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# Effects of Exercise-Related versus Entertainment-Related Conversation on Post-Exercise Food Consumption

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Effects of Exercise-Related versus Entertainment-Related Conversation on Post-Exercise Food  
Consumption

By

Christa S. Ahrens

A Senior Project in Partial Fulfillment of the Honors Program Requirements

St. Catherine University

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### Abstract

Lifestyle choices of **college** students influence their risk of **obesity** and/or developing chronic heart disease later in life. Many students gain weight during **college** due to decreased exercise, overeating, and poor nutritional choices. Exercise may increase food consumption and/or the consumption of unhealthy foods due to **compensation**. The purpose of the study was to determine if individuals who discussed exercise-related topics would compensate by taking more food after the exercise session than those who discussed entertainment-related topics. Sixteen **female college** students were randomly assigned to participate in either the exercise-related or entertainment-related conversations while working out, both consisting of power walking at the same absolute intensity for the same duration. To determine if there was a difference in food **intake** between groups, the calories of the snacks that subjects took after their session were recorded. The subjects who participated in the session that had exercise-related conversations had a significantly higher **intake** of food than the subjects in the entertainment-related conversation session. In conclusion, individuals may compensate with food more if are talking about exercise-related topics than entertainment related topics while exercising.

Key words: Intake, compensation, college, female, obesity

## INTRODUCTION

Heart failure is the leading cause of hospitalization among older adults, which makes heart disease and failure major public health issues in the United States (Djoussé, Driver & Gaziano, 2009). There are more than 550,000 cases of heart failure in the United States annually. Since this study focuses on women, it is important to note that heart disease is the leading cause of death of women (Muñoz et al., 2010). The large aging population due to the post-war baby boom is expected to increase medical and social service costs substantially after 2010 (Wang, Worsley & Cunningham, 2009). In order to lower these costs, measures must be taken to increase the health of the population and therefore reduce the risk of heart failure. In order to reduce the prevalence of heart failure, it is important to understand its predictors and limit their effects.

The lifetime risk of heart failure may be influenced by modifiable lifestyle factors (Djoussé, Driver & Gaziano, 2009). Modifiable lifestyle factors include: maintaining a healthy weight, not smoking, moderate alcohol intake, engaging in regular exercise, and maintaining a healthy, balanced diet. A 20 year study by Djoussé, Driver, and Gaziano on lifestyle factors and health outcomes found that those who had healthy lifestyle habits had a lower lifetime risk of heart failure including coronary artery disease, diabetes mellitus, and hypertension. Individuals who had unhealthy lifestyle habits had a higher risk of heart failure. Past studies have shown that education on the effects of these factors may reduce an individual's lifetime risk of heart failure (Unick et al., 2010). The number of obese individuals in the United States has increased over the past decade, which has contributed to the number of cases of heart failure due to the increased demands that obesity places on the cardiovascular system.

Lifestyle choices of college students influence their risk of obesity and/or developing chronic heart disease later in life. Many students gain weight during college due to decreased exercise, overeating, and poor nutritional choices (Gruber, 2008). Anding, Suminski, and Boss (2001) found that many female college students are not following the Dietary Guidelines for Americans (DGA). The DGA has seven dietary guidelines to improve dietary habits to reduce the risk of developing chronic diseases. Sedentary habits are developed when students try to save time in their busy schedule by not exercising in order to fulfill work and school obligations. Students may choose to eat unhealthy meals because they are often cheaper than healthy meals (Epstein et al., 2006). A study on the effect of food prices on food choices by Epstein et al. (2006) found that purchases of both unhealthy and healthy food decreased when prices were raised. Also, students may prefer purchasing unhealthy foods because they take less time away from their schoolwork than healthy meals. It takes longer to shop for and cook whole grains, fruits, and vegetables for a healthy meal than frozen dinners that may be micro-waved.

Another possible problem is that students do not know the nutritional information needed for a healthier diet. For example, a study by Jasti and Kovacs (2010) found that there is a positive relationship between trans fat knowledge with food label use and eating a low-fat diet. Jasti and Kovacs (2010) found that while 73 percent of college age consumers were aware of the relationship between trans fat intake and cardiovascular disease, only 21 percent could name three food sources of trans fat. Food label use is associated with female sex, higher education levels, higher nutrition knowledge, and healthy diet behaviors. The American Dietetic Association (ADA) supports the idea that all foods can fit into a healthful eating style if consumed in moderation and combined with regular physical activity (Freeland-Graves & Nitzke, 2007). It is important for individuals to be educated on nutritional information including:

appropriate portion size, balance and adequacy of the diet of time, and the importance of obtaining nutrients from foods and physical activity to maintain a healthy lifestyle.

Food consumption control is affected by a variety of factors. Past studies have found that there may be a difference in energy intake compensation between the sexes. Davy, Van Walleghen, and Orr (2007) found that males may be better at regulating energy intake than females. While no difference between perceptions of hunger and satiety were found between the sexes, females tended to have higher levels of food compensation than males. The increased amount of compensation in women may lead to weight gain. Another factor that affects food compensation is age. A study by Appleton, Martins, and Morgan (2011) found that the ability to detect and/or adjust energy intake decreases with age. As people get older, they have a more difficult time regulating the amount of calories they consume. Appleton, Martins, and Morgan (2011) also found that individuals are better able to detect food energy deficits than excess food energy consumption.

Exercise may increase food consumption and/or the consumption of unhealthy foods due to compensation (Werle, Wansink & Payne, 2011). Individuals may unconsciously eat more if they feel that they can neutralize the negative effects of overeating by exercising. For example, a person may unconsciously take more food during a meal if they know that they are going to be working out later in the day. Also, an individual may believe that overeating is okay if they can burn off some of their excess calories by working out. Mental effort may cause people to consume more food due to decision fatigue. When the body is tired or is perceived as tired, individuals indulge more as the brain's ability to reason diminishes. A study by Pomerleau, Imbeault, Parker, and Doucet (2004) found that food compensation often occurs after exercise, even though exercise increases satiety and decreases feelings of hunger. Even if individuals

have a decreased appetite when completing an exercise program, they may consume more food because they feel that they “earned” it.

Other studies have found that exercise does not increase food compensation. King, Miyashita, Wasse, and Stensel (2010) found that exercise did not lead to acute compensatory responses in appetite or energy intake. A study by Martin, Truby, and Morgan (2007) found that exercise increases short-term appetite control in a longitudinal study, but does not increase food compensation. They found that individuals in an exercise program are more conscious about what they are eating and the amount they consume, which decreases food compensation. They also found that food compensation with exercise decreases over time.

