthy, 9j=I like the taste of dark bread (e.g., whole wheat,) 9k=I like the taste of fast foods (e.g., McDonald's), 10a=People my age don't need to be concerned about their eating habits, 10b=At this point in my life, I am not very concerned about my health, 10c=People my age don't need to worry about their health, 10d=Eating healthy meals just takes too much time, 10e=Most vegetables taste bad, 10f=I sometimes skip meals since I am concerned about my weight, 10g=Most healthy foods just don't taste that great, 10h=I weigh myself often, 10i=Foods from fast food restaurants are generally unhealthy. Prompt for 11a-c: If you wanted to, how sure are you that you could eat healthy foods when you are… 11a=stressed out, 11b=feeling down, 11c=bored. Prompt for 12a-f: How confident are you that you could change or maintain your eating patterns so that you could… 12a=eat at least two servings per day of fruit, 12b=eat at least three servings per day of vegetables, 12c=eat at least three servings per day of dairy foods (e.g., milk, cheese, yogurt), 12d=eat at least three servings per day of whole grains (e.g., dark bread, cereals like Cheerios), 12e=limit soda pop to one can per day or less, 12f= limit eating at fast food restaurants to once per week or less.

[2]For self-efficacy to change/maintain eating patterns and self-efficacy to eat healthy during negative emotions, scale is from 1 to 6, where 1 is least positive and 6 is most positive. For all other composites, scale is from 1 to 4, where 1 is least positive and 4 is most positive.

[3]IQR=interquartile range; 25th = 25th percentile; 75th = 75th percentile

Table 41

Food Environment Questionnaire: Descriptive Statistics

Item		n	Scale[1] (n; valid %)				Median	IQR[2] 25th, 75th
			1	2	3	4		
1	I have healthy food choices available where I live	268	8; 3.0	63; 23.5	111; 41.4	86; 32.1	3.00	2.00, 4.00
2	When I go out to eat, I have healthy foods available	268	15; 5.6	97; 36.2	108; 40.3	48; 17.9	3.00	2.00, 3.00
3	When I go home, I have healthy foods available	264	8; 3.0	72; 27.3	87; 33.0	97; 36.7	3.00	2.00, 4.00
4	There is not enough food available where I live	268	6; 2.2	14; 5.2	54; 20.1	194; 72.4	4.00	3.00, 4.00
5	There is too much food available where I live	268	41; 15.3	86; 32.1	78; 29.1	63; 23.5	3.00	2.00, 3.00
6	When I go out to eat, there is too much food served	267	9; 3.4	68; 25.5	117; 43.8	73; 27.3	3.00	2.00, 4.00
7	I buy healthy foods to keep in my room	268	23; 8.6	105; 39.2	69; 25.7	71; 26.5	3.00	2.00, 4.00
8	I buy "not so healthy" foods to keep in my room	268	13; 4.9	67; 25.0	141; 52.6	47; 17.5	3.00	2.00, 3.00

[1] For items 4 and 8: 1=almost always, 2=often, 3=sometimes, 4=rarely/never. For all other items: 1=rarely/never, 2=sometimes, 3=often, 4=almost always.
[2] IQR=interquartile range; 25th = 25th percentile; 75th = 75th percentile

Table 42

Food Environment Questionnaire: Factor Loadings

Item	General Sample			Normal-weight			Overweight	
	Comp[1] 1	Comp 2	Comp 3	Comp 1	Comp 2	Comp 3	Comp 1	Comp 2
I have healthy food choices available where I live		.755			.762		.742	
When I go out to eat, I have healthy foods available		.728			.701		.602	
When I go home, I have healthy foods available	.670			.648			.810	
There is not enough food available where I live		.621			.645			-.658
There is too much food available where I live			.827			.853		.750
When I go out to eat, there is too much food served			.805			.753		.784
I buy healthy foods to keep in my room	.795			.788			.804	
I buy "not so healthy" foods to keep in my room	.678			.686			.615	

[1]Comp=Component

Table 43

Food Environment Questionnaire: Consistent Factor Structure across Weight Categories

Item	General Sample		Normal-weight		Overweight	
	Comp[1] 1	Comp 2	Comp 1	Comp 2	Comp 1	Comp 2
I have healthy food choices available where I live	.614		.538		.721	
When I go out to eat, I have healthy foods available	*	*	*	*	*	*
When I go home, I have healthy foods available	*	*	*	*	*	*
There is not enough food available where I live	*	*	*	*	*	*
There is too much food available where I live		.838		.835		.856
When I go out to eat, there is too much food served		.810		.801		.850
I buy healthy foods to keep in my room	.812		.784		.863	
I buy "not so healthy" foods to keep in my room	.724		.751		.744	

[1]Comp=Component
* denotes that item was removed

Table 44

Food Environment Questionnaire: Internal Consistency and Composite Score Analyses

Grouping	Items[1]	n; Cronbach's α	Composite n	Composite Median[2]	IQR[3] 25th, 75th
Healthy food availability where it is uncontrollable	1, 2, 4	268; 0.55 (0.70 with item 4 deleted)	268	3.00	2.50, 3.50
Healthy food availability where it is controllable	3, 7, 8	264; .68		2.67	2.33, 3.33
Perceived food quantity	5, 6	267; .54			

[1]Items: 1=I have healthy food choices available where I live, 2=When I go out to eat, I have healthy foods available, 3=When I go home, I have healthy foods available, 4=There is not enough food available where I live, 5=There is too much food available where I live, 6=When I go out to eat, there is too much food served, 7=I buy healthy foods to keep in my room, 8=I buy "not so healthy" foods to keep in my room.
[2]Composite median on a scale from 1-4, where 1 is least positive and 4 is most positive in terms of a healthy food environment.
[3]IQR=interquartile range; 25th = 25th percentile; 75th = 75th percentile

