Summer 2011

# An Interdisciplinary Approach to Improving Student Physical Activity and Nutritional Behaviors

Amelia Carolyn Chappell
*Georgia Southern University*

# AN INTERDISCIPLINARY APPROACH TO IMPROVING STUDENT PHYSICAL ACTIVITY AND NUTRITIONAL BEHAVIORS

by

A. CAROLYN CHAPPELL

(Under the direction of Bridget Melton)

## ABSTRACT

Freshmen are thought to be the most at risk group within the college population exhibiting levels of nutrition and physical activity well below national recommendations for health. PURPOSE: The purpose of the research project was to evaluate the effect of a Healthful Living Residential Interest Group (RIG) program on freshman exercise and nutrition habits, and physical fitness. METHODS: The Healthful Living themed RIG (n=19) within the freshman dormitories served as the intervention group and was compared to a Math themed Residential Interest Group (n=22) and a First Year Experience (FYE) course (n=23) with a physical activity focus similar to the intervention group's FYE course. Questions regarding exercise and nutrition from the American College Health Association's National College Health Assessment, subject height, weight, cardiorespiratory fitness, and percent body fat were assessed at the beginning and end of the fall 2010 semester. Focus groups for the intervention group served as a program evaluation. Four questions addressed student experiences in the Healthful Living RIG (q1), most (q2) and least favorite (q3) aspects of this RIG, and opinions on RIG improvement (q4). RESULTS: Descriptive statistics revealed that overall; the intervention group exhibited more positive nutrition and exercise behaviors than the other two groups. Dependent *t*-test results revealed that the Healthful Living RIG was the only group that did not significantly increase body mass index or body fat percent. Focus group themes included group closeness (q1), helpfulness (q1), accountability with academics (q2), proximity (q2), conflicts and lack of autonomy with class scheduling (q3), desire for more nonacademic (q4). CONCLUSION: Numerous levels of intervention can be effective in program development for innovative ways to improve or maintain freshman health and fitness.

INDEX WORDS: College, Health, Interdisciplinary, Freshmen

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A. CAROLYN CHAPPELL

B.S., Georgia Southern University, 2008

A Thesis Submitted to the Graduate Faculty of Georgia Southern University in Partial Fulfillment

of the Requirements for the Degree

MASTER OF SCIENCE

STATESBORO, GEORGIA

2011

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A. CAROLYN CHAPPELL

Major Professor: Bridget Melton

Committee: Barry Joyner
Daniel Czech

Electronic Version Approved:
Spring 2011

# DEDICATION

I would like to dedicate this thesis to my tornado-resistant support structure, my family. Your communication with me through my evolution turned each event that I viewed as a natural disaster into a mere gust of wind. Mom and Dad always say, “If it was easy, everyone would be doing it.” Whether it was making a 100 on a matching assignment in preschool, or finishing my master’s thesis, this saying allowed me to stand up tall and face each challenge with determination and a real woman of the South sort of grit. Your unwavering love and pride pulled me through these last few years and never ceases to astound me.

# ACKNOWLEDGMENTS

I would like to thank my tripod, my committee members for their constant support and patience with me through this process. Bridget, you are one tough cookie and I thank you for taking me under your wing. Without your support and encouragement, this project would not have been possible. Dr. J, I can only hope to teach one day with the enthusiasm that you possess. Thank you so much for your willingness to assist me. Checkers, I greatly admire your positivity and value of personal growth. You truly inspire me to be a better person. Finally, I would like to thank Dr. McMillan for his support in and out of the classroom.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

# CHAPTER I

## INTRODUCTION

The health of university students is an area of much inquiry and discovery. Sullivan, et al. (2008) boldly dubbed the college years the final opportunity to influence a large sector of young adults to become physically active and develop healthy lifestyles. In 2009, the American College Health Association released data from its National College Health Assessment (2009). Out of 80,121 students on 106 campuses, only 8.5% reported consumption of five or more servings of fruits and vegetables per day. When asked about physical activity habits, only 45.5% reported exercising vigorously for at least twenty minutes or moderately for at least thirty minutes on three of the past seven days. Of those students, 49.2% reported exercising to strengthen or tone muscles on at least two of the previous seven days. These values do not meet current recommendations.

The American College of Sports Medicine, in their improved 2007 (Haskell, et al.) physical activity guidelines, recommends thirty minutes of moderately intense exercise on at least five days per week or twenty minutes of vigorous exercise three days per week. They also make a recommendation of strength training exercises two days per week. These recommendations are for currently healthy adults under 65 years of age to ward off many chronic health conditions. However, according to current literature, most college students do not meet these guidelines.

In 2007, Irwin reported on the maintenance of physical activity levels of undergraduate students. In this longitudinal investigation, students from various disciplines and various age ranges from two universities were tracked for one month. Results indicated that the majority of these students were inadequately active. Only 35% maintained the physical activity guidelines for health for one month.

