

Knowledge, Motivations, and Behaviors Regarding  
Eating a Healthy Diet and Physical Activity in  
Relation to Self-Esteem in College Students

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By

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*Honors Research Thesis*

ABSTRACT

The current study hypothesized that college student's knowledge, motivations, and behaviors regarding eating and exercising would be positively correlated to their self-esteem. A sample of 268 college students, 93 males and 175 females, completed a 98 item questionnaire that surveyed their knowledge of eating and exercise recommendations, their eating and exercise motives, their eating and exercise behaviors, and their self-esteem. Correlation and regression analyses were performed to identify the relations among knowledge of physical activity and nutrition, physical activity behavior, healthy eating behavior, exercise and food choice motivations, and self-esteem. Overall nutritional and physical activity knowledge was positively correlated to healthy eating behaviors ( $r=.21$ ,  $p<0.01$ ), but was not significantly correlated with physical activity behaviors ( $r=.05$ ,  $p<0.05$ ). Positive correlations were found between overall knowledge and the exercise motives based on weight control, fitness, health, and tone, as well as the food choice motives of health and weight control. Self-esteem was positively correlated with overall nutrition and physical activity knowledge ( $r=.14$ ,  $p<0.05$ ), healthy eating behaviors ( $r=.16$ ,  $p<0.05$ ), and healthy exercise behaviors ( $r=.22$ ,  $p<0.01$ ). Self-esteem was positively correlated with the exercise motives of fitness and health and the food choice motives of health and natural content and negatively correlated to the food choice motives of mood, familiarity, and ethical concern. Physical activity was positively correlated with the exercise motives of fitness and health. Physical activity was also positively correlated with healthy eating behaviors ( $r=.26$ ,  $p<0.01$ ).

## INTRODUCTION

Eating a healthy diet and being physically active are essential to leading a healthy and long-lasting life. According to the United States Department of Health and Human Services (US DHHS), engaging in moderate physical activity can significantly reduce the risk of developing or dying from chronic diseases such as heart disease, diabetes, colon cancer, or high blood pressure (US DHHS, 2004). From a public health perspective, physical activity plays a vital role in preventing weight gain and promoting the maintenance of weight loss. Being overweight or obese significantly raises the risk of adverse health effects such as high blood pressure, high cholesterol, type 2 diabetes, heart disease and stroke, gallbladder disease, arthritis, sleep disturbances and breathing problems. Obese individuals may also suffer from social stigmatization, discrimination, and lowered self-esteem. Regular physical activity offers several health benefits, including increased muscle and bone strength, increased lean muscle, decreased body fat, enhanced psychological well-being, and possible decreases in the risk of developing depression, symptoms of depression and anxiety, and improvement in mood (US DHHS, 2004).

Over the last few decades, the percentage of Americans who are clinically overweight has steadily increased (National Center for Health Statistics, 2004). In 2006, more than two-thirds of Americans were overweight or obese (Ogden, Carroll, Curtin, McDowell, Tabak, & Flegal, 2006). Furthermore, in 2007, 23.9% of Americans did not participate in leisure-time physical activity, and 77.3% did not consume enough fruits and vegetables (Centers for Disease Control and Prevention, 2002, 2008). Better nutrition and exercise practices could prevent 300,000 deaths each year from heart disease, diabetes, cancer, and stroke.

The obesity trend in the United States has infiltrated college-aged student populations. Approximately 38% of college students are classified as either slightly or very overweight (American College Health Association-National College Health Assessment (ACHA-NCHA), 2007). Studies have indicated that college students have poor nutrition habits and often exhibit at-risk weight control behaviors. College students tend to engage in a number of unhealthy eating behaviors, including extreme dieting, skipping meals, high intake of fast foods, low intake of fruits and vegetables, and minimal consumption of dairy products (ACHA-NCHA, 2007; Cotunga and Vickery, 1994; Douglas and Collins, 1997; Huang, Harris, Lee, Nazir, Born and Kaur, 2003; Matvienko, Lewis, and Schafer, 2001). Furthermore, when young adults begin college, the new environment may place them at increased risk for developing unhealthy eating habits and adopting a more sedentary lifestyle. Since beginning college is a period when students begin to manage their own lives and adopt and solidify their health-related habits, it is important to investigate factors associated with activities such as being physically active and choosing to consume a diet rich in fruits and vegetables.

While college students have access to information about the hazards of poor dietary choices and a sedentary lifestyle, and about how to improve their health-related behaviors via such tools as the USDA's online MyPyramid.gov, they do not necessarily change their negative health behaviors. In order to help college students adopt more proactive approaches to health and lead longer and healthier lives, valid interventions to improve their lifestyles must be identified and implemented. For effective models of intervention to be formulated, groundwork on how eating a healthy diet and physical activity affect an individual must be laid. From a psychological perspective, such groundwork must include answers to questions

about individual differences. For example, why do some people easily maintain a healthy diet and make physical activity a part of their daily lives, while others take diet and physical activity (or lack thereof) to unhealthy and even deadly extremes? Can such factors as an individual's knowledge and motivations regarding eating a healthy diet and physical activity affect their behaviors? Are psychological factors affected by individuals' eating and physical activity behaviors?

Many studies focus on topics that can be applied to developing health interventions. Some researchers are studying how knowledge of diet and physical activity may affect people's corresponding health behaviors. For example, nutritional knowledge has been positively correlated with healthy eating (Wardle, Parmenter, and Waller, 2000), and knowledge regarding physical activity has been positively correlated to being more active (Rimal, 2001). However, researchers have not yet related both nutritional and physical activity knowledge and their corresponding behaviors to psychological factors such as self-esteem.

Self-esteem is an important factor in measuring an individual's overall psychological well-being (Rosenberg, Schooler, Schoenbach, and Rosenberg, 1995). Psychological factors such as depression, neuroses, and psychosomatic symptoms of anxiety often accompany low self-esteem (Rosenberg, 1965). In addition, physical activity appears to promote psychological well-being and reduces feelings of mild to moderate depression and anxiety (US DHHS and USDA, 2005). If factors such as eating a healthy diet and being physically active play a role in increasing an individual's self-esteem, then it is feasible that implementing these factors in psychological interventions and/or treatments will help alleviate illnesses such as depression, neurosis, and anxiety.