Past studies have been done on the influence of thinking about exercise on food consumption. A study by Werle, Wansink, and Payne (2011) found that individuals who are thinking about exercise may take more food than those who think about non-exercise topics. In contrast, a study by van Kleef, Shimizu, and Wansink (2011) found that individuals exposed to exercise commercials before a meal consumed 21.7 percent fewer calories than individuals who were exposed to commercials that were not related to food or exercise. This study concluded that exercise ads decrease food intake because individuals were thinking about being healthy while eating.

Individuals who participate in exercise-related conversations may spend more time thinking about exercise, which can increase their post-exercise food compensation. Werle, Wansink, and Payne (2011) found that individuals who are thinking about exercise may consume more food than those who think about non-exercise topics. The hypothesis of the study was that those who participated in exercise-related conversations while exercising would compensate for



their efforts by taking more food after the exercise session than those who participated in entertainment-related conversations while exercising.

## METHODS

### Subjects

All procedures were approved by the St. Catherine University Institutional Review Board. The sample was a convenience sample because the researcher chose to study college students from the college she attends. Since this study was done at an all women's university, it focused on food compensation in women only. Inclusion criteria for the subjects included: female, a student, between the ages of 18 and 24 years, healthy, and being able to participate in moderate intensity exercises. Exclusion criteria included: known allergies and/or physical disabilities that prevent them from participating in moderate intensity exercises. Excluding all subjects with known allergies allowed the study to be completed without the subjects knowing that the amount of food that they consumed was going to be measured.

Subjects were recruited by word-of-mouth, informational fliers, and an informational message posted on the St. Catherine University internal website. This internal website may only be accessed by students and faculty of the university. Saint Catherine University is a women's college in the Midwest. Sixteen eligible subjects were recruited and signed an informed consent form prior to participating. The subjects attended Saint Catherine University at the time of the study.

### Procedures

This study measured the differences in post-exercise food consumption between exercise sessions that had either exercise-related or entertainment-related conversation. Deceptive techniques were necessary for this study to obtain an accurate measurement of post-exercise food

consumption. The alternative considered was telling the subjects that their post-exercise food consumption was being measured, but that could have potentially influenced the amount of food that they consumed. Subjects were told that they were participating in a study on exercises that are most effective in keeping college students active. They knew that they were going to participate in a one session exercise study, but did not know that the amount of food that they took after the study was what was actually being measured until after the debriefing statement.

Subjects were randomly assigned to participate in exercise-related or entertainment-related conversation groups while working out. The subjects participated in only one exercise session. Each subject's height and weight were recorded before the workout so that their BMI could be calculated. Both workouts consisted of power walking at the same absolute intensity for the same duration. The subjects power walked on an indoor track at the absolute intensity of 4.5 mph for 20 minutes for both sessions. The researcher controlled the pace and time by monitoring it with a stopwatch. The sessions took place on the indoor track at the university. During the entertainment-related workout, subjects were encouraged to take in their surroundings and were encouraged to discuss courses that they are enrolled in rather than focusing on the exercises. During the workout with exercise-related conversations, subjects were verbally prompted that they were working their bodies to keep them focused on the exercise. For example, they were told that they were "getting their heart pumping." They were also asked about the types of activities that they do to stay fit.

After exercising, subjects were offered a snack that they were told that they could not eat until after a brief discussion of the study. Subjects were given the choice of Kit-Kat or Reece's chocolates. The two types were selected because they were similar in calorie content. Both chocolates had five calories per gram. The calorie content of individual pieces of Kit Kats and

Reeces were 35 and 44 respectively. Two types of chocolates were chosen to provide variety in case a subject did not like one of the two. Vanilla cookies that were also provided in case subjects did not like chocolate. Each cookie was 90 calories and had 4 calories per gram. After subjects chose snacks, a debriefing statement was read to them describing the deception and why it was necessary. All questions and concerns were answered at this time. After the debriefing, the calories of each subject's snacks were recorded.

### Statistical Analyses

Statistical measurements, including an independent samples t-test, were done in Microsoft Excel (2007) to determine if there was a significant difference ( $p < .05$ ) in post-exercise food consumption between the two exercise sessions. Each Subject's BMI was calculated using their height and weight in Excel.

## RESULTS

There was one hundred percent compliance with the exercise program. Each subject walked one and a half miles during their twenty minute exercise session. None of the subjects showed signs of exercise stress or stated that the pace was difficult for them.

Table 1 compares the characteristics and post-exercise food intake between the two groups. As seen in the table, the average age and BMI of the subjects were similar between the groups. The similarity in average age between the groups was expected due to the narrow age range that was included in the study (18-24). There was a difference of post-food snack intake between the two exercise groups. The average calorie intake for the entertainment-related group was 39 calories of snacks per person. In the exercise-related conversation group the average post-exercise snack intake was 153 calories of snacks per person. The results of the study

showed a significant difference in calorie intake between the exercise-related and entertainment-related conversation exercise groups,  $p < .05$  (figure one).

Conversation	Number of Subjects	Average Age (years)	Average BMI	Average Calorie Intake
Entertainment-Related	8	$19.50 \pm 1.50$	$22.30 \pm 3.72$	39
Exercise-Related	8	$20.25 \pm 3.75$	$25.06 \pm 15.88$	153