This gives rise to the question, what is taking place of the physical activity in the daily lives of these students? Buckworth and Nigg (2004) investigated the relationship between exercise, physical activity, and sedentary behaviors. They reported that students spend approximately thirty hours in a typical week engaging in sedentary behaviors. Most fell under three different categories, studying, television watching, and computer use.

College freshmen have been reported as the most at risk population (Bray & Kwan, 2006). In 2005, Racette, et al. reported on the weight changes, exercise, and dietary patterns experienced by a population of college students. This study tracked each student at the beginning of their freshman year and continued to monitor them through their second year. Initial data collection revealed that 29% of students surveyed did not exercise, 70% ate fewer than five fruits and vegetables per day, and 50% consumed fried or high-fat fast foods on three of the previous seven days. Upon the completion of sophomore year, 70% of the students reassessed had gained weight.

In 2006, Neimeire et al discovered that individuals aged 18-27 years (n=9,919) consumed fast food an average of 2.5 times per week. Authors stated that this trend, along with a tendency to skip breakfast could partially explain the weight gain occurring during the transition from adolescence to adulthood.

More specifically, students living in dormitories exhibit dangerous behaviors. In regards to nutrition, an exploration by Nelson and Story (2009) exposed the average of 22,888 calories residing within each of the 100 dorm rooms investigated. This inventory reported that more than 70% of students had each of the following: cereal/granola bars, salty snacks, main dishes, desserts/candy, and sugar sweetened beverages. A smaller quantity of students had low-calorie beverages, fruits and vegetables, dairy products, tea/coffee, and 100% fruit or vegetable juice.

Logically, as a result of physical inactivity and poor nutrition habits, Minalopous, Auinger, and Klein (2008) report than on average, unmarried freshmen living on-campus will gain 2.7 pounds (175 g/month). Their results are based on a seven month period from the beginning of the college career to the time of the survey. This rate is reported as 5.5 times the rate of the general population (about 32 g/month). Researchers go on to state that should this rate be upheld for several years, students would become obese. Furthermore, strong positive associations have been made between physical activity patterns among college seniors and current activity as recent alumni (Sparling & Snow, 2002). Influencing students to begin a routine of physical activity early in their college careers is a necessary part of the journey to eventual establishment of active habits.

Though the "freshman 15" is an extinct concept (Minalopous, 2008), the question remains, why does this particular population have such weight gain and nutritional dysfunction? The transition to university life is well documented as a time often characterized by elevated levels of stress (Dyson & Renk, 2006) and depression (Fisher & Hood, 1987; Dyson & Renk, 2006) as students are establishing themselves as independent adults and are often away from their social support systems for the first time. Both stress and depression have been linked to weight and activity level changes in individuals (Barefoot, Heitmann, Helms, Williams, Surwit, Siegler, 1998; Korkeila, Kaprio, Rissanen, Koskenvu, Sorensen, 1998). Fortunately, exercise has been well documented as a means of alleviating psychological distress (Ross & Hayes, 1988). Further, it has also been noted that this transitional period can be a smoother one with sufficient amounts of physical activity (Bray & Kwan, 2006). However, as stated previously, activity levels decline as students begin college.

Educators and administrators are, thus, faced with a challenge. "From a public health perspective, the best solution remains encouraging positive behavior changes associated with diet and physical activity." (Sparling, 2007, page 1) Intervention is necessary.

Unfortunately, the interventions to increase physical activity targeting college populations have only produced moderate effects and are insufficiently researched (Keating, Guan, Pinero, & Bridges, 2005). The two most documented attempts at increasing undergraduate physical activity levels are Project GRAD (Sallis JF, Calfas KJ, Nichols JF, Sarkin JA, Johnson MF, Caparosa S, Thompson S, & Alcaraz JE, 1999) and ARTEC (Leslie, Sparling, & Owen, 2001). Project GRAD utilized a for-credit classroom setting. The control group was simply knowledge-oriented while the intervention group was taught behavior change skills in lectures and peer-led labs. This investigation employed a seven-day physical activity recall to monitor habits. Results indicate no significant change in baseline activity levels of males within the intervention group. However, females within the intervention group reported significant increases in activity levels.

The Active Recreation on Tertiary Education Campuses Project (ARTEC) targeted inactive students of an Australian university. This intervention involved free activity classes on campus, fitness

assessments, demonstrations of various activities, swimming vouchers, and media promotion on campus. This short, eight week intervention resulted in significant increases in the proportion of students engaging in high levels of physical activity indicated by energy expenditure.