Some researchers are attempting to understand how eating attitudes and food choice motives play a role in self-esteem. Many of these studies concentrate on self-esteem in relation to eating attitudes that are associated with disordered eating (Furnham, Badmin, and Sneade, 2002; Furnham and Calnan, 1998; Baş, Aşçi, Karabudak, and Kiziltan, 2004). Few, if any, studies have looked at normal or non-maladaptive (maladaptive, as mentioned in this study, is defined as a behavior and/ or motive that is counter-productive or interferes with everyday living) eating motives in relation to self-esteem. However, a multidimensional measure for eating motives that underlie food choices has been developed for potential use in fields such as health psychology and will likely be useful for implementing appropriate strategies for health intervention models. This multidimensional measure for food choice motives includes factors such as choosing foods based on healthiness, mood enhancement, being convenient, having sensory appeal, having natural contents, having an affordable price, facilitating weight control, being familiar, and promoting ethical choices (Stephoe, Pollard, & Wardle, 1995).

A positive correlation between exercise and well-being has been found (Silberstein, Striegel-Moore, Timko, & Rodin, 1988). Many studies have particularly examined the relationship between reasons or motives for exercise and self-esteem (Furnham, et al., 2002; Silberstein, et al., 1988; Strelan, Mehaffey, & Tiggemann, 2003; Tiggemann and Williamson, 2000). In these studies, it has generally been found that exercising for appearance is moderately negatively related to self-esteem, and that exercising for health and/or fitness reasons are moderately positively related to self-esteem. Furthermore, exercising for enjoyment and/or mood reasons is moderately positively related to self-esteem (Strelan, et al., 2003).

Additional relationships among knowledge, motivations, and behaviors regarding eating a healthy diet and being physically active have not been sufficiently explored. If relationships among these variables are found, the findings may contribute to the creation of an intervention tool that includes psychological and behavioral factors to help college students lead all-around healthier lives and improve their psychological and physiological well-being. In this study, I will begin to investigate the differences in college students' knowledge, motivations, and behaviors and examine whether or not they have any relationship with one another as well as with self-esteem.

Based on previous research, I hypothesized that: 1) Compared to those who are less knowledgeable about nutritional and/or physical activity recommendations made by experts, individuals who are more knowledgeable will report eating more healthfully, being more physically active, and will report having food choice motives and exercise motives that are based on weight control, health and/or fitness reasons and will not have motives based on attractiveness or familiarity reasons. 2) Being physically active will be positively correlated with healthy eating behaviors and the exercise motives of health and/or fitness. 3) Individuals who have a higher self-esteem will report eating healthier, being more physically active, have greater knowledge of nutritional and physical activity recommendations, be more likely to perceive their own diet as being healthy, and have eating and exercising motives that are based on health and/or fitness reasons and not for reasons such as attractiveness. 4) Similar motives for eating and exercising will be reported; for example, those individuals who report exercising for health reasons will also report eating for health reasons. 5) Those individuals who perceive their diet to be healthy will be more likely to have healthy eating behaviors and have eating motives that correspond with health, weight control, and/or natural content



reasons. 6) Males and females will differ on some food choice motives and exercise motives, such as weight control and mood. 7) When the combined effects of knowledge, motives, and related behaviors on self-esteem are considered, positive effects on self-esteem are predicted, relating more knowledge, more health-related motives, and more health-related behaviors to self-esteem.

## METHODS

### *Participants*

Participants were 268 undergraduate students, 93 males and 175 females, enrolled in a sophomore-level psychology course at a large university. Approximately 25% were 19 years old or younger, about 46% were 20 or 21 years old, 19% were 22 or 23 years old, about 4% were 24 or 25 years old, and about 7% were 26 years old or older. Almost 62% of the students were Non-Hispanic White, about 24% were Hispanic, 7.5% were African American, 1.5% were Asian, and about 5% classified themselves in other ethnic groups. Most students described themselves as middle class (45%) or upper-middle class (31%).

### *Materials*

The materials for this study included a consent form and a 98-item survey divided into six sections that assessed participants' self-esteem as well as their behaviors, motivations, and knowledge regarding eating a healthy diet and engaging in physical activity. In order to control for social-desirability response bias, the six sections were ordered as follows: 1) demographic questionnaire, 2) dietary and physical activity assessment, 3) food choice motivations, 4) physical activity/exercise motivations, 5) knowledge of healthy diet and physical activity recommendations, and 6) self-esteem. The consent form along with the

complete 98- item questionnaire with scoring instructions can be found in the appendices A, B, and C.

The demographic section of the questionnaire included questions about the participants' age, gender, ethnicity, college major or minor, whether or not they lived on the college campus, and their socioeconomic status.

To determine participants' healthy eating behaviors, multiple choice questions were formulated from the United States Department of Agriculture's (USDA's) healthy eating recommendations found in the "Dietary Guidelines for Americans 2005." Questions addressed participants' fruit, vegetable, whole grain, and dairy consumption in the last seven days. An additional question at the end asked about the participant's perception regarding the healthfulness of his/her diet.

In order to survey physical activity behaviors, questions were adapted from the "Physical Activity Assessment Tool" or PAAT (Meriwether, McMahon, Islam, and Steinmann, 2006). The PAAT was originally developed for physicians to quickly assess a patient's physical activity, and therefore make proper recommendations to the patient. The PAAT includes questions that measure type, frequency, and duration of moderate and vigorous activity from all four domains of physical activity (leisure, occupational, household, and transportation) in the last seven days, and asks if this is "more, less, or about the same as usual" activity. While these questions were included in this study's questionnaire, open-ended questions were first modified into a multiple-choice format so the questionnaire could be computer scored. To help maintain validity and reliability to the extent possible, the order of the questions was very similar to the original order in the PAAT. The original PAAT also included questions about contraindications to physical activity, stage of change, patient-oriented benefits, and

psychosocial facilitators of physical activity, but these were not included because they were not applicable to the subject of this study.