Table 45

Nutrition Goals Questionnaire: Descriptive Statistics

Item	n	Scale[1] (n; valid %)				Median	IQR[2] 25th, 75th
		1	2	3	4		
I have goals I've set for myself and lots of things I want to do	268	7; 2.6	47; 17.5	106; 39.6	108; 40.3	3.00	3.00, 4.00
The goals I've set for myself include a healthy lifestyle	268	8; 3.0	56; 20.9	101; 37.7	103; 38.4	3.00	3.00, 4.00
In particular, I have goals about the food I eat	268	31; 11.6	84; 31.3	77; 28.7	76; 28.4	3.00	2.00, 4.00
One food-related goal of mine is to eat at least 5 servings of fruits and vegetables each day	268	87; 32.5	94; 35.1	51; 19.0	36; 13.4	2.00	1.00, 3.00
Another goal of mine is to eat lower-fat foods more often	267	40; 15.0	81; 30.3	91; 34.1	55; 20.6	3.00	2.00, 3.00
Another goal of mine is to choose 3 servings of calcium-rich lower-fat foods every day	268	100; 37.3	96; 35.8	39; 14.6	33; 12.3	2.00	1.00, 3.00

[1] For all items: 1=rarely/never, 2=sometimes, 3=often, 4=almost always
[2]IQR=interquartile range; 25th = 25th percentile; 75th = 75th percentile

Table 46

Nutrition Goals Questionnaire: Factor Loadings

Item	General Sample		Normal-weight		Overweight
	Comp[1] 1	Comp 2	Comp 1	Comp 2	Comp 1
I have goals I've set for myself and lots of things I want to do	.812		.795		One component extracted: solution could not be rotated
The goals I've set for myself include a healthy lifestyle	.847		.866		
In particular, I have goals about the food I eat	.767		.797		
One food-related goal of mine is to eat at least 5 servings of fruits and vegetables each day		.823		.818	
Another goal of mine is to eat lower-fat foods more often		.667		.615	
Another goal of mine is to choose 3 servings of calcium-rich lower-fat foods every day		.864		.874	

[1]Comp=Component

Table 47

Nutrition Goals Questionnaire: Internal Consistency and Composite Score Analyses

Grouping	Items[1]	n; Cronbach's α	Composite n	Composite Median[2]	IQR[3] 25th, 75th
General goals	1-3	268; 0.80	268	3.00	2.33, 3.67
Food-specific goals	4-6	267; 0.77		2.00	1.67, 2.67

[1] Items: 1=I have goals I've set for myself and lots of things I want to do, 2=The goals I've set for myself include a healthy lifestyle, 3=In particular, I have goals about the food I eat, 4=One food-related goal of mine is to eat at least 5 servings of fruits and vegetables each day, 5=Another goal of mine is to eat lower-fat foods more often, 6=Another goal of mine is to choose 3 servings of calcium-rich lower-fat foods every day

[2] Composite scale: 1=rarely/never, 2=sometimes, 3=often, 4=almost always

[3]IQR=interquartile range; 25th = 25th percentile; 75th = 75th percentile

Table 48

Item Groupings Consistent across Weight Categories: Internal Consistency and Composite Score Analyses

Grouping	Items[1]	n; Cronbach's α	Composite n	Composite Median[2]	IQR[3] 25th, 75th
Self-efficacy for fruits when motivation is low	1-4, 6	268; 0.93	268	2.20	1.60, 3.20
Self-efficacy for fruits when effort is required	9-12	267; 0.76		2.75	2.50, 3.25
Self-efficacy for vegetables when motivation is low	1-4, 6	268; 0.92		2.20	1.80, 2.80
Self-efficacy for vegetables when effort is required	9, 10, 13, 14	266; 0.81		2.50	2.00, 3.00
Self-efficacy for lower-fat foods when motivation is low and one has no time	1-4, 6, 9, 10	266; 0.93		2.29	1.86, 2.86
Self-efficacy to make lower-fat choices	16-18	268; 0.73		3.33	2.67, 4.00
Self-efficacy for higher-calcium foods when motivation is low and one has no time	1-4, 6, 9, 10	268; 0.93		2.14	1.86, 2.82

[1]Items: For self-efficacy: 1=You don't feel like eating [category]; 2=You don't like to eat [category]; 3=You are tired of eating [category]; 4=You don't have time to eat [category], 6=There is no [category] that you like; 9 = When you are really busy with school; 10=When it is a lot of work to peel/cut/prepare; 11=Can you choose fruits instead of salty snacks; 12=Can you choose fruit instead of sweets; 13=Can you choose vegetables instead of salty snacks; 14= Can you choose vegetables instead of French fries; 16=Can you choose lower-fat cheese (mozzarella from skim milk) instead of higher-fat cheeses (cheddar); 17=Can you choose lower-fat meats (whole meats, skinless poultry, fish) instead of higher-fat meats (hamburgers and dishes made with hamburger, hot dogs, brats); 18=Can you choose lower-fat breads (pretzels, toast) instead of higher-fat breads (chips, muffins, donuts). For WELQ: 1=I can resist eating when I am anxious (nervous), 4=I can resist eating when I feel physically run down, 6=I can resist eating when I am depressed (or down), 8= I can resist eating when I feel it's impolite to refuse a second helping, 13=I can resist eating when others are pressuring me to eat, 16=I can resist eating when I have experienced failure, 18=I can resist eating when I think others will be upset if I don't eat. For Project EAT: 9d=I think a lot about being thinner, 9e=I am too busy to eat healthy foods, 9g=I am worried about gaining weight, 9h=I am too rushed in the morning to eat a healthy breakfast, 9i=I don't have time to think about eating healthy, 10a=People my age don't need to be concerned about their eating habits, 10b=At this point in my life, I am not very concerned about my health, 10c=People my age don't need to worry about their health. For Food Environment: 1=I have healthy food choices available where I live, 5=There is too much food available where I live, 7=I buy healthy foods to keep in my room, 8=I buy "not so healthy" foods to keep in my room.

[2] For self-efficacy: on a scale from 1-4, where 1=rarely/never, 2=sometimes, 3=often, 4=almost always. For WELQ: on a scale from 1-10, where 1=not at all confident and 10=very confident. For Project EAT: scale is from 1-4, where 1=strongly agree, 2=agree, 3=disagree, and 4=strongly disagree.

[3]IQR=interquartile range

Table 48 (cont.)