In their review of these two programs, Leslie, et al. (2001), argued for campuses as a key setting for interventions by stating that these settings should not be undervalued. Further, Weinberg and Gould communicate that community-based intervention approaches have been most successful for increasing exercise participation rates (2003). Sparling (2007), in an article addressing obesity on college campuses, sites that universities must change as the status of their health students change. He states that as the issues of excess weight and obesity trickle down into younger age groups, the disjointed attempts at dealing with weight issues must be restructured. His recommendation is that new programs be built upon current efforts in order to cut cost. Sparling (2000) notes that, like most human behaviors, this behavior is complex and is not determined by a single aspect, but instead by a complex web of factors. Additionally, he states that, "Just as the causes of obesity are multifactorial, solutions must be both broad in scope and coordinated." Programs for change must also be multidimensional, addressing various behavioral and environmental factors within a community setting. One Southeastern university has made an attempt to create such an intervention.

A Residential Interest Group, focused on health and physical activity, was created for the freshman dormitory. Members lived together under the supervision of a community leader, took several courses together, including Healthful Living, and were offered various programs centered on health and physical activity in which they may participate. Involvement of student housing, academics and First Year Experience made the list for this pilot effort. The aim of the Healthful Living Residential Interest Group was to employ the various aspects of a successful intervention as listed by Kahn, et al. (2002) based on an extensive review of various levels and methods of intervention such as educational and behavioral approaches using point-of-decision prompts, media, college-based health and physical education classes, and enjoyable activities in a community emphasizing social support. The purpose of the research project

was to evaluate the effect of a Healthful Living Residential Interest Group program on students' exercise and nutrition habits, and physical fitness.

# CHAPTER II

# METHODS

## *Participants*

Residential living on campus has evolved to offer various Residential Interest Groups (RIG) of approximately twenty-two freshmen undergraduate students. These students, sharing similar interests and goals take various classes together and live within the same dormitory with one another. Should they choose, students self-select their own interest group based on personal significance. Subjects were freshmen undergraduate students between the ages of 18 and 19. Convenience sampling was utilized. Students were recruited by self-registering for these groups during university housing enrollment and class registration. Students from the Healthful Living Residential Interest Group (n=19) were compared against students from a Math Residential Interest Group (n=22), as well as students from a First Year Experience course (n=23) with an emphasis in physical activity. The Healthful Living RIG took a university Healthful Living class and a fitness-themed First Year Experience course, had healthy vending machine options in their dormitory, had a lunch and learn of healthy dining out meal options, a healthy dorm cooking demonstration, and healthful living educational programming by their Community Leader. The FYE control group and the intervention Healthful Living RIG students each took a First Year Experience Course that followed the same lesson plan with activities and assignments related to health and physical activity. The Math RIG took classes and lived together similarly to the Healthful Living RIG. However, these students did not take any classes associated with health, nor did they participate in any health related activities as part of their group membership. The professors and community leaders of all groups were contacted and permission was granted to use their classes as part of the current study. If students chose not to participate or discontinue participation in the study, they were not in any way penalized. The identities of the participants were only known to the researcher and will not appear in any publications or presentations. Recruitment of subjects began on Wednesday August 18, 2010. The researcher thoroughly explained the purpose, procedures, risks and benefits of the study to potential

participants. Upon completion of this orientation, subjects volunteering for this study signed an informed consent form and began participation.

*Instrumentation*

The human experience of life is complex. "The last few decades have witnessed great debate within the human sciences on which methods are able to provide certain knowledge while considering the uniqueness of the human being (Patel, 2002, pg. 5)." One's lived experiences, in their complexity, cannot be measured and represented in strictly quantified units (Patton, 2002). Therefore, a mixed methods approach to inquiry was utilized in order to capture the essence of the lived experiences of the Healthful Living Residential Interest Group and to enhance the meaning of inventory results. Qualitative data also served as an evaluation of this pilot program. This will aid in future program development for this group.

*Quantitative*

National College Health Assessment. In order to track student's exercise and diet behaviors, four questions regarding exercise and nutrition from the American College Health Association's National College Health Assessment were utilized. Results of this assessment have been shown to be generalizable, reliable and valid by comparing to nationally representative values of such data sets as the Centers for Disease Control National College Health Risk Behavior Survey from 1995, the Harvard School of Public Health 1999 College Alcohol Study (CAS), the United States Department of Justice: The National College Women Sexual Victimization Study 2000 (NCWSV), ACHA-National College Health Assessment 1998, Spring 1999 and Fall 1999 Pilots, ACHA-NCHA Spring 2000(American College Health Association, 2009).

NCHA Questions:

1. NCHA nutrition question- How many servings of fruits and vegetables do you usually have per day? (1 serving=1 medium piece of fruit; ½ cup of canned frozen of fresh fruits/vegetables; ¾ cup fruit/vegetable juice; or ¼ cup of dried fruit)

2. NCHA exercise question 1- On how many of the past 7 days did you do moderate-intensity cardio or aerobic exercise (caused a noticeable increase in heart rate, such as a brisk walk) for at least 30 minutes?