To evaluate food choice motivations, questions were adapted from the “Food Choice Questionnaire” (Stephoe, et al., 1995). The original 68 item questionnaire was developed to measure eating motives that underlie food choices, and included such factors as health, mood, convenience, sensory appeal, natural content, price, weight control, familiarity, and ethical concern. However, the factor of sensory appeal, which consisted of four items, was omitted since it was not relevant to this study’s purpose. In order to maintain validity and reliability, the order of the items was kept very close to the order of the items in the original questionnaire. Participants were asked to endorse the statement “It is important to me that the food I eat on a typical day...” for each of the 64 items by choosing between four responses: *not at all important, a little important, moderately important, and very important*, scored from 1 to 4. In example, some statements for the 9 food choice factors were: “is nutritious,” “cheers me up,” and “is cheap.” All of the statements can be found in Appendix B, Section B.

To measure participants’ physical activity/exercise motivations, questions were adapted from the “Reasons for Exercise Inventory” (Silberstein, et al., 1988). The questionnaire asks the participants to rate the importance of a variety of reasons for why they may exercise using a scale ranging from 1 to 7, one being not at all important to seven being extremely important. All of the original 24 items of the questionnaire were kept; questions assessed factors such as weight control, fitness, mood, health, attractiveness, enjoyment, and tone. In example, some statements for the 7 exercise factors were: “to be slim,” “to have fun,” and “to improve my appearance.” All of the statements can be found in Appendix B, Section C. To

facilitate scantron scoring, the range of the scale was slightly altered to “a” through “d”. “a” being not at all important, “b” being a little important, “c” being moderately important, and “d” being a very important reason for why the participant exercises.

To assess participants’ knowledge regarding eating a healthy diet, a total of seven multiple choice questions were adapted from the “Nutrition Knowledge Questionnaire” (Parmenter and Wardle, 1999) and the recommendations given by the USDA (2005) in the “Dietary Guidelines for Americans 2005.” The questions included items that referenced recommendations made of the following particular food groups: fruits, vegetables, milk and milk equivalent products, fats, and whole grains. In example, some of the questions were: “according to accepted guidelines, how many cups of fruit do you think people should consume per day (for a reference 2,000 calories a day intake?)” and “what do experts consider the healthiest type of fat?” All of the questions assessing knowledge of a healthy diet can be found in Appendix B, Section D.

In order to survey participants’ knowledge regarding physical activity recommendations, six multiple choice questions were adapted from the interview questions used by Morrow and colleagues (Morrow, Krzewinski-Malone, Jackson, Bungum, & FitzGerald, 2004) and the recommendations provided by the USDA (2005) and the US DHHS (2005) in “Dietary Guidelines for Americans, 2005”. In example, some of the questions were: “what is the minimum number of days per week you believe a person must be physically active in order to receive any health benefit?” and “what is the minimum length of time (in minutes) one needs to be physically active throughout a typical day in order to achieve a health benefit?” All of the questions assessing knowledge of physical activity recommendations can be found in Appendix B, Section D.

Lastly, to determine participants' self-esteem, the ten-item "Rosenberg Self-Esteem Scale" (Rosenberg, 1965), a generally accepted measure of self-esteem, was used. The scale is a ten-item questionnaire in which positive and negative statements are presented alternatively to reduce the danger of response set. In this study, the ten items were answered on a four point scale; from strongly agree to strongly disagree. Participants were asked to rate the degree to which they agree with the statements. In example, some of the statements were: "on the whole, I am satisfied with myself" and "at times, I think I am no good at all." The entire "Rosenberg Self-Esteem Scale" (Rosenberg, 1965) can be found in Appendix B, Section E.

Since I used Rosenberg's self-esteem scale, I used his operational definitions for low and high self-esteem as well. According to Rosenberg (1965), low self-esteem "implies self-rejection, self-dissatisfaction, [and] self-contempt. The individual lacks respect for the self he observes" (Rosenberg, 1965, p. 31). On the other hand, Rosenberg (1965) describes high self-esteem as when:

The individual respects himself, considers himself worthy; he does not necessarily consider himself better than others, but he definitely does not consider himself worse; he does not feel that he is the ultimate in perfection but, on the contrary, recognizes his limitations and expects to grow and improve. (Rosenberg, 1965, p. 31)

### *Procedure*

Students in a psychology class at a large southern university were asked to volunteer to be part of the research study following a class examination in order to receive extra credit points for that particular class. However, if any student did not wish to participate, they were given an alternative extra credit option. Each volunteer was asked to sign a consent form upon

their decision to participate in the study; however, their names were not connected to their responses. Information disclosed by the participants remained confidential, and the general results found from the study were provided to students upon request.

The professor explained the procedure for participation in the study before the students began their class examination. The information about the research, including what the study was considering, assurances of anonymity, and the instructions for the surveys were given at this time. After the students completed their class examination they approached the researcher to receive the survey materials which included a 98-item questionnaire, consent form, and a scantron answer sheet. The consent form described the information requested during the study, identified any foreseen risks, gave assurances of anonymity, and provided further contact information if students were interested in learning about the hypothesis and results found. Once the participants completed the survey, they returned the materials to the researcher and signed a separate sheet in order to receive their extra credit. The students then left the room after they finished.

## RESULTS

### *Hypothesis 1: Knowledge, Health Behaviors, and Motives*

Correlation analyses were performed to identify the relations between overall nutrition and physical activity knowledge and healthy eating and exercise behaviors. Overall nutrition and physical activity knowledge was positively correlated to healthy eating behaviors ( $r=.21$ ,  $p< 0.01$ ) and was not significantly correlated with physical activity behaviors ( $r=.05$ ,  $p<0.05$ ). These results partially support my prediction that those individuals who are more knowledgeable about nutritional and physical activity recommendations made by experts will

report eating more healthfully and report being more physically active than those individuals who are less knowledgeable.

Correlational analyses were performed to identify the relationship between overall nutritional and physical activity knowledge and the items measuring exercise motives and eating motives that underlie food choices. The correlations are given in Table 1. Positive correlations were found between overall knowledge and the exercise motives based on weight control, fitness, health, and tone. Positive correlations were also found between overall knowledge and the food choice motives based on health and weight control. These results are consistent with my hypothesis that those individuals who are more knowledgeable about nutritional and/or physical activity recommendations made by experts will report having exercise motives that are based on weight control, health and/or fitness reasons and food choice motives that are based on weight control and/or health reasons. However, I did not find that a negative correlation existed between overall knowledge and more superficial exercise motives such as attractiveness as predicted. This may be due to the fact that I based my hypothesis off of studies that focus on motives related to eating disorders.