Grouping	Items[1]	n; Cronbach's α	Composite n	Composite Median[2]	IQR[3] 25th, 75th
WELQ: Emotional eating	1, 4, 6, 16	268; 0.86	268	6.50	5.25, 8.00
WELQ: Social situations	8, 13, 18	268; 0.80		6.67	5.00, 8.00
Project EAT: Time constraints	9e, 9h, 9i	266; 0.74		3.00	2.67, 3.33
Project EAT: Healthy eating concerns	10a, 10b, 10c	268; 0.81		3.67	3.00, 4.00
Project EAT: Weight concerns	9d, 9g	268; 0.79		2.00	1.00, 2.50
Food Environment: Healthy food availability where one lives at school	1, 7, 8	268; 0.55			
Food Environment: Perceived quantity of food available	5, 6	267; 0.54			

[1]Items: For self-efficacy: 1=You don't feel like eating [category]; 2=You don't like to eat [category]; 3=You are tired of eating [category]; 4=You don't have time to eat [category], 6=There is no [category] that you like; 9 = When you are really busy with school; 10=When it is a lot of work to peel/cut/prepare; 11=Can you choose fruits instead of salty snacks; 12=Can you choose fruit instead of sweets; 13=Can you choose vegetables instead of salty snacks; 14= Can you choose vegetables instead of French fries; 16=Can you choose lower-fat cheese (mozzarella from skim milk) instead of higher-fat cheeses (cheddar); 17=Can you choose lower-fat meats (whole meats, skinless poultry, fish) instead of higher-fat meats (hamburgers and dishes made with hamburger, hot dogs, brats); 18=Can you choose lower-fat breads (pretzels, toast) instead of higher-fat breads (chips, muffins, donuts). For WELQ: 1=I can resist eating when I am anxious (nervous), 4=I can resist eating when I feel physically run down, 6=I can resist eating when I am depressed (or down), 8= I can resist eating when I feel it's impolite to refuse a second helping, 13=I can resist eating when others are pressuring me to eat, 16=I can resist eating when I have experienced failure, 18=I can resist eating when I think others will be upset if I don't eat. For Project EAT: 9d=I think a lot about being thinner, 9e=I am too busy to eat healthy foods, 9g=I am worried about gaining weight, 9h=I am too rushed in the morning to eat a healthy breakfast, 9i=I don't have time to think about eating healthy, 10a=People my age don't need to be concerned about their eating habits, 10b=At this point in my life, I am not very concerned about my health, 10c=People my age don't need to worry about their health. For Food Environment: 1=I have healthy food choices available where I live, 5=There is too much food available where I live, 7=I buy healthy foods to keep in my room, 8=I buy "not so healthy" foods to keep in my room.

[2] For self-efficacy: on a scale from 1-4, where 1=rarely/never, 2=sometimes, 3=often, 4=almost always. For WELQ: on a scale from 1-10, where 1=not at all confident and 10=very confident. For Project EAT: scale is from 1-4, where 1=strongly agree, 2=agree, 3=disagree, and 4=strongly disagree.

[3]IQR=interquartile range

Table 49

Nonparametric Analysis of Variance (Mann-Whitney U) According to Weight Category

Item/Composite[1]	Survey[2]	Scale[3]	Median; Interquartile Range (25th, 75th)		U; Z	*p*[4]
			Normal	Overweight		
Weight Concern and Control	EAT	1-4	2.50; 2.13, 2.88	2.25; 1.88, 2.63	7366.5; -2.091	.037
Weight Concern Only	EAT	1-4	2.00; 1.50, 2.50	1.50; 1.00, 2.00	4807; -2.954	.003
SEVegPCA2	SE	1-4	2.67; 2.17, 3.17	2.33; 1.83, 2.83	5280; -1.98	.048

[1]Item/Composite: Weight Concern and Control contains the items: "I think a lot about being thinner," "I am worried about gaining weight," "I sometimes skip meals since I am concerned about my weight," and "I weigh myself often"; Weight Concern Only includes just the first two of the preceding items. SEVegPCA2=self-efficacy to eat vegetables "when you are REALLY hungry," "when you are really busy with school," and "when it is a lot of work to peel/cut/prepare."
[2]Survey: EAT=Project EAT Survey; SE=Self-Efficacy for Fruits, Vegetables, Lower-Fat Foods, and Higher-Calcium Foods
[3]For Weight Concern and Control and Weight Concern Only, 1=strongly agree, 2=agree a little, 3=disagree a little, 4=strongly disagree. For SEVegPCA, 1=rarely/never, 2=sometimes, 3=often, 4=almost always.
[4]Significance set at $p<0.05$

Table 50

Summary of Factor Loading Pattern Differences between Normal- and Overweight Subjects

Questionnaire[1]	Factor Loading Pattern Differences among Normal- and Overweight Subjects (+/-)[2]	
OE for Fruits and Vegetables	-	-
OE for Low-Fat Foods	-	-
OE for Calcium-Rich Foods	-	-
SE for Fruits	+	+
SE for Vegetables	+	+
SE for Lower-Fat Foods	+	+
SE for Higher-Calcium Foods	+	+
WELQ	+	+
Project EAT	+	+
Food Environment	+	+
Nutrition Goals	+	+

[1]OE=Outcome Expectations, SE=Self-Efficacy, WELQ=Weight Efficacy Lifestyle Questionnaire
[2](+) = differences were present, (-) = differences were not present

APPENDIX A

INFORMED CONSENT

UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN



Department of Kinesiology and Community Health

Louise Freer Hall
906 South Goodwin Avenue
Urbana, IL 61801-3895
217 244-0823 *office*
http:// www.kines.uiuc.edu

Project PEER: Peer education, Exercising and Eating Right

Investigators: Ellen Evans, PhD, elevans@illinois.edu, 217-333-6768 (Project Director)
Karen Chapman-Novakofski, PhD
Edward McAuley, PhD
Robert Motl, PhD

You are being asked to participate in a research study assessing dietary and physical activity behaviors of freshman females on the University of Illinois campus. The purpose of this informed consent is to:

1. Inform you about the procedures and requirements of and compensation for the study.
2. Allow you to give your consent voluntarily (i.e., participate because you want to).
3. Make sure that you understand that you can withdraw your consent at any time.