3. NCHA exercise question 2- On how many of the past 7 days did you do vigorous intensity cardio or aerobic exercise (caused large increases in breathing or heart rate such as jogging) for at least 20 minutes?
4. NCHA exercise question 3- On how many of the past 7 days did you do 8-10 strength training exercises (such as resistance weight machines) for 8-12 repetitions each?

Fitness Test. In order to obtain physiological measures of fitness, various values from a fitness assessment were analyzed. Students within each group were required to obtain an initial and final fitness test as a part of their membership/course curriculum. Prior to testing, participants were instructed that they needed to come dressed for participation in physical activity, wearing tennis shoes and comfortable, breathable clothing. Tests were administered pre and posttest at the same time of day for each group. Students were given no prior restrictions or instructions aside from wearing appropriate clothing and shoes. For safety purposes, students completed the Physical Activity Readiness Questionnaire. Based on student responses, if physical activity was deemed safe, students were cleared for participation. Once demographic information was collected and questionnaires were completed, students then rotated through stations. Stations were managed both pretest and posttest by the same students of Kinesiology that were well-versed in measurement protocols. Prior to testing, the primary researcher met with these assistants to ensure proper protocols were followed.

Measurements employed in the data analysis of the current study included height and weight for body mass index, body fat percentage via hand-held bioelectrical impedance, and cardiovascular fitness via the YMCA 3-minute step test. Body mass index is the most used stature-weight index and is used to classify people's health-related fitness (AAHPERD, 1988), their extent of obesity, and mortality risk (Deurenberg, et al., 1991; DiGirolamo, 1986). Due to BMI's inability to distinguish between fat and fat-free mass (Howley & Franks, 2007), percent fat from bioelectrical impedance analysis was also utilized. This second measure will provide more insight into body composition changes from pretest to posttest. BIA is a portable, inexpensive, noninvasive and efficient method for the estimation of body composition. It has been demonstrated to be a valid and reliable means of fat free mass and percent body fat estimation for children and adults (Heyward & Wagner, 2004). The YMCA 3 minute step test was chosen because

as it is a safe submaximal test of aerobic fitness. It estimates maximal oxygen consumption due to the relationship between heart rate and oxygen consumption. Cardiovascular fitness is inversely related to coronary heart disease and all-cause mortality (Gibbons, et al., 1983; Blair, et al., 1989).

*Qualitative*

The primary investigator and another graduate student proficient in qualitative research interviewed subjects on their experiences in the Healthful Living RIG utilizing focus group format. A focus group is a research technique during which a group discusses a topic determined by the researcher (Morgan, 1996). The interview is "focused" because it involves a type of collective involvement. The discussion of health education is common.

A frequent combination of quantitative and qualitative data collection methods utilizes surveys as the primary method and focus groups as a means of clarifying the findings of the surveys. Such methods are often utilized to fill in the gaps left by surveys and to identify group norms.

Interaction as a feature of data collection is a distinguishing aspect of this type of format. Participants both question each other and explain themselves to each other, making this type of interview different from a simple sum of individual interviews. The interaction within the group is a valuable source of data. The conversation amongst participants is often revealing to the researcher as well as the participants themselves. Regardless of the selection method, participants are not uniform and thus can offer much insight (Kitzinger, 1994). This often leads to the discovery of aspects of their personal experiences that may have changed various previous opinions. It can also lead into conversations about often taboo or embarrassing subjects which might be left uncovered during one-on-one interviews.

Question structure in focus group formatted data collection is determined by the purpose of the research (Frey & Fontana, 1991). For the current study, semi-structured, open-ended questions were utilized. This allowed for greater flexibility in probing and response patterns.

A dictaphone was also utilized in order to ensure accurate data capture and expedite the transcription process. A journal and pen were utilized for note taking during the focus groups, as well.

*Procedures*

The design for this study was a mixed methodological pre-post design. This study evaluated a fifteen week semester of a self-selected Residential Interest Group (RIG) entitled Healthful Living (n=19). A self-selected First Year Experience (FYE) class (n=23) with a physical activity emphasis and a self-selected Math RIG (n=22) served as controls. Following an introduction and orientation to the research project, participants signed an informed consent and began their participation. Students completed a Physical Activity Readiness Questionnaire (for safety purposes) a modified version of the National College Health Assessment, developed by the American College Health Association, and completed a fitness assessment. Fitness test order is as follows: height, weight, body fat percentage, and YMCA 3-Minute Step Test. A wall mounted stadiometer was used for height measurement. When measuring height, students were instructed to take off their shoes, stand up straight with their backs against the wall, and look straight ahead. Height was recorded to the nearest quarter inch. A sliding balance beam scale was used for weight. For weight collection, students left their shoes off stepped onto the scale and weight was recorded to the nearest half pound. Students then put their shoes back on and went to the handheld bioelectrical impedance analyzers station. Participants were oriented on how to properly enter their demographics and began the tests. Height and weight from the previous two stations were used in calculating BMI and body fat via the handheld device. The final station was the YMCA 3-Minute Step Test. All participants were oriented by the primary researcher on how to properly record heart rate via the carotid or radial artery. Upon assurance that all participants were familiar with how to palpate and count their hear rate, the primary researcher explained the test and allowed students to practice briefly. During this test, students stepped up and down from a 12inch box to the beat of a metronome set to 96 beats per minute for three minutes. The primary researcher signaled the completion of three minutes of stepping, students sat down, palpated their pulses and upon the primary researcher's signal, counted their pulse rate for 1 minute. This value was recorded.