Table 1 Comparisons of sessions

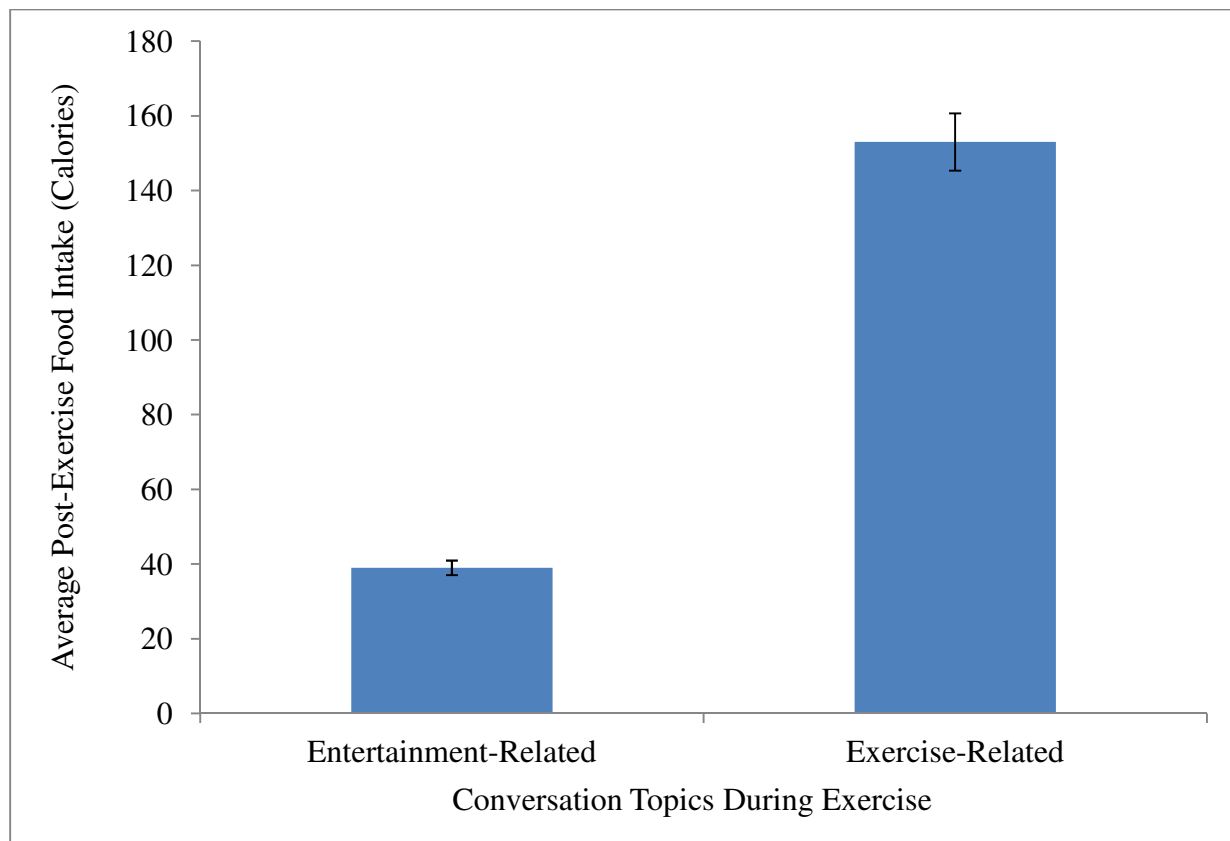


Figure 1 Comparison of average post-exercise food intake between the exercise group sessions with entertainment-related and exercise-related conversations (error bars with 5% error).

## DISCUSSION

The results of this study found that individuals who engage in conversation about exercise while they are working out are more likely to consume more food than individuals who focus on entertainment or non-exercise related topics while working out. The conclusion that individuals who have exercise-related conversations during exercise are more likely to compensate with food supports the findings of previous studies. Pomerleau et al. (2004) have found that food compensation often occurs after exercise, despite the fact that exercise decreases feelings of hunger and appetite (Pomerleau et al., 2004). While individuals may not feel as hungry when completing an exercise program, they may take more food because they feel that they “earned” it. Pomerleau et al. (2004) also found that high intensity exercise may increase energy intake in women relative to the energy expenditure of the workout.

This study does not support the findings of the study done by King, Miyashita, Wasse, & Stensel (2010). King et al. found that exercise did not lead to acute compensatory responses in appetite or energy intake. The researchers measured appetite through subject rating and energy intake was recorded by measuring food intake from a buffet. Martin, Truby, and Morgan (2007) also found that exercise increases short-term appetite control in a longitudinal study. They found that individuals in an exercise program are more conscious about what they are eating and the amount they consume. They also found that food compensation with exercise decreases over time. While food compensation was greater in the session that had exercise-related conversations than in the session with entertainment-related conversations, food compensation may decrease if subjects participated in multiple sessions.

The differences between the findings of this study and the findings of King et al. (2010) and Martin et al. (2007) may be due to difference in methodology. None of the subjects reported

that the exercise session was difficult, but the 4.5mph pace may be awkward for some females who are overweight or are not physically active. The methodology of the exercise program in the study by King et al. (2010) was a 90 minute run at a speed predicted to be about 70% VO<sub>2</sub> max. This study had a shorter duration and lower intensity than the study by King et al. (2010). The methodology used by Martin et al. (2007) was a moderate, six-week exercise program with an intensity of 65-75% of the subjects' maximum heart rate. Subjects in this study were measured one time so decreased food compensation over time could not be determined. Further research to look at whether food compensation decreases over time is warranted.

College students often make lifestyle choices (overeating, lack of exercise, and poor nutritional choices) that increase their risk of obesity and/or developing chronic heart disease later in life (Gruber, 2008). These poor habits are developed when students attempt to save time and/or are possibly a psychophysiological response to stress created by busy schedules. Epel et al. (2001) found that stress may increase food consumption in women to compensate for a negative mood. It is important that students are aware of the effects of their exercise and diet choices. Awareness of food compensation after exercise may decrease its affects on college students' food intake.

Another factor that influences food consumption is food insecurity (Townsend, Peerson, Love, Achterberg, & Murphy, 2001). Food insecurity refers to a lack of availability of and access to food. Food insecurity is most prevalent in the poor population. A study by Townsend et al. (2001) found that food insecurity is related to weight issues in women. The study shows that women who were mildly insecure were about thirty percent more likely to be overweight than women who were food secure. Individuals who have food insecurity may have higher chances of being obese due to the fact that unhealthy foods are often less expensive than healthy

foods. It is possible that some participants took more snacks because they were people with increased food insecurity. It may be beneficial for future research to investigate the relationship between food insecurity, exercise, and weight issues.

An individual's diet and exercise habits are also influenced by their parents' lifestyles. Eating habits and levels of physical activity are developed early in life and are strongly influenced by childhood experiences (Lopez-Dicastillo, Grande, & Callery, 2010). Therefore, parents' perceptions of food affect the way that they raise their children and are passed onto them. For example, parents who believe that unhealthy food does not have a great affect on their health may have children who consume a large amount of unhealthy food in adulthood. It is important for parents to promote healthy lifestyles to prevent childhood obesity and obesity and other diseases developed later in life, such as heart disease. Parents who are aware of the effects of food compensation may pass on better diet and exercise habits to their children.