Procedures and Requirements of the Study

There are two components to this research study:

1. Data collection procedures, which will be identical at the beginning of the fall semester, end of the fall semester, and end of the spring semester (end of freshman year) for a total of 3 measurement time points.

2. The PEER program, which will take place primarily at the beginning of the fall semester for 6 weeks (weekly meetings) with 3 refresher meetings throughout the academic year and interactions via a course website on Illinois Compass and email contact. The small group PEER program meetings will take place in various locations around campus (academic or residence halls, etc.).

1. Data Collection Procedures: *Note that you will experience identical online, interview and physical measurement data collection procedures (except you will not sign this informed consent)* ***a total of 3 times*** *(baseline, end of the fall term and end of spring term).*

Visit 1: Orientation (approximately 60 minutes):
At this first session, groups of no more than 15 candidates at a time will be welcomed and given an overview of the PEER program, which involves dietary and physical activity education for freshman females on the University of Illinois campus. This will include an explanation of the program, procedures, requirements and compensation.

It will be explained to you that you will have a 50% random chance (i.e. like the flip of a coin) of being assigned to the PEER program. It will also be explained that, in the event you are NOT randomized to the PEER program, you will only be asked to complete the data collection visits and your experience will be similar to a typical freshman on the University of Illinois campus.

This first session will include an introduction to the content of the project's online Illinois Compass website, including an explanation of how to access (and complete before your next visit) a number of data collection questionnaires that will be posted there before your next laboratory visit. It will be explained that these questionnaires will request information regarding: a) your medical history including routine medication usage and safety for you to exercise; b) your routine physical activity habits and c) various psychosocial outcomes such as how you determine your dietary and physical activity habits and your confidence in your ability to engage in these behaviors.

You will also be informed that you will be required to wear a physical activity monitoring device (accelerometer) for 7 days while you go about your normal daily routine. It will also be explained that you will need to complete a dietary recall/record for 3 days and dietary calcium questionnaire as well. Facilitators will also explain that your next visit will involve having your height, weight and waist measured; with the last two requiring you to be in your undergarments (privacy screens will be provided).

The elements of informed consent and voluntary participation will then be explained to the group. After this, you will meet privately with a study facilitator, with whom you may discuss all questions and concerns you wish to address. You will then be offered the opportunity to indicate your willingness to participate by providing your signature on this informed consent.

Once you have given your signed consent for participation in the study, you will be given instructions for the completion of the 3-day dietary recall and calcium questionnaire. You will also be given instructions for and shown how to use the accelerometer, which is very small, similar to a pedometer or small cell phone and worn on your hip. Prior to leaving this first appointment, you will also be scheduled for Visit 2: Laboratory.

Visit 2: Laboratory (approximately 45 minutes): Within 8-10 days after your first appointment, you will have a second appointment where you will return your physical activity monitor. You will also return the dietary recall/record and dietary calcium questionnaire, which will be reviewed with you in detail. You will also have your height, weight and waist measured. The last two will require you to be in your undergarments and a paper gown. Privacy screens will be provided. Additionally, you will be asked to provide any information that may be missing from your completed on-line questionnaires.

2. The PEER Program:

Overview of 6-Week Program & Refresher Meetings (3 total): Participation in the PEER program will require you to attend 6 class sessions (approximately 45-60 minutes on one day per week) which will be taught by senior level nutrition and kinesiology undergraduate students as Peer Educators, directly supervised by graduate students trained in nutrition and kinesiology. The location of these meetings will be determined by your PEER group, which will have approximately 10-15 members. Course content will cover such topics as physical activity and dietary behaviors for weight management and strategies to impact these behaviors. You will be provided with a pedometer to encourage walking as physical activity. In addition to the formal meetings, you will have access to a PEER website, frequent e-mail contact from your Peer Educator including health tips and monthly newsletters and personal health reports from weight, physical activity and dietary measurements. During the 12th or 13th week of the fall semester and the 2nd or 3rd and 8th or 9th week of the spring semester, your PEER group will meet for a refresher class on topics originally covered in the 6-week course.
REMEMBER: In the event you are NOT randomized to the PEER program, you will only be asked to complete the data collection visits and your experience will be similar to a typical freshman on the University of Illinois campus.

Volunteer
Your participation in this study is completely voluntary. You may decide to withdraw from the study or decline certain types of data collection at any time without penalty. Your participation or choice to not participate will in no way affect your academic standing with the University of Illinois.

Risks and Benefits
Other than the potential embarrassment or frustration that is often experienced in our society with regard to weight status, there are no known risks associated with this research. One direct benefit from participation in this study is knowledge regarding your weight status, physical activity and dietary intake behaviors and a weight management program, which is good health information and can cost up to several hundred dollars in commercially-available programs. You will be contributing to the knowledge surrounding health behavior change and this information may be used in the future to design health behavior programs in the college-aged female population.

Compensation
All Research Participants: Monetary compensation will be given for the completion of each testing time point on a prorated basis with $20, $30 and $40 given for early fall term, end of fall term and end of spring term time points, respectively. Note that completion of all testing measures (i.e.; on-line questionnaires, dietary data, physical activity testing) is required to obtain payment at a given time point. In addition, all subjects that complete a given time point for testing will be entered into a drawing to win $500 with one prize being given per group (i.e. intervention and control groups or a theoretical worst case ratio of 1 in 75 chance of winning depending on study adherence rates).

PEER Intervention Participants: In addition to the monetary compensation for the research testing, subjects randomly assigned to the PEER program will also receive a $15 payment for class attendance **IF a minimum of 3 classes is attended (3 out of 6 possible classes or 50%)** with $5 per class being paid for the 3 additional classes attended for a maximum payment of $30. Attendance at each of the 3 scheduled refresher group meetings will result in entry into a drawing to win $100 for each PEER group or a theoretical worst case ratio of 1 in 15 chance of winning depending on adherence rates in the study.