All data collection occurred within the first and final weeks of the fall 2010 academic semester. In addition to this, upon the completion of the fall 2010 semester, semi-structured qualitative questions were asked of the Healthful Living Residential Interest Group students in a focus group format to

understand what aspects of participation in the Healthful Living Residential Interest Group aided the students in healthy living, as well as how their experience could have been enhanced. McLafferty (2004) stated that smaller groups are more manageable for this particular format. Thus, two groups (n=11, 8) were utilized. Gender was as evenly distributed as possible. The primary investigator and another researcher equally educated in qualitative research each conducted one of the two focus groups.

Focus Group Questions:

1. When you think about the possible effects of this Residential Interest Group, what comes to mind?
2. Describe which aspect of the Healthful Living RIG aided you most in living a healthy lifestyle.
3. Describe your least favorite aspect of the Healthful Living RIG.
4. Describe what you think would make this RIG more effective for healthy living.

*Data Analysis*

Quantitative variables were analyzed using a two-way ANOVA with repeated measures design and dependent *t*-tests. The group (Healthful Living RIG, FYE class, Math RIG) served as the independent variable. Dependent variables were the NCHA II questions and the fitness test results, body mass index, percent body fat, and recovery heart rate. For statistical significance, the alpha level was set at .01.

Upon the completion of the focus group process, the data were transcribed and thematized by the primary researcher. Each transcription was viewed by the researcher and the research committee. A system of checks, known as triangulation, aided in theme identification and agreement as well as contributed to the validity of the data. Triangulation involves the use of numerous methods to enhance the validity of qualitative research (Patton, 2002). The current study employed peer debriefing. This "…is a process of exposing oneself to a disinterested peer in a manner paralleling an analytical sessions and for the purpose of exploring aspects of the inquiry that might otherwise remain only implicit within the inquirer's mind" (Lincoln & Guba, 1985, p. 308). The researcher met with a group of peers to identify themes and check them with the themes the researcher individually identified. This practice enhanced the quality and truth of the data. Member checks were also utilized. This was performed during the interview

in order to allow subjects to ensure that the statements and thoughts recorded are accurate. The researcher also conducted a bracketing interview to identify possible biases.

The analysis approach, adapted from Czech et al. (2004), is outlined below:

1. APPROACHING THE INTERVIEW
   - Transcribing
   - Obtaining a grasp of the interview
2. FOCUSING THE DATA
   - Clearing and grouping text
3. SUMMARIZING THE INTERVIEWS
   - Preparing and verifying summary
4. RELEASING MEANINGS
   - Forming categories
   - Determining and describing structures

*Approaching the Interviews*

Transcribing. Each recorded interview was transcribed verbatim by the primary researcher. Upon completion of each updated transcript throughout analysis, co-participants had the opportunity to view and approve of their statements.

Obtaining a grasp of the Interviews. Through listening to the audio tapes and reading the transcripts, the researcher ensured exact data capture that is free of errors. This step also allowed the researcher to obtain a cumulative grasp of the data (Czech, et al., 2004).

*Focusing the Data*

Clearing and Grouping the Text. This step allowed the researcher to view an uncluttered, clear manuscript. By eliminating overlapping, or irrelevant pieces of data, the researcher possessed a more succinct text for analysis.

*Summarizing the Interviews*

Preparing and Verifying the Summary. Following the "polishing" process of the manuscript, what remained was a rich description of each co-participant's lived experiences. The goal of this step in this analysis is for each co-participant to verify that the fresh version the data is still representative of the thoughts they wish to convey.

*Releasing the Meanings*

Forming Categories. At this time, the data was placed into meaningful clusters based on analogous emerging premises with the assistance of the research team. Comparison of the clusters followed, and the categories were formed by similar units.

Determining and Describing Structures. Interviews tend to yield great amounts of data. In order to capture the experience of their participation in these programs, a final elimination of unnecessary data occurred during this step. Final structures as determined from the data were determined and described.

# CHAPTER III

# RESULTS

*Quantitative*

Quantitative data were collected from 64 students and analyzed using SPSS 17.0 for Windows.

**Intervention** (n=19), 10 female, 9 male

**Control 1 - FYE** (n=23), 14 female, 9 male

**Control 2 - RIG** (n=22), 16 female, 6 male

Demographical data by group is listed in Table 1 below. The values represent pre-test data. All group means for body mass index are within the normal range (National Heart, Lung, and Blood institute, 1998).