#### *Hypothesis 2: Physical Activity, Healthy Eating Behaviors, and Exercise Motives*

A positive correlation was found between physical activity and healthy eating behaviors ( $r = .26, p < 0.01$ ). Furthermore, a correlational analysis was performed to identify the relations between physical activity and the items measuring exercise motives. The correlations are given in Table 2. Positive correlations were found between physical activity and the exercise motives fitness and health. These results are consistent with my prediction that individuals who report being more physically active will also report healthy eating behaviors as well as having exercise motives such as health and/or fitness.

Table 1  
*Correlations between Overall Nutritional and Physical Activity Knowledge and Exercise Motives*

Overall Knowledge		
<u>Exercise Motives</u>	Weight Control	.151*
	Fitness	.164*
	Mood	.079
	Health	.251**
	Attractiveness	.067
	Enjoyment	-.079
	Tone	.174**
<u>Food Choice Motives</u>	Health	.233**
	Mood	-.023
	Convenience	.075
	Natural Content	.063
	Price	.055
	Weight Control	.181**
	Familiarity	-.116
	Ethical Concern	-.120

Note: \*p<.05, two-tailed, \*\*p<.01, two-tailed

Table 2  
*Correlations between Physical Activity and Exercise Motives*

Physical Activity		
<u>Exercise Motives</u>	Weight Control	-.068
	Fitness	.252**
	Mood	.109
	Health	.202**
	Attractiveness	.079
	Enjoyment	.069
	Tone	.068

Note: \*p<.05, two-tailed, \*\*p<.01, two-tailed



*Hypothesis 3: Self-esteem, Health Behaviors, Knowledge, Perception of Own Diet, and Motives*

Overall self-esteem as indicated by the “Rosenberg Self-Esteem Scale” (Rosenberg, 1965) was positively correlated with healthy eating behaviors ( $r=.16$ ,  $p<0.05$ ) and exercise behaviors ( $r=.22$ ,  $p<0.01$ ), nutritional and physical activity knowledge ( $r=.14$ ,  $p<0.05$ ), as well as perceiving one’s own diet as being healthy ( $r=.31$ ,  $p<0.01$ ). These results are consistent with my hypotheses that those individual’s with a high self-esteem will report having healthy eating behaviors; being physically active; being more knowledgeable about nutrition and exercise recommendations; and perceiving their own diet as being healthy.

A correlational analysis was performed to identify the relations between overall self-esteem as indicated by the “Rosenberg Self-Esteem Scale” (Rosenberg, 1965) and the items measuring exercise motives. The correlations are given in Table 3. Positive correlations were found between overall self-esteem and the exercise motives of fitness and health. A negative correlation was found between overall self-esteem and the reason for exercise motive of attractiveness. These results match my prediction that those individuals who have a higher self-esteem will report having exercise motives that are based on health and/or fitness reasons and not for reasons such as attractiveness.

A correlational analysis was performed to identify the relations between overall self-esteem as indicated by the “Rosenberg Self-Esteem Scale” (Rosenberg, 1965) and the items measuring eating motives that underlie food choices. The correlations are given in Table 3. Positive correlations were found between overall self-esteem and the food choice motives of health and natural content. Negative correlations were found between overall self-esteem and the food choice motives of mood, familiarity, and ethical concern. These results partially

match my prediction that those individuals who have a higher self-esteem will report having food choice motives that are based on health reasons.

Table 3  
*Correlations between Self-esteem and Exercise and Food Choice Motives*

	Self-Esteem	
<u>Exercise Motives</u>	Weight Control	.095
	Fitness	.197**
	Mood	.064
	Health	.221**
	Attractiveness	-.127*
	Enjoyment	-.068
	Tone	.067
	<u>Food Choice Motives</u>	Health
Mood		-.226**
Convenience		.051
Natural Content		.133*
Price		.055
Weight Control		-.015
Familiarity		-.139*
Ethical Concern		-.130*

Note: \*p<.05, two-tailed, \*\*p<.01, two-tailed

*Hypothesis 4: Food Choice Motives and Exercise Motives*

A correlational analysis was performed to identify the relations among the items measuring eating motives that underlie food choices and the items measuring exercise motives. The correlations are given in Table 4. These results agree with my hypothesis that similar motives for eating and exercising will be reported; for example, those individuals who report exercising for health reasons will also report eating for health reasons. The same can be said for mood and weight control.

Table 4  
Correlations between Food Choice Motives and Exercise Motives

(Factors)	<u>Exercise Motives</u>						
	Weight Control	Fitness	Mood	Health	Attractiveness	Enjoyment	Tone
Health	.211**	.531**	.404**	.573**	.172**	.288**	.252**
Mood	.220**	.181**	.462**	.234**	.181**	.367**	.212**
Convenience	.252**	.009	.130*	.053	.162**	.119	.248**
Natural Content	.187**	.434**	.347**	.433**	.112	.271**	.169**
Price	.183**	.057	.122	.126*	.274**	.079	.234**
Weight Control	.574**	.269**	.298**	.293**	.248**	.117	.434**
Familiarity	.235**	.018	.179**	.051	.167**	.234**	.245**
Ethical Concern	.096	.200**	.230**	.212**	.054		

Note: \*p<.05, two-tailed, \*\*p<.01, two-tailed

*Hypothesis 5: Perceptions of Own Diet, Healthy Eating Behaviors, and Food Choice Motives*

A positive correlation was found between the perception of the healthfulness of one's own diet and healthy eating behaviors ( $r=.51, p<0.01$ ). This result agrees with my prediction that those individuals who perceive their diet as being healthy will also report eating a healthy diet. Furthermore, positive correlations were found between the perception of the healthfulness of one's own diet and the food choice motives health, natural content, and weight control. Negative correlations were found between perception and the food choice motives convenience, price, and familiarity. These correlations are given in Table 5. These results partially agree with my hypothesis that those individuals who perceive their diet as being healthy will have eating motives that correspond with health, weight control, and/or natural content reasons. However, I did not anticipate any negative correlations with perception of one's own diet and food choice motives.