Confidentiality

Data from your participation in this study will be kept confidential and will be used for research purposes only. All data collected from you will be given a number for identification. All data files will be kept in a locked filing cabinet that will have limited access by research personnel. In the event of a published article or presentation, your personal data will not be identifiable.

Who to Contact With Questions

Questions about this research study should be directed to the principal investigator, Dr. Ellen Evans at 217-333-6768 or elevans@illinois.edu. Questions about your rights as a research participant should be directed to the UIUC Institutional Review Board Office at (217) 333-2670 or irb@illinois.edu. You will receive a copy of this form.

Consent

I certify that I have read this form and voluntarily provide my consent for participation in this study. I understand if I am less than 18 years of age, my parent or guardian will also need to sign this informed consent.

Participant Name (please print)	Date	E-mail address
Signature of Participant	Date	Parental Signature if Needed
Signature of Investigator	Date	

APPENDIX B

OUTCOME EXPECTATIONS FOR NUTRITION

Code: Date:

Directions: We want to know what you think will happen if you eat fruit and vegetables and low-fat foods everyday. There are no right or wrong answers, just your opinion. Please select the response that best describes how much you agree or disagree with each of the below sentences.

If I ate five servings of fruit and vegetables every day…

I would have more energy.

A	B	C	D	E
Strongly Agree	Agree a Little	Unsure, Don't Know	Disagree a Little	Strongly Disagree

I would be able to keep my weight where I want it.

A	B	C	D	E
Strongly Agree	Agree a Little	Unsure, Don't Know	Disagree a Little	Strongly Disagree

I would feel that I am being good to myself by eating healthy.

A	B	C	D	E
Strongly Agree	Agree a Little	Unsure, Don't Know	Disagree a Little	Strongly Disagree

Other people would think I am healthy.

A	B	C	D	E
Strongly Agree	Agree a Little	Unsure, Don't Know	Disagree a Little	Strongly Disagree

I would not enjoy eating.

A	B	C	D	E
Strongly Agree	Agree a Little	Unsure, Don't Know	Disagree a Little	Strongly Disagree

I would have an upset stomach.

A	B	C	D	E
Strongly Agree	Agree a Little	Unsure, Don't Know	Disagree a Little	Strongly Disagree

My food would cost too much.

A	B	C	D	E
Strongly Agree	Agree a Little	Unsure, Don't Know	Disagree a Little	Strongly Disagree

The people I eat with would not enjoy eating with me.

A	B	C	D	E
Strongly Agree	Agree a Little	Unsure, Don't Know	Disagree a Little	Strongly Disagree

I would be less likely to get cancer or heart disease.

A	B	C	D	E
Strongly Agree	Agree a Little	Unsure, Don't Know	Disagree a Little	Strongly Disagree

I would be a good example for my friends and family.

A	B	C	D	E
Strongly Agree	Agree a Little	Unsure, Don't Know	Disagree a Little	Strongly Disagree

If I ate foods low in fat every day…

I would have more energy.

A	B	C	D	E
Strongly Agree	Agree a Little	Unsure, Don't Know	Disagree a Little	Strongly Disagree

I would be able to keep my weight where I want it.

A	B	C	D	E
Strongly Agree	Agree a Little	Unsure, Don't Know	Disagree a Little	Strongly Disagree

I would feel that I am being good to myself by eating healthy.

A	B	C	D	E
Strongly Agree	Agree a Little	Unsure, Don't Know	Disagree a Little	Strongly Disagree

Other people would think I am healthy.

A	B	C	D	E
Strongly Agree	Agree a Little	Unsure, Don't Know	Disagree a Little	Strongly Disagree

I would not enjoy eating.

A	B	C	D	E
Strongly Agree	Agree a Little	Unsure, Don't Know	Disagree a Little	Strongly Disagree

I would have an upset stomach.

A	B	C	D	E
Strongly Agree	Agree a Little	Unsure, Don't Know	Disagree a Little	Strongly Disagree

My food would cost too much.

A	B	C	D	E
Strongly Agree	Agree a Little	Unsure, Don't Know	Disagree a Little	Strongly Disagree

The people I eat with would not enjoy eating with me.

A	B	C	D	E
Strongly Agree	Agree a Little	Unsure, Don't Know	Disagree a Little	Strongly Disagree

I would be less likely to get cancer or heart disease.

A	B	C	D	E
Strongly Agree	Agree a Little	Unsure, Don't Know	Disagree a Little	Strongly Disagree

I would be a good example for my friends and family.

A	B	C	D	E
Strongly Agree	Agree a Little	Unsure, Don't Know	Disagree a Little	Strongly Disagree

If I ate 3 or more servings of calcium-rich, low-fat foods every day…

I would have more energy.

A	B	C	D	E
Strongly Agree	Agree a Little	Unsure, Don't Know	Disagree a Little	Strongly Disagree

I would be able to keep my weight where I want it.

A	B	C	D	E
Strongly Agree	Agree a Little	Unsure, Don't Know	Disagree a Little	Strongly Disagree

I would feel that I am being good to myself by eating healthy.

A	B	C	D	E
Strongly Agree	Agree a Little	Unsure, Don't Know	Disagree a Little	Strongly Disagree

Other people would think I am healthy.

A	B	C	D	E
Strongly Agree	Agree a Little	Unsure, Don't Know	Disagree a Little	Strongly Disagree

I would not enjoy eating.

A	B	C	D	E
Strongly Agree	Agree a Little	Unsure, Don't Know	Disagree a Little	Strongly Disagree

I would have an upset stomach.

A	B	C	D	E
Strongly Agree	Agree a Little	Unsure, Don't Know	Disagree a Little	Strongly Disagree

My food would cost too much.

A	B	C	D	E
Strongly Agree	Agree a Little	Unsure, Don't Know	Disagree a Little	Strongly Disagree

The people I eat with would not enjoy eating with me.

A	B	C	D	E
Strongly Agree	Agree a Little	Unsure, Don't Know	Disagree a Little	Strongly Disagree

I would be less likely to get cancer or heart disease.

A	B	C	D	E
Strongly Agree	Agree a Little	Unsure, Don't Know	Disagree a Little	Strongly Disagree

I would be a good example for my friends and family.