### PRACTICAL APPLICATIONS

The findings of this study are relevant to individuals who are trying to lose weight as well as the health-professionals that are helping them achieve health goals. When beginning an exercise program, individuals may unconsciously compensate their work effort with food. Exercise programs may seem to not be effective if an individual unconsciously compensates with food, depending on the amount of compensation, they may maintain or gain weight, leading to discouragement and increased dropout rate. It is important for individuals who have a weight-loss goal to understand the food compensation-exercise issue in order to limit its effects on their ability to lose or maintain weight. Individuals who are aware that they may unconsciously take more food after exercise could make a greater effort to ensure that they are taking appropriate portions of food.

### IMPLICATIONS FOR FUTURE RESEARCH

The researcher studied a convenience sample of female students at a women's university in the Midwest. The sample was chosen because the researcher was a student at St. Catherine University at the time of the study. Therefore, a limitation to the study is that no males were included. Future research should be done including males. Also, future studies to determine if similar results are shown in other workout programs would be beneficial. It is also important to determine if individuals who frequently exercise and enjoy physical activity are less prone to excess food compensation than beginners or those who do not like physical activity.

Additional research on how awareness of food compensation after exercise affects the eating habits of college students is needed. Individuals who are aware of how food consumption may increase after exercising may consciously control their compensation tendencies and live a healthier life, thus decreasing the risk of obesity and chronic heart disease.

Another area of research that would be interesting is to determine if individuals who think of working out as boring or difficult have less spontaneous physical activity during the day. One thing that was noticed but not measured in this study was that more individuals who participated in the session with exercise-related conversations took the elevator out of the field house than those who were in the session with entertainment-related conversations. The elevator and stairs were at equal distances away from the subjects at the end of the study.

In conclusion, the findings of this study suggest that future research should be done to further investigate the relationship between food compensation and exercise. Decreases in excess food compensation after exercise may reduce the prevalence of obesity in the U.S. population.



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## **Institutional Review Board**

### **2011-2012 Application**

St. Catherine University is committed to safeguarding and respecting the rights and welfare of human subjects involved in research. In order to carry out this obligation, the University, through its Institutional Review Board (IRB), is responsible for conducting initial and continuing review of *all* research that involves human subjects. Investigators cannot begin research with human subjects until a complete application has been submitted to the IRB, reviewed and approved.

The purpose of this application is to ensure that human research subjects are protected. This includes protecting the privacy of subjects, respecting the autonomy of subjects, preserving the dignity of subjects, minimizing risks while maximizing benefits to subjects, and providing adequate information for subjects to make informed decisions. In addition to promoting quality research, protecting human subjects also protects the researcher, the advisor, and the University.

### **Instructions for Completing the IRB Application**

**Complete the following application in its entirety. Do not insert "see attached" in any of the application blanks. You may excerpt material from your thesis or grant proposal, but your application should be relatively concise.**

#### **Application Submission:**

- **All applications must be submitted electronically as a Word document. Submit your application via email to [Lynne Linder](mailto:llinder@stkate.edu) <llinder@stkate.edu> with "Attention IRB" in the subject line.**
- **Applications that lack clarity due to excessive errors or incomplete information may be returned to the investigator, which will delay the review. Spell- and grammar-check your document.**

#### **Checklist for application submission:**

- IRB Application with electronic signature**
- informed consent form**
- child assent form (if applicable)**
- recruiting materials (phone script, fliers, ads, etc)**
- survey/questionnaire(s), focus group or interview questions (if applicable)**
- conflict of interest/financial interest disclosure (if applicable)**
- letter(s) of support (if you are conducting research at another agency, school, etc).**

**Questions? Visit the St. Catherine IRB website at [www.stkate.edu/irb](http://www.stkate.edu/irb) for additional information and for a list of contacts.**

**REQUEST FOR THE APPROVAL  
FOR THE USE OF HUMAN SUBJECTS IN RESEARCH  
2011 - 2012 APPLICATION FORM**

Human Subjects Code Number:   11 EXP 44    
(To be assigned by SCU IRB)

**APPLICATION DATA**

**Date of application: 10/21/2011**

Indicate type of review:     \_\_\_           Exempt            **X** Expedited           \_\_\_    Full

**For all exempt reviews, indicate which of the following categories apply:**

- |   |                              |
|---|------------------------------|
| ___ 1. Normal Educational Practices           | ___ 5. Secondary Use of Data |
| ___ 2. Educational Tests<br>Research/Programs | ___ 6. Evaluation of Federal |
| ___ 3. Survey/Interview Procedures            | ___ 7. Taste Tests           |
| ___ 4. Observation                            |                              |

**Note:** There are three levels of IRB Review. You should indicate the level of review you believe is required for your research. The IRB may determine that a different level of review is necessary.

**Exempt Status (Level I)**

Research is reviewed for Exempt status (Level I review) by an IRB member if it involves very minimal or no risk. In general, research which does not propose to disrupt or manipulate the normal life experiences of subjects, incorporate any form of intrusive procedures or sensitive topics, or involve deception will be exempt from full IRB review. Projects that involve more than very minimal risk and those that include any degree of deception *do not* qualify for Exempt status. For more information about the types of research listed in the expedited category, visit the IRB website at [www.stkate.edu/irb](http://www.stkate.edu/irb).

Please note that all of the rights and protection afforded to human subjects in research are required in Exempt status cases. Researchers engaged in human subjects research that qualifies for Exempt status must still complete a full application form and prepare an informed consent statement. Researchers must engage in practices that minimize risk, maximize benefit and ensure privacy. In short, research with Exempt status is exempt only from full IRB review.

**Expedited Review (Level II)**

Expedited review (Level II review), is a procedure through which certain kinds of

research may be reviewed and approved without convening a meeting of the entire IRB. The term "expedited" can be misleading: reviews of this type are *not* "quicker" or conducted with less rigor, but fewer reviewers are required for approval. For more information about the types of research listed in the expedited category, visit the IRB website at [www.stkate.edu/irb](http://www.stkate.edu/irb).

### **Full Review (Level III)**

All research not qualifying for Exempt status or Expedited review and research involving protected classes of subjects requires Full (Level III) review. In general research requiring Full review places the subject at greater than minimal risk. Full review means that the research protocol is read, discussed and voted upon by the full IRB.