Table 5  
*Correlations between Perception of Own Diet and Food Choice Motives*

Perception of the Healthfulness of Own Diet	
<u>Food Choice Motives</u>	Health .389**
	Mood -.079
	Convenience -.150*
	Natural Content .366**
	Price -.156*
	Weight Control .143*
	Familiarity -.183**
	Ethical Concern .043

*Note:* \* $p < .05$ , two-tailed, \*\* $p < .01$ , two-tailed

*Hypothesis 6: Gender and Motives*

A multivariate analysis of variance (MANOVA) was performed to investigate the effect of gender on exercise motives, as measured by “Reasons for exercise inventory” (Silberstein, et al., 1988). The MANOVA identified significant differences between genders for the motives of weight control,  $F(1, 248) = 42.39$ ,  $p < .001$ , mood  $F(1, 248) = 9.19$ ,  $p < .01$ , and tone  $F(1, 248) = 17.65$ ,  $p < .001$ . For each of these motives, females had a significantly higher average score than the males.

A MANOVA was also performed to investigate the effect of gender on eating motives, as measured by the “Food Choice Questionnaire” (Step toe, et al., 1995). The MANOVA identified significant differences between genders for the motives of mood,  $F(1, 255) = 5.17$ ,  $p < .05$ , convenience  $F(1, 255) = 3.94$ ,  $p < .05$ , and weight control  $F(1, 255) = 25.23$ ,  $p < .001$ . For each of these motives, females had a significantly higher average score than the males. These results match my hypothesis that males and females would differ on some exercise and food choice motives, specifically the motives related to weight control and

mood. However, I did not predict that females would be more likely to choose foods based on convenience.

#### *Hypotheses 7: Knowledge, Behaviors, Motives, and Self-esteem*

To consider the impact of these variables (nutritional and physical activity knowledge, eating and exercise behaviors, and food choice and exercise motives) together upon self-esteem, a regression analysis using a forward method of variable entry was performed with self-esteem as the dependent variable. The predictor variables included the eight food choice motives of health, mood, convenience, natural content, price, weight control, familiarity, and ethical concern; the seven exercise motives of weight control, fitness, mood, health, attractiveness, enjoyment, and tone; diet and exercise recommendation knowledge; physical activity behavior; healthy eating behavior; and the perception of one's own diet.

The first variable to enter was the food motive of mood,  $F(1, 208) = 14.64, p < .001$ , which accounted for 7% of the variance. The food motive of health entered next and increased the explained variance to 14%,  $F(2, 207) = 16.11, p < .001$ . The final three variables to enter significantly increased the variance explained to 21% and were the following: the exercise motive of health, accounting for an additional 3% of the variance,  $F(3, 206) = 12.76, p < .001$ ; the exercise motive of attractiveness, accounting for another 3% of the variance,  $F(4, 205) = 12.02, p < .001$ ; and the food motive of ethical concern, accounting for an additional 2% of the variance,  $F(5, 204) = 10.91, p < .001$ . No other variables significantly explained additional variance in self-esteem. This analysis supports our original idea that those individuals who report having the exercise motive based on attractiveness will tend to have a lower self-esteem; however, we did not anticipate these other variables to collectively predict a lower self-esteem.

## DISCUSSION

This study found, as predicted, that in college students, eating and exercise knowledge was positively related to exercise and eating behaviors and motives, and ultimately to self-esteem in the correlational analyses. Self-esteem was found to be positively correlated with overall nutrition and physical activity knowledge, healthy eating behaviors, and healthy exercise behaviors. Self-esteem was also positively correlated with the exercise motives of fitness and health, and the food choice motives of health and natural content. Self-esteem was negatively correlated to the food choice motives of mood, familiarity, and ethical concern.

However, this study only outlines relationships among these variables. To determine cause and effect relationships, future research could employ a longitudinal design that includes a wider variety of participants, not just college students. Possible research questions could include the following: Does increasing an individual's knowledge about healthy diet and physical activity improve their health-related behaviors and/or change their eating and exercise motives? Can psychological factors, such as self-esteem and well-being be increased by improving an individual's eating and physical activity behaviors? Results from such studies could further the groundwork for developing interventions to help individuals acquire and maintain healthy habits and improve well-being.

One study conducted by Stellingma and colleagues (2006) created inconsistent cognitions within individuals to elicit positive changes in college students' diet and physical activity behaviors. They found that making college students feel greater levels of risk for health problems associated with eating and exercise behaviors had little effect on their health-related behaviors. This is interesting in regard to the present study because the food choice motive and exercise motive of health was positively correlated to college students'

corresponding behaviors. Therefore, if being healthy is a significant motive behind college students' health-related behaviors, then it would seem that making them feel greater levels of risk for health problems would have created stronger intentions for changing health behaviors. Perhaps both of these variables (health behavior motives and feelings of cognitive dissonance) should be considered in future studies dealing with health behaviors.

Furthermore, Stellingma and colleagues (2006) found that when college students' felt at risk for diminished physical appearance due to their unhealthy behaviors, they were more likely to question their health-related behaviors. Once again, this does not reflect correlations found in the present study; exercising to increase attractiveness, which relates to physical appearance, was not significantly correlated with physical activity. If exercising to increase attractiveness is not a significant motive for exercising, it seems that it would not influence college students' cognitions about their health-related behaviors. However, Stellingma and colleagues' finding may have an interesting implication when taking into account the results of the regression analysis from the current study. The exercise motive of attractiveness accounted for 3% of the variance in low self-esteem, even after taking into account several other eating and exercise motives. Therefore, if exercising to increase attractiveness seems to play an important role in self-esteem and if emphasizing the effect of health behaviors on physical appearance is important in increasing positive health-related behaviors (Stellingma, et al., 2006), then perhaps future studies could look more closely at the relationship among these variables (the health behavior motives of attractiveness and appearance, self-esteem and/or other important psychological factors, cognitions surrounding health-related behaviors, and health behavior change) in order to develop appropriate intervention strategies that target college students' health-related behaviors.

Limitations of the current study are worth noting. Physical activity and healthy eating behaviors were not individualized. For example, the survey did not take into consideration the different dietary needs of individuals based on age, gender, and physical activity level. The survey also did not include unhealthy foods and beverages that may contain added fats, added sugars, and alcohol. This is important to note because recommended calorie intake will differ for individuals based on age, gender, and activity level (USDA and US DHHS, 2005).