**Table 1:** Subject demographical data

| | **Healthful Living RIG** | **FYE Control** | **Math RIG Control** |
|---|---|---|---|
| **Age** | 18±0.6 | 18±.4 | 18±.5 |
| **Weight (kg)** | 69.1±16.8 | 68.9±16.3 | 73.2±19.7 |
| **Height (cm)** | 172.3±10.8 | 173.4±10.1 | 176.3±11.2 |
| **Body Mass Index** | 22.9±4.8 | 22.7±3.7 | 23.3±5.8 |

*National College Health Assessment*

The National College Health Assessment data were analyzed using descriptive statistics.

Table 2 reveals that initial levels of fruit and vegetable intake are higher for the Healthful Living Residential Interest Group and the fitness-related First Year Experience course. These levels both decline but still remain higher than the control math-themed Residential Interest Group.

**Table 2:** NCHA nutrition question 1, how many servings of fruits and vegetables do you usually have per day? (1 serving=1 medium piece of fruit; ½ cup of canned frozen of fresh fruits/vegetables; ¾ cup fruit/vegetable juice; or ¼ cup of dried fruit)

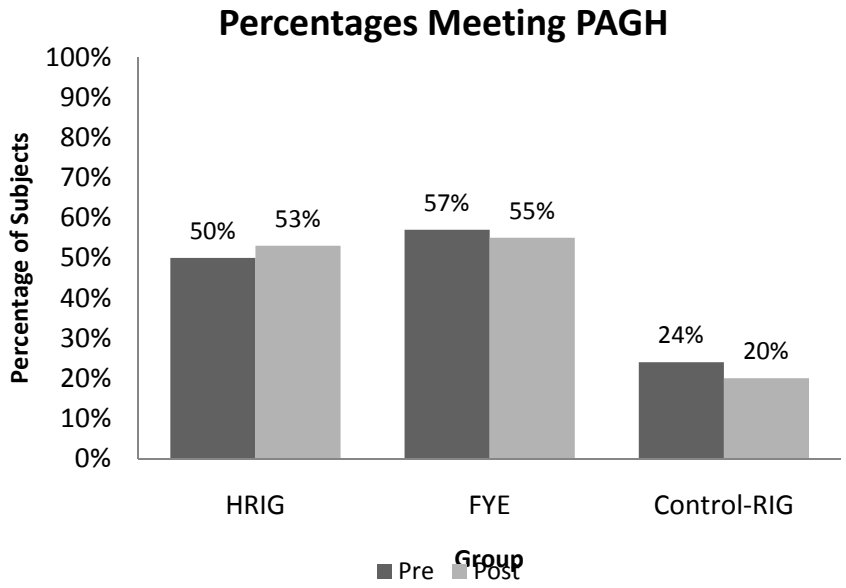
| | | Servings | | | |
|---|---|---|---|---|---|
| **Group** | | **0** | **1-2** | **3-4** | **5+** |
| ***Healthful Living RIG*** | *n*=18 | | | | |
| *Baseline* | | 0 | 50% n=9 | 50% n=9 | 0 |
| *Post-Test* | | 11% *n*=2 | 72% *n*=13 | 17% *n*=3 | 0 |
| ***FYE Course*** | *n*=20 | | | | |
| *Baseline* | | 15% *n*=3 | 45% *n*=9 | 35% *n*=7 | 5% *n*=1 |
| *Post-Test* | | 10% *n*=2 | 70% *n*=14 | 15% *n*=3 | 5% *n*=1 |
| ***Control*** | *n*=14 | | | | |
| *Baseline* | | 14% *n*=2 | 86% *n*=12 | 0 | 0 |
| *Post-Test* | | 14% *n*=2 | 86% *n*=12 | 0 | 0 |

Exercise habit data are reported similar to the American College Health Association's National College Health Assessment reports (2009) in which participant frequencies are either meeting national recommendations for health or are not meeting these recommendations for disease risk reduction. These values indicate that subjects are either meeting these guidelines with at least 150 minutes per week of moderate intensity aerobic activity, 75 minutes per week of vigorous intensity aerobic activity, or a combination of both, as well as perform 8-10 muscle strengthening exercises for 8-12 repetitions each at

least twice per week (Haskell, et al). In order to establish whether students who had combinations of both moderate and vigorous activity were meeting recommendations, the researcher followed the rule provided by the CDC (2011) stating that one minute of vigorous intensity activity is equal to approximately two minutes of moderate intensity activity. The combination of vigorous time converted to moderate time and moderate time had to equal 150 minutes per week in order to be classified as meeting the guidelines.

Figure 1 presents the percentages of each group pre and posttest meeting the Physical Activity Guidelines for Health. Although the FYE group value is slightly higher, the Healthful Living RIG was the only group to elicit an improvement.