A	B	C	D	E
Strongly Agree	Agree a Little	Unsure, Don't Know	Disagree a Little	Strongly Disagree

APPENDIX C

SELF-EFFICACY FOR FRUITS, VEGETABLES, LOWER-FAT AND HIGHER-CALCIUM

Suppose you decided to eat FRUITS every day, or more fruits every day to meet the suggested amounts to be healthy. Would you succeed when:

1. you don't feel like eating fruits

1	2	3	4
rarely/never	sometimes	often	almost always

2. you don't like to eat fruits

1	2	3	4
rarely/never	sometimes	often	almost always

3. you are tired of eating fruit

1	2	3	4
rarely/never	sometimes	often	almost always

4. you don't have time to eat fruit

1	2	3	4
rarely/never	sometimes	often	almost always

5. there is no fruit available

1	2	3	4
rarely/never	sometimes	often	almost always

6. there is no fruit that you like

1	2	3	4
rarely/never	sometimes	often	almost always

7. when you are NOT hungry

1	2	3	4
rarely/never	sometimes	often	almost always

8. when you are REALLY hungry

1	2	3	4
rarely/never	sometimes	often	almost always

9. when you are really busy with school

1	2	3	4
rarely/never	sometimes	often	almost always

10. when it is a lot of work to peel/cut/prepare

1	2	3	4
rarely/never	sometimes	often	almost always

Suppose you decided to eat VEGETABLES every day, or more vegetables every day to meet the suggested amounts to be healthy. Would you succeed when:

1. you don't feel like eating vegetables

1	2	3	4
rarely/never	sometimes	often	almost always

2. you don't like to eat vegetables

1	2	3	4
rarely/never	sometimes	often	almost always

3. you are tired of eating vegetables

1	2	3	4
rarely/never	sometimes	often	almost always

4. you don't have time to eat vegetables

1	2	3	4
rarely/never	sometimes	often	almost always

5. there are no vegetables available

1	2	3	4
rarely/never	sometimes	often	almost always

6. there are no vegetables that you like

1	2	3	4
rarely/never	sometimes	often	almost always

7. when you are NOT hungry

1	2	3	4
rarely/never	sometimes	often	almost always

8. when you are REALLY hungry

1	2	3	4
rarely/never	sometimes	often	almost always

9. when you are really busy with school

1	2	3	4
rarely/never	sometimes	often	almost always

10. when it is a lot of work to peel/cut/prepare

1	2	3	4
rarely/never	sometimes	often	almost always

Suppose you decided to eat LOWER-FAT FOODS every day, or more lower-fat foods to meet the suggested amounts to be healthy. Would you succeed when:

1. you don't feel like eating lower-fat foods.

1	2	3	4
rarely/never	sometimes	often	almost always

2. you don't like to eat lower-fat foods.

1	2	3	4
rarely/never	sometimes	often	almost always

3. you are tired of eating lower-fat foods.

1	2	3	4
rarely/never	sometimes	often	almost always

4. you don't have time to eat lower-fat foods.

1	2	3	4
rarely/never	sometimes	often	almost always

5. there are no lower-fat foods available

1	2	3	4
rarely/never	sometimes	often	almost always

6. there are no lower-fat foods that you like

1	2	3	4
rarely/never	sometimes	often	almost always

7. when you are NOT hungry

1	2	3	4
rarely/never	sometimes	often	almost always

8. when you are REALLY hungry

1	2	3	4
rarely/never	sometimes	often	almost always

9. when you are really busy with school

1	2	3	4
rarely/never	sometimes	often	almost always

10. when it is a lot of work to prepare

1	2	3	4
rarely/never	sometimes	often	almost always

Suppose you decided to eat HIGHER-CALCIUM FOODS every day, or more higher-calcium foods to meet the suggested amounts to be healthy. Would you succeed when:

1. you don't feel like eating higher-calcium foods

1	2	3	4
rarely/never	sometimes	often	almost always

2. you don't like to eat higher-calcium foods

1	2	3	4
rarely/never	sometimes	often	almost always

3. you are tired of eating higher-calcium foods

1	2	3	4
rarely/never	sometimes	often	almost always

4. you don't have time to eat higher-calcium foods

1	2	3	4
rarely/never	sometimes	often	almost always

5. there are no higher-calcium foods available

1	2	3	4
rarely/never	sometimes	often	almost always

6. there are no higher-calcium foods that you like

1	2	3	4
rarely/never	sometimes	often	almost always

7. when you are NOT hungry

1	2	3	4
rarely/never	sometimes	often	almost always

8. when you are REALLY hungry

1	2	3	4
rarely/never	sometimes	often	almost always

9. when you are really busy with school

1	2	3	4
rarely/never	sometimes	often	almost always

10. when it is a lot of work to prepare

1	2	3	4
rarely/never	sometimes	often	almost always

MAKING CHOICES

1. Can you choose fruit instead of sweets?

1	2	3	4
rarely/never	sometimes	often	almost always

2. Can you choose fruits instead of salty snacks?

1	2	3	4
rarely/never	sometimes	often	almost always

3. Can you choose vegetables instead of French fries?

1	2	3	4
rarely/never	sometimes	often	almost always

4. Can you choose vegetables instead of salty snacks?

1	2	3	4
rarely/never	sometimes	often	almost always

5. Can you choose lower-fat milk instead of 2% or whole milk?

1	2	3	4
rarely/never	sometimes	often	almost always

6. Can you choose lower-fat cheese (mozzarella from skim milk) instead of higher-fat cheeses (Cheddar)?

1	2	3	4
rarely/never	sometimes	often	almost always

7. Can you choose lower-fat meats (whole meats, skinless poultry, fish) instead of higher-fat meat (hamburgers and dishes made with hamburger, hot dogs, brauts)?