Furthermore, because physical activity/diet recall and reporting involve a complex cognitive process, misclassifications by participants may have occurred due to errors in the interpretation of questions; estimation of duration, frequency, and intensity of physical activity periods; estimation of frequency and amount of food groups, or failure to recognize some activities as physical activity (Washburn and Montoye, 1986; Montoye, 2000; Sallis and Saelens, 2000; Durante and Ainsworth, 1996; Baranowski, 1988; Taylor, Coffey, Berra, Iaffaldano, Casey, & Haskell, 1984). Future studies could focus more on the individual by implementing a greater empirical research method, such as having participants wear a heart monitor in order to record their level of physical activity and having them record their diets in a type of food diary that professionals could examine and rate on a scale of healthfulness.

As indicated by these results, knowledge, motivations, and behavior related to a healthy lifestyle can impact not only physical health but mental health as well. In a society that emphasizes appearance and success while also suggesting that we indulge ourselves, motives related to eating and exercising can become complex. The data here suggest that some eating and exercise motives may be positively related to self-esteem while other may be negatively related. Becoming more self-aware of reasons behind our choices and possible implications



of those choices for our physical and psychological health may ultimately promote the well-being of individuals as well as society as a whole.

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APPENDIX A  
Consent Form

**Knowledge, Motivations, and Behaviors Regarding Eating a Healthy Diet and Physical Activity  
in Relation to Self-Esteem in College Students**

You are invited to participate in a study of self-esteem in relation to knowledge, motivations, and behaviors regarding eating a healthy diet and physical activity in college students. We hope to learn if any relationship exists between self-esteem and health behaviors. You were selected as a possible participant in this study because you are a member of the college population.

You will receive a small amount of extra credit if you decide to participate in this study. If you would prefer to write a one-page summary of a brief article, that option is available to you in lieu of participating in this research.

If you decide to participate you will be asked to complete 92 questions assessing demographic information and information about your self-esteem and your knowledge, motivations, and behaviors regarding eating a healthy diet and physical activity. The questionnaire should take about 15 minutes for you to complete. There are no foreseen risks in completing the questions. However, if you find participation difficult or disagreeable, you may discontinue participation at any time and still receive the extra credit. You may skip a question that you do not wish to answer for any reason. The Counseling Center, 512-245-2208, located in the LBJ Student Center, Room 5-4.1, is available free of charge to help students with a variety of stresses and personal problems.

Participation in this study is voluntary. Your decision whether to participate or not will in no way prejudice your future relations with Texas State University-San Marcos, the Department of Psychology, your professors, or any person affiliated with the University. You will not be putting your name or any identifying information on the questionnaire so your anonymity is assured. A separate sheet is used for you to print your name to receive the extra credit. The separate consent form and anonymous computer-graded data forms will be kept for approximately 5 years after data collection. A copy of this consent form is attached for you to keep.

If you have any questions, please ask. After the study is over, if you have any additional questions, you may contact Dr. Ogletree (512-245-3156 - so01@txstate.edu) or Chelsea Fielder (254-702-1191 - cf1163@txstate.edu). If you have questions regarding participants' rights or concerns, you may contact the Co-Chairs or Administrator of the Internal Review Board, Dr. Eric Schmidt (512-245-3979 - es17@txstate.edu), Dr. Lisa Lloyd (512-245-8358 - LL12@txstate.edu), and/or Ms. Becky Northcut, at 512-245-2102. After my study is completed, you will be given more information about my hypothesis and my results.

At this time, you are making a decision whether or not to participate in this study. Your signature indicates that you have read the information provided above and have decided to participate.

---

Signature of Participant

---

Date

APPENDIX B  
Questionnaire

**Demographic Questionnaire**

**Please mark your answers on the computer-graded form.**

1. What is your age?
  - a. 19 or younger
  - b. 20 or 21
  - c. 22 or 23
  - d. 24 or 25
  - e. 26 or older
  
2. What is your gender?
  - a. Male
  - b. Female
  
3. What is your ethnicity?
  - a. Non-Hispanic White
  - b. African-American
  - c. Hispanic
  - d. Asian
  - e. Other
  
4. Are you seeking a major or minor in one of the following:
  - a. Nutrition and Foods
  - b. The department of health, physical education, and recreation
  - c. Other
  
5. Do you live on campus?
  - a. Yes
  - b. No
  
6. How would you describe your family's socioeconomic status?
  - a. Upper class
  - b. Upper-middle class
  - c. Middle class
  - d. Lower-middle class
  - e. Lower class

**Section A: The following questions address your dietary and physical activity. With respect to the last 7 days, please answer the following questions on your computer-graded form. To help define moderate and vigorous activity, examples of each are provided in the boxes below.**

<b>Moderate Activity Examples</b>		
Walking Fast (3-4mph)	Walking downstairs	Aerobics, low impact
Bicycling (Less than 12 mph)	Bowling	Calisthenics, light
Carpentry	Dancing	Fishing, standing
Gardening: Planting, raking, weeding	Frisbee	Golf
Housework: Mopping, sweeping, vacuuming	Gymnastics	Horseback riding
Lifting, turning, carrying (Less than 50 lbs.)	Mowing lawn, power mower	Ping Pong
Playing with children: Walking, kneeling, lifting	Rowing, Sailing	Skateboarding
Tai Chi, Qi gong	Volleyball	Yoga, vigorous stretching
Water Aerobics	Washing, working on car	Weight Lifting

<b>Vigorous Activity Examples</b>		
Jogging, Running	Walking upstairs	Aerobics, high impact
Bicycling, fast (More than 12 mph)	Ski Machine (Nordic Track)	Calisthenics, vigorous
Carrying loads (More than 50 lbs.)	Basketball	Jumping rope
Roller Skating, Roller Blading	Judo, Karate, Kick boxing	Soccer
Tennis, Racquetball	Swimming laps	Stair climber (Stairmaster)

- 7.** Which of the following descriptions best describes your physical activity level during the last 7 days?
- a. I was not physically active or I was physically active for less than a total of 30 minutes on 1 to 7 days.
  - b. I was moderately active for at least a total of 30 minutes on 1 to 2 days.
  - c. I was moderately active for at least a total of 30 minutes on 3 or more days.
  - d. I was moderately to vigorously active for a total of 60 to 90 minutes on 1 to 2 days.
  - e. I was moderately to vigorously active for a total of 60 to 90 minutes on 3 or more days.
- 8.** Compared to your physical activity over the last 3 months, was this 7 days' activity:
- a. Less
  - b. More
  - c. About the Same