**APPLICANT DATA**

**Investigator name(s) and credentials (e.g., PhD, RN, etc.):** Christa Ahrens

**(please list all co-investigators)**

**Project Title:** Effects of “tedious” versus “fun” exercise on post-exercise food consumption.

**Department:** Exercise and Sports Science

**Investigator Mailing Address:** 2004 Randolph Avenue P.O. Box 2964 St. Paul, MN 55105

**Investigator E-mail Address:** csahrens@stkate.edu

**Investigator Telephone:** 612-743-5815

**Dates of Project:** September 2011-May 2012

*All SCU internally funded research, state, federal and privately funded external grants, and most published research is required to undergo IRB review if human subjects are involved.*

**Is this research funded by a grant?**             Yes     No

*(If YES, please provide name of funding agency)*

**Has this research been reviewed by another IRB?**             Yes     No

*(If YES, please provide a copy of the letter of approval, or indicate the status of your application.)*

**Will this research be reviewed by another IRB?**     Yes             No

*(If YES, please indicate your plans for review)*

**Note:** *In cases where a research protocol requires approval from outside institutions (e.g., a hospital IRB or other college/university) as well as St. Catherine University, it is expected that the SCU IRB application will be submitted and approved before the researcher applies to the outside organization. Requests for exceptions to this protocol may be submitted by a St. Catherine’s faculty member on his or her own behalf, or by the research advisor on behalf of student researchers. Contact the IRB chair (John Schmitt, PT, PhD; [jsschmitt@stkate.edu](mailto:jsschmitt@stkate.edu)) with these requests. In some instances, the St. Catherine University IRB may request that the researcher obtain approval from the outside organization’s IRB*

*before St. Catherine's IRB approval is given. This might occur when the research and privacy policies of the outside organization need to be clarified and interpreted as part of the review process. In all cases, IRB approval must be obtained from each relevant IRB prior to the initiation of the research project.*



**1. RESEARCH SUMMARY:** *Please complete each section in clear, easy to read language that can be understood by a person unfamiliar with your research and your field.*

**a. Purpose of the research:** *Provide a clear, concise statement of your purpose.*

The purpose of my study is to explore the relationship between an individual's perceived workout effort and their post-exercise food compensation.

**b. Background:** *Provide a concise summary in 1 or 2 brief paragraphs to explain the importance of the research and how it fits with previous research.*

Cardiovascular diseases are the leading cause of hospitalization among older adults in the United States. A person's risk of cardiovascular disease is influenced by their modifiable lifestyle risk factors, such as, diet, smoking, and engaging in regular exercise (Djoussé, Driver, & Gaziano, 2009). Individuals tend to gain weight while in college due to a combination of lower rates of physical activity and exercise, overeating, and poor nutritional choices (Gruber 2008). This research is important because it may increase knowledge and awareness on post-exercise food consumption, which may help reduce weight gain during college and later years.

Previous research suggests that individuals will consume more food after they are thinking about exercise than if they were thinking about entertainment (Werle, Wansink, & Payne 2011). This study will determine if individuals will consume more food after exercising if they perceive that the workout was tedious than as if they perceived the workout as fun. The exercises in each session will be the same absolute intensity and duration.

#### References

- Djoussé, L., Diver, J., & Gaziano, J. (2009). Relation between modifiable lifestyle factors and lifetime risk of heart failure. *Journal of the American Medical Association*, 302(4), 394-399.
- Gruber, K. (2008). Social support for exercise and dietary habits among college students. *Adolescence*, 43(171). 557-575.

Werle, C., Wansink, B., & Payne, C. (2011). Just thinking about exercise makes me serve more food. *physical activity and calorie compensation. Appetite, 56, 332-335.*

**c. Research Methods and Questions:** *Give a general description of the study design, and specific methods you will use in your investigation. Specify all of your research questions and/or hypotheses. Reviewers will consider whether the information you are gathering from participants is necessary to answer your research question(s), so this should be clear in your application.*

The study will measure the differences in post-exercise food consumption after two exercise sessions. Participants will be randomly assigned to either doing the “tedious” workout or “fun” workout. Both workouts will consist of power walking at the same absolute intensity (4.5 mph) for the same duration (20 minutes). During the fun workout, participants will be encouraged to take in their surroundings and enjoy the scenery rather than focusing on the exercises. During the “tedious” workout, participants will be verbally prompted that they are working their bodies to keep them focused on the exercises. For example, they will be told that they are “getting their heart pumping.”

After exercising, participants will be offered a snack that they will be told that they cannot eat until after the session is over. The researcher will then read the debriefing statement and answer any questions that participants may have. Before participants leave, their food will be weighed. Statistical measurements will be done to determine if there is a difference in post-exercise food consumption between the two exercise sessions. I hypothesize that participants will take more food after they complete the “tedious” workout because they perceived that they worked harder and may compensate this perceived increased effort with more food.

**d. Expectations of Participants:** *Give a step by step description of all procedures that you will have participants do. Attach any surveys, tests, instruments, interview questions, data collection forms, etc. that you will use with participants.*

Each participant will be weighed and have their height measured to determine their BMI

Both exercise sessions will consist of power walking at the same absolute intensity and duration (each subject will do one session). The researcher will establish intensity by using a stop watch to keep the pace at 4.5 miles per hour. The researcher will participant in the study so that she may act as a pacer. The subjects will power walk for twenty minutes.

After each session, participants will be offered snacks.

Participants will be told that they cannot eat the snacks until after the session due to discussion.

The researcher will then read the debriefing statement and answer any questions.

Before each participant leaves, their snack will be weighed.

**e. Estimated Time Commitment for Participants:**

1 Number of sessions for each participant

1.5 hours Time commitment per session for each participant

1.5 hours Total time commitment for each participant

**f. Access to Existing Data: *If you are analyzing existing data, records, or specimens, explain the source and type, means of access, and permission(s) to use them.***

Not applicable

**2. SUBJECTS: *Provide your best estimates below.***

**a. Age Range of Subjects Included: 18-24 years old**

**b. Number: \_\_\_\_\_ Male 30 Female 30 Total**

**c. Target Population: Describe your target population (the group you will be studying; e.g. seniors, children ages 9-12, healthy adults 18 or over, etc).**

Female college students between the ages of 18 and 24 years old.

- d. **Specific Exclusions:** *If women and/or minorities are to be excluded from the study, a clear rationale should be provided in section “f” below.*

Individuals with known allergies and/or physical disabilities that prevent them from participating in moderate intensity exercises will be excluded from the study. I do not want participants to know that they will be receiving a snack and that it will be weighed at the end of the study. Excluding all subjects with known allergies allows me to not ask participants prior to the study if they have any food allergies. I will ensure that the subjects do not have known allergies or physical disabilities that prevent them from participating in moderate intensity exercises by including these exclusions on the consent form, and I will verbally ask them again before they participate in an exercise session.