**Figure 1:** Percentages of all groups meeting Physical Activity Guidelines for Health

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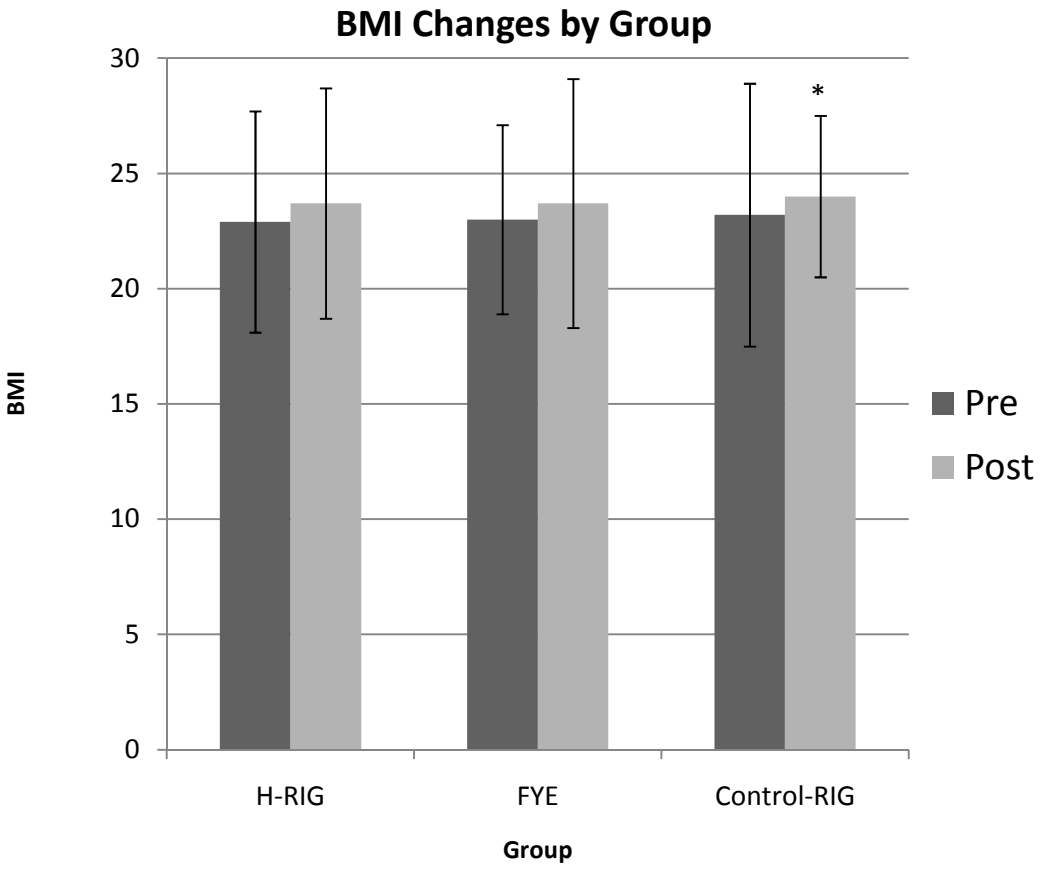
*Fitness Assessment*

Figure 2 illustrates that the math-themed control RIG was the only group to significantly elicit an increase in body mass index.

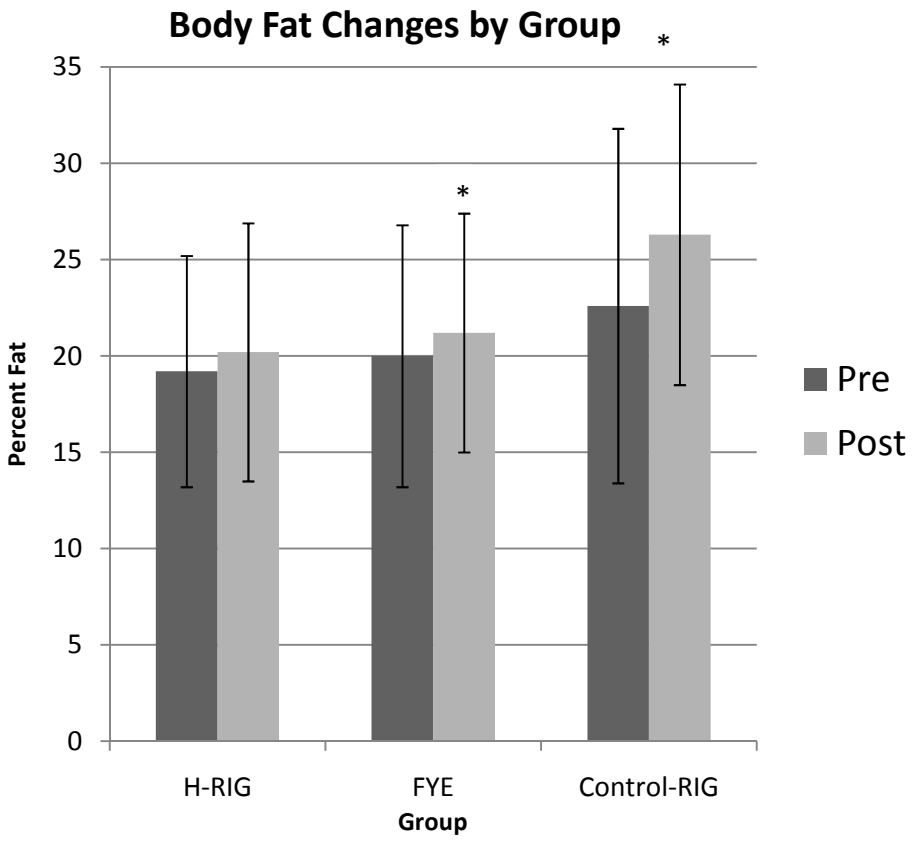
**Figure 2:** Dependent *t*-test results for all groups for BMI, $p < .01$.