9. During the last 7 days, how many days did you eat at least one piece of fruit? (Fruit juice is not included.)
- 0
  - 1-2
  - 3-4
  - 5-7
10. On those days, about how many cups of fruit did you eat each day, on average? (Each of the following counts as 1 cup: 1 medium grapefruit, 1 large banana, 1 small apple, 1 small wedge of watermelon, 1 large orange, 8 large strawberries. Fruit juice is not included.)
- 0
  - 1
  - 2-3
  - 4 or more
11. During the last 7 days, how many days did you eat at least one serving of vegetables?
- 0
  - 1-2
  - 3-4
  - 5-7
12. On those days, about how many cups of vegetables did you eat, on average? (Each of the following counts as 1 cup: 1 large bell pepper, 2 large celery stalks, 1 medium potato, 1 cup cooked or 2 cups raw greens (spinach, collards, turnip greens), 1 large sweet potato, 12 baby carrots, 2 medium carrots, 10 broccoli or cauliflower florets, 1 cup of green beans.)
- 0
  - 1
  - 2-3
  - 4 or more
13. During the last 7 days, how many days did you eat at least one serving of whole grains? (Consider “whole grains” as being 100% whole grain products and products containing whole grains as ingredients: for example, whole wheat and rye breads, whole grain cereals and crackers, oatmeal, and brown rice.)
- 0
  - 1
  - 2-3
  - 4 or more

14. On those days, about how many servings of whole grains did you eat each day, on average? (Each of the following counts as 1 serving (1 ounce) of whole grains:  $\frac{1}{2}$  cup cooked brown rice,  $\frac{1}{2}$  cup whole grain pasta, or  $\frac{1}{2}$  cup cooked whole grain cereal; 1 ounce dry pasta or rice; 1 slice bread; 1 small muffin (1 oz); 1 cup ready-to-eat cereal flakes.)
- a. 0
  - b. 1-2
  - c. 3-4
  - d. 5 or more
15. During the last 7 days, how many days did you consume at least one serving of fat-free or low-fat milk or equivalent milk products? (Each of the following counts as 1 serving of fat-free or low-fat milk products:  $\frac{1}{2}$  ounce low-fat cheese, 1 cup yogurt, 1 cup milk.)
- a. 0
  - b. 1-2
  - c. 3-4
  - d. 5-7
16. On those days, about how many cups of fat-free or low-fat milk or equivalent milk products did you consume each day, on average? (Each of the following counts as 1 serving of fat-free or low-fat milk products:  $\frac{1}{2}$  ounce low-fat cheese, 1 cup yogurt, 1 cup milk.)
- a. 0
  - b. 1-2
  - c. 3
  - d. 4 or more
17. Please use the following scale to indicate how healthful you consider your diet to be?

a	b	c	d	e
Not at all healthy	Somewhat healthy	Moderately healthy	Mostly healthy	Extremely healthy

**Section B: The following questions are surveying your motivations for consuming food items. Please indicate your reply to the following statement by marking your answer on the computer-graded form:**

**“It is important for me that the food I eat on a typical day...” for each item given below, by using the following scale:**

a	b	c	d
Not at all important	A little important	Moderately important	Very important

18. Is easy to prepare
19. Is low in calories
20. Contains natural ingredients
21. Is not expensive
22. Is low in fat
23. Is familiar
24. Is high in fiber
25. Is nutritious
26. Is good value for money
27. Cheers me up
28. Can be cooked very simply
29. Helps me cope with stress
30. Helps me control my weight
31. Is packaged in an environmentally friendly way
32. Comes from countries I approve of politically
33. Contains a lot of vitamins and minerals
34. Contains no artificial ingredients
35. Keeps me awake/alert
36. Helps me relax
37. Is high in protein
38. Takes no time to prepare
39. Keeps me healthy
40. Makes me feel good
41. Has the country of origin clearly marked
42. Is what I usually eat
43. Helps me cope with life
44. Can be bought in shops close to where I live or work
45. Is cheap

**Section C: People exercise for a variety of reasons. When people are asked why they exercise, their answers are sometimes based on the reasons they believe they *should* have for exercising. What I want to know are the reasons people *actually* have for exercising. Please respond to the items below as honestly as possible. To what extent is each of the following an important reason that you have for exercising? Use the scale below in giving your answers on the computer-graded form: (If you never exercise, please skip this section.)**

a	b	c	d
Not at all important	A little important	Moderately important	Extremely important

46. To be slim
47. To socialize with friends
48. To improve my muscle tone
49. To cope with sadness, depression
50. To be attractive to members of the opposite sex
51. To alter a specific area of my body
52. To maintain my current weight
53. To improve my mood
54. To improve my cardiovascular fitness
55. To improve my flexibility, coordination
56. To have fun
57. To improve my overall health
58. To increase my energy level
59. To redistribute my weight
60. To increase my resistance to illness and disease
61. To improve my appearance
62. To lose weight
63. To cope with stress, anxiety
64. To improve my strength
65. To be sexually desirable
66. To maintain my physical well-being
67. To improve my endurance, stamina
68. To meet new people
69. To improve my overall body shape

**Section D: The following questions address your knowledge of physical activity and nutrition. Please mark your answer on your computer-graded form. If you do not know the answer, mark 'not sure' rather than guess.**

- 70.** What is the minimum number of days per week you believe a person must be physically active in order to receive any health benefit?
- a. 0 – 1
  - b. 2
  - c. 3- 5
  - d. Not sure
- 71.** What is the minimum length of time (in minutes) one needs to be physically active throughout a typical day in order to achieve a health benefit?
- a. 15
  - b. 20
  - c. 30
  - d. Not sure
- 72.** Vigorous levels of physical activity are necessary to provide any health benefits.
- a. True
  - b. False
  - c. Not sure
- 73.** Moderate levels of physical activity do NOT provide any health benefits.
- a. True
  - b. False
  - c. Not sure
- 74.** Ten minutes of physical activity three times per day provide the same health benefits as a single session of 30 minutes.
- a. True
  - b. False
  - c. Not sure
- 75.** Everyone should get 30 minutes of at least moderate physical activity most days of the week.
- a. True
  - b. False
  - c. Not sure
- 76.** According to accepted guidelines, how many cups of fruit do you think people should consume per day (for a reference 2,000 calories a day intake?)
- a. Less than 1
  - b. 1
  - c. 2
  - d. Not sure

**77.** According to accepted guidelines, how many cups of milk or equivalent milk products do you think people should consume per day (for a reference 2,000 calories a day intake?)