- e. **Special Populations Included:** *Place an “X” in front of any special population that will be the focus of your research. NOTE: These groups require special consideration by federal regulatory agencies and by the IRB. In section “f” below you should provide a rationale for focusing on special populations.*

- |  |   |
|--|---|
| <input type="checkbox"/> Minors (under age 18)   | <input type="checkbox"/> HIV/AIDS patients                |
| <input type="checkbox"/> St. Catherine Employees   | <input type="checkbox"/> Economically disadvantaged       |
| <input checked="" type="checkbox"/> Students   | <input type="checkbox"/> Educationally disadvantaged      |
| <input type="checkbox"/> Pregnant women  | <input type="checkbox"/> Hospital patients or outpatients |
| <input type="checkbox"/> Elderly/aged persons  | <input type="checkbox"/> Prisoners                        |
| <input type="checkbox"/> Cognitively impaired persons  |   |
| <input type="checkbox"/> Minority group(s) and/or non-English speakers ( <i>please specify</i> )         |   |
| <input type="checkbox"/> Other Special Characteristics and Special Populations ( <i>please specify</i> ) |   |

- f. **Provide reasons for targeting or excluding any special populations listed above.**

Female college students are being targeted because research has shown that students tend to gain weight while in college. For my senior honors project, I would like to focus on students that attend St. Catherine University, which is a college for women.

**3. RECRUITMENT: LOCATION OF SUBJECTS** (*check all that apply*):

- St. Catherine University students
- School setting (PreK – 12)
- Hospital or clinic
- Other Institution (*Specify*): \_\_\_\_\_
- None of the above (*Describe location of subjects*): \_\_\_\_\_
- 

**NOTE:** *If subjects are recruited or research is conducted through an agency or institution other than St. Catherine University, submit either written or electronic documentation of approval and/or cooperation. A hard copy should use the agency or institution's letterhead and contain enough information to demonstrate understanding of their role in your research. An electronic version should be sent from the email system of that particular institution. The document should include the name and title of the appropriate administrator sending the approval.*

- a. **Recruitment Method:** *Describe how you will recruit your subjects? Be specific and attach a copy of any advertisement, flyer, letter, or statement that you will use for recruitment purposes.*

I will hang fliers in the Butler Center, Mendel Hall, and the CDC to recruit participants. I will also put an announcement in the daily update with the same information that is on the flier. I will email the flier to the students in the honors program to recruit participants. I am the president of the Honors Program Student Organization; therefore I have a list of the emails of all honors students. I will obtain the emails of those interested in participating when they respond through email to my flier, email, and/or daily update post.

- b. **Incentives:** *Will the subjects be offered inducements for participation? If yes, explain.*
- None

**4. RISKS AND BENEFITS OF PARTICIPATION**

a. **Check all that apply. Does the research involve:**

- Use of private records (medical or educational records)
- Possible invasion of privacy of the subjects and/or their family
- Manipulation of psychological or social variables
- Probing for personal or sensitive information in surveys or interviews
- Use of deception
- Presentation of materials which subjects might consider offensive, threatening or degrading
- Risk of physical injury to subjects
- Other risks

b. **Risks:** *Briefly describe the risks or participation in your study, if any. Describe the precautions taken to minimize these risks.*

This study has minimal risks. The participants are required power walk to complete this activity. The powering walking will be low impact, have a moderate intensity and duration, and have small risk of injury. Participants will be power walking and the same absolute intensity (4.5 mph) and duration (20 minutes) for both sessions. In case of injury, the athletic trainer will be located and/or 911 will be called.

c. **Benefits:** *List any anticipated direct benefits to your subjects. If none, state that here and in the consent form.*

There are no direct benefits to you for participating in this research. The benefit of the study to provide is a better understanding on the effectiveness of exercise when dealing with mental compensation due to perceived effort.

d. **Risk/Benefit Ratio:** *Justify the statement that the potential benefits of this research study outweigh any probable risks.*

The potential benefits of this research to college students outweighs any probable risks because it may lower weight gained by students while in college and lower the risk of heart disease later in life.

e. **Deception:** *The use of deception in research poses particular risks and should only be used if necessary to accomplish the research, and when risks are minimized as much as*

*possible. The researcher should not use deception when it would affect the subject's willingness to participate in the study (e.g, physical risks, unpleasant emotional or physical experiences, etc).*

**Will you be using deception in your research? \_X\_ yes \_no**

*If yes, justify why the deceptive techniques are necessary in terms of study's scientific, educational or applied value. Explain what other alternatives were considered that do not use deception and why they would not meet the researcher's objective. Attach a copy of a debriefing statement explaining the deception to participants.*

Deceptive techniques are necessary for this study to obtain an accurate measurement of post-exercise food consumption. Alternatives that were considered were telling the subjects that their post-exercise food consumption was being measured, but this may influence the amount of food that they take. Subjects will be told that they are participating in a Senior Honors Project on exercises that are most effective in keeping students active. They will know that they are going to participate in an exercise study, but they will not know that the amount of food that they take after the study is what is actually being measured until after the debriefing statement. After the subjects complete their exercise session, they will be offered snacks that they will be told they cannot eat until after a brief discussion of the study. Next, I will read the debriefing statement to them and answer any questions and/or concerns that they may have. After the debriefing, the weight of the snacks that each participant took will be measured.

## **5. CONFIDENTIALITY OF DATA**

- a. **Will your data be anonymous? \_yes \_X\_no**  
*(Anonymous data means that the researcher cannot identify subjects from their data, while confidential data means that the researcher can identify a subject's response, but promises not to do so publicly.)*
- b. **How will you maintain anonymity/confidentiality of the information obtained from your subjects?**

Each subject will be identified as a number rather than by name. The number system will allow statistical measures to be run to determine if there is a difference in post-exercise food consumption between the sessions.

- c. **Data Storage:** *Where will the data be kept, and who will have access to it during that time?*

Data will be kept in a notebook that will be locked in my apartment during the experiment. I will be the only person with access to the notebook during that time.

- d. **Data Destruction:** *How long will it be kept? What is the date when original data will be destroyed? (All studies must specify a date when original data that could be linked back to a subject's identity will be destroyed. Data that is stripped of all identifiers may be kept indefinitely).*

The notebook will be destroyed May 1<sup>st</sup>, 2012.