1	2	3	4
rarely/never	sometimes	often	almost always

8. Can you choose lower-fat breads (pretzels, toast) instead of higher-fat breads (chips, muffins, donuts)?

1	2	3	4
rarely/never	sometimes	often	almost always

APPENDIX D

WEIGHT EFFICACY LIFESTYLE QUESTIONNAIRE

Code: _____ Date: _____

Listed below are a number of situations that lead some people to eat. We would like to know how confident you are that you would not eat in each situation. Circle the number that best describes your feelings of confidence to not eat food in each situation according to the following scale:

1	2	3	4	5	6	7	8	9	10
Not confident									Very confident

1. I can resist eating when I am anxious (nervous)

1	2	3	4	5	6	7	8	9	10
Not confident									Very confident

2. I can control my eating on the weekends

1	2	3	4	5	6	7	8	9	10
Not confident									Very confident

3. I can resist eating when I have to say "no" to others

1	2	3	4	5	6	7	8	9	10
Not confident									Very confident

4. I can resist eating when I feel physically run down.

1	2	3	4	5	6	7	8	9	10
Not confident									Very confident

5. I can resist eating when I am watching TV

1	2	3	4	5	6	7	8	9	10
Not confident									Very confident

6. I can resist eating when I am depressed (or down)

1	2	3	4	5	6	7	8	9	10
Not confident									Very confident

7. I can resist eating when there are many different kinds of food available

1	2	3	4	5	6	7	8	9	10
Not confident									Very confident

8. I can resist eating when I feel it's impolite to refuse a second helping

1	2	3	4	5	6	7	8	9	10
Not confident									Very confident

9. I can resist eating when I have a headache

1	2	3	4	5	6	7	8	9	10
Not confident									Very confident

10. I can resist eating when I am reading

1	2	3	4	5	6	7	8	9	10
Not confident									Very confident

11. I can resist eating when I am angry (or irritable)

1	2	3	4	5	6	7	8	9	10
Not confident									Very confident

12. I can resist eating when I am at a party

1	2	3	4	5	6	7	8	9	10
Not confident									Very confident

13. I can resist eating even when others are pressuring me to eat

1	2	3	4	5	6	7	8	9	10
Not confident									Very confident

14. I can resist eating when I am in pain

1	2	3	4	5	6	7	8	9	10
Not confident									Very confident

15. I can resist eating just before going to bed

1	2	3	4	5	6	7	8	9	10
Not confident									Very confident

16. I can resist eating when I have experienced failure

1	2	3	4	5	6	7	8	9	10
Not confident									Very confident

17. I can resist eating even when high-calorie foods are available

1	2	3	4	5	6	7	8	9	10
Not confident									Very confident

18. I can resist eating even when I think others will be upset if I don't eat

1	2	3	4	5	6	7	8	9	10
Not confident								Very confident	

19. I can resist eating when I feel uncomfortable

1	2	3	4	5	6	7	8	9	10
Not confident								Very confident	

20. I can resist eating when I am happy

1	2	3	4	5	6	7	8	9	10
Not confident								Very confident	

APPENDIX E

PROJECT EAT ITEMS

1. How many hours a week do you work for pay?
   a. 0 hours b. 1-9 hours c. 10-19 hours d. 20-29 hours
   e. 30-39 hours f. 40 hours g. more than 40 hours

2. Are you on a college dining plan (e.g. residence hall)?
   a. No b. Yes, for some meals c. Yes, for most meals d. Yes, for all Meals

3. During the past week, how many days did you eat breakfast?
   a. Never b. 1-2 days c. 3-4 days d. 5-6 days e. Every day

4. During the past week, how many days did you eat lunch?
   a. Never b. 1-2 days c. 3-4 days d. 5-6 days e. Every day

5. During the past week, how many days did you eat dinner?
   a. Never b. 1-2 days c. 3-4 days d. 5-6 days e. Every day

6. In the past week, where did you eat dinner most often? (Mark only one.)
   a. My own home/apartment b. My parents' home c. Dining or residence hall (e.g. dorm, fraternity house)

   d. Fast food restaurant e. Another type of restaurant f. Car or other transportation

   g. Other

7. In the past week, how often did you eat something from a fast food restaurant (like McDonald's, Burger King, Hardee's, etc.)?
   a. Never b. 1-2 times c. 3-4 times d. 5-6 times e. 7 times f. More than 7 times

8. How many times did you snack (eat in between meals) yesterday?
   a. None b. 1 time c. 2-3 times d. 4-5 times e. More than 5 times

9. How strongly do you agree with the following statements?

a. I like the taste of potato chips and other salty snack foods.

1	2	3	4
Strongly disagree	Disagree	Agree	Strongly agree

b. Milk tastes good to me.

1	2	3	4
Strongly disagree	Disagree	Agree	Strongly agree

c. Most unhealthy foods taste better than healthy foods.

1	2	3	4
Strongly disagree	Disagree	Agree	Strongly Agree

d. I think a lot about being thinner.

1	2	3	4
Strongly disagree	Disagree	Agree	Strongly agree

e. I am too busy to eat healthy foods.

1	2	3	4
Strongly disagree	Disagree	Agree	Strongly agree

f. I like the taste of most fruits.

1	2	3	4
Strongly disagree	Disagree	Agree	Strongly agree

g. I am worried about gaining weight.

1	2	3	4
Strongly disagree	Disagree	Agree	Strongly agree

h. I am too rushed in the morning to eat a healthy breakfast.

1	2	3	4
Strongly disagree	Disagree	Agree	Strongly agree

i. I don't have time to think about eating healthy.

1	2	3	4
Strongly disagree	Disagree	Agree	Strongly agree

j. I like the taste of dark bread (e.g., whole wheat).

1	2	3	4
Strongly disagree	Disagree	Agree	Strongly agree

k. I like the taste of fast foods (e.g., McDonald's).

1	2	3	4
Strongly disagree	Disagree	Agree	Strongly agree

10. How strongly do you agree with the following statements?

a. People my age don't need to be concerned about their eating habits.

1	2	3	4
Strongly disagree	Disagree	Agree	Strongly agree

b. At this point in my life, I am not very concerned about my health.

1	2	3	4
Strongly disagree	Disagree	Agree	Strongly agree

c. People my age don't need to worry about their health.

1	2	3	4
Strongly disagree	Disagree	Agree	Strongly agree

d. Eating healthy meals just takes too much time.

1	2	3	4
Strongly disagree	Disagree	Agree	Strongly agree

e. Most vegetables taste bad.