- a. 1
- b. 2
- c. 3
- d. Not sure

**78.** Consuming a variety of fruits and vegetables is NOT important when eating a healthy diet.

- a. True
- b. False
- c. Not Sure

**79.** According to accepted guidelines, how many cups of vegetables do you think people should consume per day (for a reference 2,000 calories a day intake?)

- a. Less than 1
- b. 1 to 2
- c. More than 2
- d. Not sure

**80.** What do experts consider the healthiest type of fat?

- a. Monosaturated fat
- b. Trans fat
- c. Saturated fat
- d. Not sure

**81.** How much of the daily recommendation for grains do experts suggest come from whole grains?

- a. None
- b.  $\frac{1}{4}$
- c.  $\frac{1}{2}$
- d. Not sure

**82.** According to accepted recommendations, dietary fat should comprise what percentage of total calories?

- a. 0% to 15%
- b. 15 % to 20%
- c. 20% to 35%
- d. Not sure

**Section E: The following questions are surveying your self-esteem. Please indicate your reply to each statement given below, by marking on your computer-graded form:**

a  
Strongly agree

b  
Agree

c  
Disagree

d  
Strongly disagree

**83.** On the whole, I am satisfied with myself.

**84.** At times, I think I am no good at all.

**85.** I feel that I have a number of good qualities.

**86.** I am able to do things as well as most other people.

**87.** I feel I do not have much to be proud of.

**88.** I certainly feel useless at times.

**89.** I feel that I'm a person of worth, at least on an equal plane with others.

**90.** I wish I could have more respect for myself.

**91.** All in all, I am inclined to feel that I am a failure.

**92.** I take a positive attitude toward myself.

APPENDIX C  
Scoring Instructions for the Questionnaire

**Demographic Questions (Questions 1-6):** enter into SPSS as variables.

**Section A (Questions 7-17)**

**7.** Treat this answer as a rough quantitative variable to see how level of physical activity is related to other variables (e.g., nutrition knowledge, exercise motivations, etc.)

**8.** The answers (less, more, about the same) may just be interesting to see and report the percentages of those participants who fell into these categories.

**Questions 9-16:** Each answer to each question is allotted a certain number of points to represent their health level (please see below for amount of points allotted for each answer and what the scores represent). These scores are totaled for a sum ranging between 0 and 24. Total scores ranging from 0 to 4 will be considered “not at all healthy”, 5-9 “somewhat healthy”, 10-14 “moderately healthy”, 15-19 “mostly healthy”, and 20-24 “extremely healthy”.

**Question 9.** a. 0, b. 1, c. 2, d. 3

**10.** a. 0, b. 1, c. 3, d. 3

**11.** a. 0, b. 1, c. 2, d. 3

**12.** a. 0, b. 1, c. 3, d. 3

**13.** a. 0, b. 1, c. 2, d. 3

**14.** a. 0, b. 1, c. 3, d. 3

**15.** a. 0, b. 1, c. 2, d. 3

**16.** a. 0, b. 1, c.3, d. 3

Scores represent as follows:

0= not at all healthy

1= somewhat healthy

2= mostly healthy

3= extremely healthy

**17.** This question is a “standalone” question to assess how healthful people perceive their diet to be.



**Section B (Questions 18 – 45):** Items for each factor (health, mood, convenience, natural content, price, weight control, familiarity, ethical concern) were added and a mean score for each factor was computed. The mean factor then had a total scale score (1 – 4) which represents the importance of each factor. Below are the different factors with their contributing items. The items are numbered according to their number on the questionnaire.

Factor 1 health: 33, 39, 25, 37, 24

Factor 2 mood: 29, 43, 36, 35, 27, 40

Factor 3 convenience: 18, 28, 38, 44

Factor 4 sensory appeal: (not included in this study)

Factor 5 natural content: 20, 34

Factor 6 price: 21, 45, 26

Factor 7 weight control: 19, 30, 22

Factor 8 familiarity: 42, 23

Factor 9 ethical concern: 32, 41, 31

**Section C (Questions 46-69):** Items for each factor were added and a mean score for each factor was computed. The higher the mean factor scores identify the main reason(s) individuals engage in exercise activities. Below are different factors with their contributing items. The items are numbered according to their number given on the questionnaire.

Factor 1 weight control: 46, 62, 52

Factor 2 fitness: 48, 64, 67, 55

Factor 3 mood: 49, 63, 58, 53

Factor 4 health: 54, 57, 60, 66

Factor 5 attractiveness: 61, 50, 65

Factor 6 enjoyment: 68, 47, 56

Factor 7 tone: 59, 69, 51

**Section D: (Questions 70-82):** Each answer is marked as either correct or incorrect. The total number of correct answers equals the overall score. The higher the overall score indicates higher knowledge about physical activity and nutrition. The correct answers for this section are:

70. c

71. c

72. b

73. b

74. a

75. a

76. c

77. c

78. b

79. c

80. a

81. c

82. c

**Section E (Questions 83-92):** Rosenberg Self Esteem Scale. Items without an asterisk should be scored as: a=3, b=2, c=1, d=0. Items with an asterisk are reversed scored as: a=0, b=1, c=2, d=3. Sum the scores for the 10 items. Higher scores indicate higher self-esteem.

- 83. On the whole, I am satisfied with myself.
- 84. \* At times, I think I am no good at all.
- 85. I feel that I have a number of good qualities.
- 86. I am able to do things as well as most other people.
- 87. \* I feel I do not have much to be proud of.
- 88. \* I certainly feel useless at times.
- 89. I feel that I'm a person of worth, at least on an equal plane with others.
- 90. \* I wish I could have more respect for myself.
- 91. \* All in all, I am inclined to feel that I am a failure.
- 92. I take a positive attitude toward myself.



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Dr. Shirley Ogletree, Chelsea Fielder, and Dr. Sylvia Crixell

Honors Thesis Forum

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