- e. **Availability of Data:** *Will data identifying subjects be made available to anyone other than you or your advisor? If yes, please explain who will receive the data, and justify the need.*

The data will be made available only to me and my advisor.

- f. **Official Records:** *Will the data become a part of the medical or school record? If yes, explain.*

No

## 6. INFORMED CONSENT

- a. **How will you gain consent?** *State what you will say to the subjects to explain your research.*

Subjects will be given a written consent form.

- b. **Consent Document:** *Attach the consent form or text of oral statement. For a template, visit [www.stkate.edu/irb](http://www.stkate.edu/irb) (Note: if you propose to work with children ages 7-18 and you are gaining consent from their parents, you must also*



*develop a process for obtaining the subject's assent to participate in the study. For older children, it may be sufficient to add an assent signature line to the consent form. For younger children, it may be necessary to develop an age-appropriate assent form that is a simplified version of the parental consent form.)*

- c. **Timing of Consent Process:** *When will you obtain consent (that day? several days before the project? a week before?)? (Note: In studies with significant risk or volunteer burden, the IRB may require that subjects be given an interim period of 24 hours or more before agreeing to participate in a study.)*

Participants will be emailed the consent form 7 days before the experiment takes place. They will turn in their signed consent forms on the day of the experiment.

- d. **Assurance of Participant Understanding:** *How will you assess that the subject understands what he/she has been asked to do? (Note: It is not sufficient to simply ask a yes/no question, such as "do you understand what you are being asked to do?" Instead, ask the subject to explain the purpose of the study, the procedures they are asked to do, what happens if they decide to withdraw, etc. You do not have to ask about every aspect of the consent form, but ask a few key questions to check their understanding.)*

I will ask the subjects to explain the purpose of the study before the session and tell them that they may withdraw at any time.

## 7. ASSURANCES AND SIGNATURES

The signatures below certify that:

- The information furnished concerning the procedures to be taken for the protection of human subjects is correct.
- The investigator, to the best of his/her knowledge, is complying with Federal regulations governing human subjects in research.
- The investigator will seek and obtain prior written approval from the IRB for any substantive modification in the proposal, including, but not limited to changes in cooperating investigators, procedures and subject population.
- The investigator will promptly report in writing to the IRB any unexpected or otherwise significant adverse events that occur in the course of the study.

- The investigator will promptly report in writing to the IRB and to the subjects any significant findings which develop during the course of the study which may affect the risks and benefits to the subjects who participate in the study.
- The research will not be initiated until the IRB provides written approval.
- The term of approval will be for one year. To extend the study beyond that term, a new application must be submitted.
- The research, once approved, is subject to continuing review and approval by the IRB.
- The researcher will comply with all requests from the IRB to report on the status of the study and will maintain records of the research according to IRB guidelines.
- If these conditions are not met, approval of this research may be suspended.

PLEASE NOTE: *Applications received without signatures will be returned. To avoid delay, please make sure the primary investigator(s), advisor and department chair (if applicable) have signed the application.*

As primary investigator(s), I/we understand and will follow the above conditions.

Christa Ahrens \_\_\_\_\_ 10/12/11 \_\_\_\_\_

Signature of Investigator

Date

As Advisor or Sponsor, I assume responsibility for ensuring that the investigator complies with University and federal regulations regarding the use of Human Subjects in research.

\_\_\_\_\_  
Signature of Advisor or Sponsor

Date

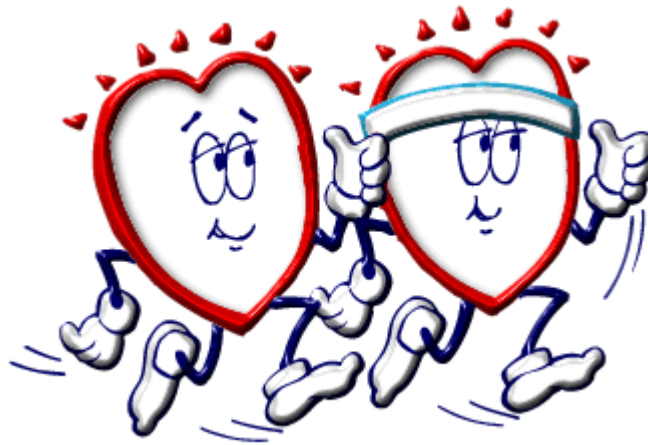
*(Student investigators must have an advisor. Staff and non-SCU applicants must have a departmental sponsor)*

As Department Chair, I acknowledge that this research is in keeping with the standards set by our department and assure that the investigator has met all departmental requirements for review and approval of this research.

\_\_\_\_\_  
Signature of Department Chair

Date

*(Necessary only for faculty and staff research at the Expedited and Full levels)*



**Wanted:** Female College students between the ages of 18-24 with no known allergies and/or disabilities that do not allow them to perform moderate intensity exercises.

**Time Commitment:** ONE 1.5 hour session

**For:** Senior Honors Project on exercises that are most effective in keeping students active

**If interested:** Please email Christa Ahrens at [csahrens@stkate.edu](mailto:csahrens@stkate.edu)

**Effectiveness of various exercises on keeping college students active****RESEARCH INFORMATION AND CONSENT FORM****Introduction:**

You are invited to participate in a research study investigating the effectiveness of various exercises on keeping college students active. This study is being conducted by Christa Ahrens in the Exercise and Sport Science Program at St. Catherine University. You were selected as a possible participant in this research because you are a college female between the ages of 18 and 24 with no known allergies and/or disabilities that do not allow you to perform moderate intensity and duration exercises. Please read this form and ask questions before you decide whether or not to participate in the study.

**Background Information:**

The purpose of this study is to discover the type(s) of exercises that will keep college students active over a long period of time. Many students become less active while in college for many reasons, such as course loads, social activities, and balancing work and school. Having an exercise program that students would want to continue doing over a long period of time will help make college students more active. Approximately 30 people are expected to participate in this research.

**Procedures:**

If you decide to participate, you will be asked to perform one of various moderate intensity exercises for about an hour. Each test group will do a workout based on one type of exercise. Subjects will be randomly assigned to a test group. The research will take place in the Butler Center on the St. Catherine University Saint Paul campus. The session will be followed by a discussion of the workout and its effectiveness to keep students active for a long period of time. This study will take approximately 1.5 hours over 1 session. Exercises that participants may be asked to do include: lunges, jumping jacks, light jogging (at 4.5 mph), crunches, and pushups. The exercise portion of the session will last twenty minutes.