1	2	3	4
Strongly disagree	Disagree	Agree	Strongly agree

f. I sometimes skip meals since I am concerned about my weight.

1	2	3	4
Strongly disagree	Disagree	Agree	Strongly agree

g. Most healthy foods just don't taste that great.

1	2	3	4
Strongly disagree	Disagree	Agree	Strongly agree

h. I weigh myself often.

1	2	3	4
Strongly disagree	Disagree	Agree	Strongly agree

i. Foods from fast food restaurants are generally unhealthy.

1	2	3	4
Strongly disagree	Disagree	Agree	Strongly agree

11. If you wanted to, how sure are you that you could eat healthy foods when you are:

a. Stressed out

1	2	3	4	5	6
Not at all sure					Very sure

b. Feeling down

1	2	3	4	5	6
Not at all sure					Very sure

c. Bored

1	2	3	4	5	6
Not at all sure					Very sure

12. How confident are you that you could change or maintain your eating patterns so that you could…

a. Eat at least two servings per day of fruit

1	2	3	4	5	6
Not at all confident					Very confident

b. Eat at least three servings per day of vegetables

1	2	3	4	5	6
Not at all confident					Very confident

c. Eat at least three servings per day of dairy foods (e.g., milk, cheese, yogurt)

1	2	3	4	5	6
Not at all confident					Very confident

d. Eat at least three servings per day of whole grains (e.g., dark bread, cereals like Cheerios)

1	2	3	4	5	6
Not at all confident					Very confident

e. Limit soda pop to one can per day or less

Not at all confident					Very confident

f. Limit eating at fast food restaurants to once per week or less

1	2	3	4	5	6
Not at all confident					Very confident

How often have you gone on a diet during the last year? By "diet" we mean changing the way you eat so you can lose weight.

a. Never b. 1-4 times c. 5-10 times d. More than 10 times e. I am always dieting

Are you currently trying to:

a. Lose weight b. Stay the same weight c. Gain weight d. I am not trying to do anything about my weight

Have you ever intentionally lost 10 pounds or more and kept it off for at least 6 months?

a. Yes b. No

Have you ever been a vegetarian?

a. No b. Yes, but for less than one month c. Yes, for longer than one month

Are you a vegetarian now?

a. Yes b. No

About how long have you been a vegetarian?

a. Less than one month b. Less than 1 year (but more than 1 month)
c. 1-2 years d. 3-4 years e. 5 years or more

As a vegetarian, do you eat any of the following? (Mark all that apply.)

a. Eggs
b. Dairy food (such as milk, cheese)
c. Chicken
d. Fish

What are your main reason(s) for eating a vegetarian diet? (Mark all that apply.)
a. To lose weight or keep from gaining weight
b. Want a healthier diet
c. To help the environment
d. Religious reasons
e. Do not want to kill animals
f. A family member is a vegetarian
g. I don't like the taste of meat
d. Other (please specify) _____

Have you experienced any of the following in the past 12 months? (Mark all that apply.)
a. Being diagnosed as having a serious physical illness
b. Serious physical illness of someone very close to you
c. Termination of a long personal relationship
d. A serious automobile accident
e. Being arrested
f. Failing a class
g. Being diagnosed as having a mental illness
h. Death of someone very close to you
i. Your parents filing for divorce or separation
j. Excessive credit card debt
k. Being fired or laid off from a job

23. During the past 12 months, how often have you been bothered or troubled by:
a. Feeling too tired to do things
b. Having trouble going to sleep or staying asleep
c. Feeling unhappy, sad, or depressed
d. Feeling hopeless about the future
e. Feeling nervous or tense
f. Worrying too much about things
g. Changes in your appetite

APPENDIX F

FOOD ENVIRONMENT

1. I have healthy food choices available where I live.

1	2	3	4
rarely/never	sometimes	often	almost always

2. When I go out to eat, I have healthy foods available

1	2	3	4
rarely/never	sometimes	often	almost always

3. When I go home, I have healthy foods available.

1	2	3	4
rarely/never	sometimes	often	almost always

4. There is not enough food available where I live.

1	2	3	4
rarely/never	sometimes	often	almost always

5. There is too much food available where I live.

1	2	3	4
rarely/never	sometimes	often	almost always

6. When I go out to eat, there is too much food served.

1	2	3	4
rarely/never	sometimes	often	almost always

7. I buy healthy foods to keep in my room.

1	2	3	4
rarely/never	sometimes	often	almost always

8. I buy "not so healthy" foods to keep in my room.

1	2	3	4
rarely/never	sometimes	often	almost always

APPENDIX G

NUTRITION GOALS

1. I have goals I've set for myself and lots of things I want to do.

1	2	3	4
rarely/never	sometimes	often	almost always

2. The goals I've set for myself include a healthy lifestyle.

1	2	3	4
rarely/never	sometimes	often	almost always

3. In particular, I have goals about the food I eat.

1	2	3	4
rarely/never	sometimes	often	almost always

4. One food-related goal of mine is to eat at least 5 servings of fruits and vegetables each day.

1	2	3	4
rarely/never	sometimes	often	almost always

5. Another goal of mine is to eat lower-fat foods more often.

1	2	3	4
rarely/never	sometimes	often	almost always

6. Another goal of mine is to choose calcium-rich lower-fat foods - 3 servings every day.

1	2	3	4
rarely/never	sometimes	often	almost always

AUTHOR'S BIOGRAPHY

Leia Kedem was born in Park Ridge, Illinois on December 2nd, 1985. She graduated from the University of Illinois at Urbana-Champaign in 2008 with a B.S. in Psychology. After losing a significant amount of weight, she decided to merge her interest in human behavior with nutrition by pursuing her M.S. in Nutritional Sciences, also at the University of Illinois. While working toward her degree, Leia has worked as a research assistant for Project PEER and as a nutrition graduate assistant in Health Education at McKinley Health Center. During her graduate studies, she has also fulfilled the Didactic Program in Dietetics coursework requirements. Following graduation, Leia will complete her dietetic internship at the University of Houston. She plans to work as a registered dietitian in weight management counseling and nutrition education.