**Risks and Benefits:**

The study has minimal risks. The exercises that participants are required to complete this activity are low impact, have a moderate intensity and duration, and have small risk of injury. Possible risks include: a sprained ankle, heart problems and/or dizziness due to exercising, and muscle strain. Participants that are injured may choose to no longer participate.

There are no direct benefits to you for participating in this research. The benefit of the study is to find exercises that will make college students more active.

**Compensation:**

In the event that this research activity results in an injury, I will assist you by locating the St. Catherine University's Athletic Trainer and/or her assistants. In the case of an emergency, I will assist you by calling 911. Any medical care for research-related injuries should be paid by you or

your insurance company. If you think you have suffered a research-related injury, please let me/us know right away.

**Confidentiality:**

Any information obtained in connection with this research study that could identify you will be kept confidential. In any written reports or publications, no one will be identified or identifiable and only group data will be presented.

I will keep the research results in a password protected computer and/or a locked file cabinet in my apartment and only I and my advisor will have access to the records while I work on this project. I will finish analyzing the data by May 1<sup>st</sup>, 2012. I will then destroy all original reports and identifying information that can be linked back to you.

**Voluntary nature of the study:**

Participation in this research study is voluntary. Your decision whether or not to participate will not affect your future relations with the Exercise and Sports Science Department or Saint Catherine University in any way. You may choose to not participate in the discussion on the exercises at the end of the session if you choose. If you decide to participate, you are free to stop at any time without affecting these relationships, and no further data will be collected.

**Contacts and questions:**

If you have any questions, please feel free to contact me, Christa Ahrens, (612) 743-5815. You may ask questions now, or if you have any additional questions later, the faculty advisor, Jacquelyn Nyenhuis, will be happy to answer them. If you have other questions or concerns regarding the study and would like to talk to someone other than the researcher(s), you may also contact John Schmitt, PhD, Chair of the St. Catherine University Institutional Review Board, at (651) 690-7739.

You may keep a copy of this form for your records.

**Statement of Consent:**

You are making a decision whether or not to participate. Your signature indicates that you have read this information and your questions have been answered. Even after signing this form, please know that you may withdraw from the study at any time and no further data will be collected.

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I consent to participate in the study.

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Signature of Participant

Date

---

Signature of Researcher

Date

***Debriefing statement:***

I apologize that the experiment needed to use deception to obtain accurate results. Deceptive techniques were necessary for this study to obtain an accurate measurement of post-exercise food consumption. Alternatives that were considered were telling the subjects that their post-exercise food consumption was being measured, but this may influence the amount of food that they take if you knew that the amount of food that you took was to be weighed. You may ask questions now, or contact me or my advisor at a later time if there is any confusion. All data from this study will remain confidential. You have the right to have the data obtained from the research destroyed instead of used for data analysis.

**Data Collection Form**

Subject	“Fun” or “Tedious” Session	Height (in)	Weight (lb)	Calories of snacks
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				

24				
25				
26				
27				
28				
29				
30				



### Appendix: Reflection Essay

The experiences that I gained from the Senior Honors Project will benefit my future career as a physical therapist. I was given the opportunity to learn about the steps that physical therapists take while completing research by actually doing them instead of just reading about them in a textbook. I developed an idea, received approval from the Saint Catherine University Institutional Review Board (IRB) for human test subjects, collected and analyzed data, and presented a scientific article that I wrote on my experiment. Since I was given the opportunity to do this project as an undergraduate, I feel that I will be more prepared to do future research in graduate school and in my future career.

I integrated the knowledge that I obtained from my classes at Saint Catherine University to develop my research questions. I feel that my liberal arts education background helped in develop a unique project idea because I have been given the opportunity to learn about a variety of disciplines and perspectives. The class that prepared me the most for this project was Measurement and Evaluation in the Exercise and Sports Science Department. In this class, we completed a research project in groups. I was able to use some of the handouts that I received in the class to aid in the formatting of my paper. The Senior Honors Project allowed me to take the research and writing techniques that I learned from the Measurement and Evaluation class and my psychology classes to create a more extensive research project.

I had never worked with an IRB before this project. The IRB application was a complex process because it required detailed descriptions and explanations for everything that I was going to do with my project. I had to write detailed protocols for my recruitment techniques, informed consent, procedures, and data collection. My application fit into the expedited category, so I should have received word from the IRB within two to three weeks. It actually took about two

months to receive approval for my project, which meant that I was unable to begin recruitment or data collection until February. Since it took so long to get approval, my project was rushed during the second semester.

I began to recruit subjects from the student groups that I am involved in, such as the Honors Program Student Organization and Lambda Sigma Tau. I also posted a request for subjects on Saint Catherine University's internal student webpage. I was able to recruit some subjects from these methods, but I found that speaking to classes was more effective. Most of the subjects in my study were recruited when I went to speak to their class about my project. I would strongly recommend that students speak to classes in future Senior Honors Projects. I was unable to obtain my goal of thirty subjects, but I knew that it would be difficult to find that many subjects from talking to other students who do research on campus.

I did not have difficulty doing the computer analysis portion of my project because I was able to use statistical tests that I have frequently used in classes. I took the Statistically Methods in Psychology last year and as an Exercise and Sports Science and Psychology double major, I have had a lot of practice using SPSS and Excel data analysis. Since I have more experience working with Excel than SPSS, I decided to use it for this project.

I have learned lessons from this project that will aid me in future research. I learned that I need to leave extra time for IRB approval. Since I my application fit in the expedited category, I thought would receive approval sooner. The approval process took about two months, which caused my project to be rushed so that it could meet the Honors deadline. I feel as if my project would have benefited by having more time. My experience working with the IRB has aided me in my work as a research assistant in the AMP program. I used the experience and knowledge

that I gained from this project to complete the IRB application for a study on Recall and Recognition of Food Systems for Jacquelyn Nyenhuis, my AMP advisor.

I am glad that I was given the opportunity to complete this research project. I feel like I have gotten a better understanding of the process that physical therapists must go through when performing experiments and writing about their findings. I look forward to using the knowledge that I obtained from my project in AMP and in my future career. My only regret is that I had to rush through the writing and data collection to meet deadlines. In the future, I will be more prepared for the amount of time that it takes to get IRB approval.