(*)= *Significant change from pretest to posttest*

Though all groups increased, Figure 3 illustrates that unlike the two control groups, the Healthful Living RIG did not elicit a statistically significant increase in percent body fat.

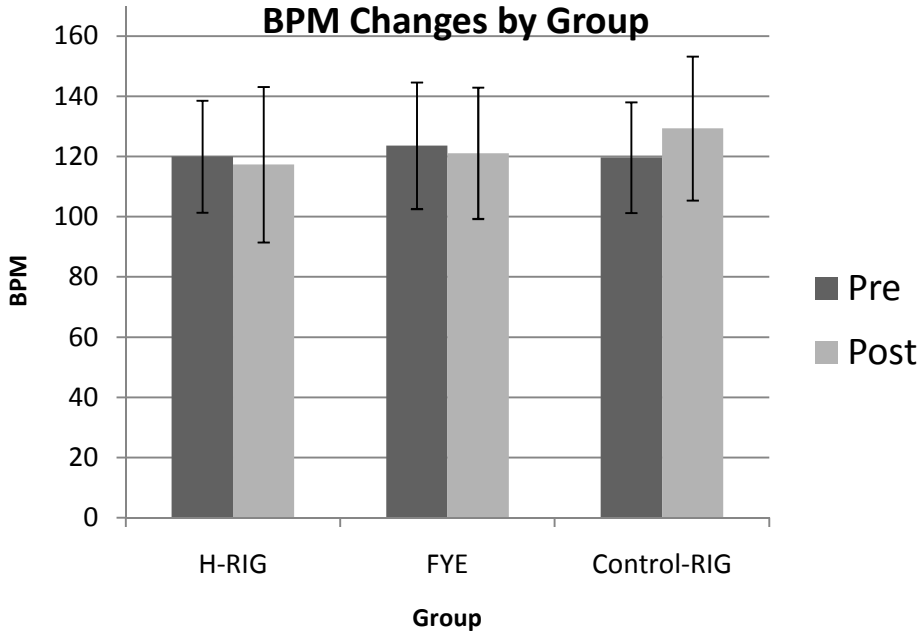
**Figure 3:** Dependent *t*-test results for all groups for percent body fat, $p < .01$.




(*)= *Significant change from pretest to posttest*

Figure 4 displays group values for the YMCA 3-Minute Step Test pre and post. Although there are no statistically significant differences, it should be noted that the math RIG is the only group to elicit an increase in heart rate.

**Figure 4:** Dependent *t*-test results for all groups for cardiorespiratory fitness, $p < .01$.




(*)= *Significant change from pretest to posttest*

Two-way repeated measures analysis of variance (ANOVA) showed no significant main effects or interactions, as illustrated in Table 3. However, though not statistically significant, there seems to be a Bfat-Group interaction, $p$=.014. All groups had an increase in body fat percent. However, this increase was lowest in the intervention group. The math-themed RIG exhibited the largest increase.

**Table 3:** Two-way repeated measures analysis of variance (ANOVA) main effects and interactions, $p$< .01

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| **Main Effects** | | | | | |
| bmi Group | 0.005 | 2 | 1.122 | 0.025 | 0.975 |
| Hrate Group | 678.392 | 2 | 136.895 | 0.476 | 0.625 |
| Bfat Group | 25.168 | 2 | 83.383 | 1.775 | 0.181 |
| **Interactions** | | | | | |
| Group | 0.005 | 2 | 0.002 | 0.003 | 0.997 |
| Group | 678.392 | 2 | 339.196 | 0.909 | 0.41 |
| Group | 25.168 | 2 | 12.584 | 4.746 | 0.014 |

*Qualitative*

Two focus groups were performed for the Healthful Living RIG for program evaluation and improvement. The group demographics are listed in Table 4 below.

**Table 4:** Focus group demographics by group

| | **Focus Group 1** (n=11) | **Focus Group 2** (n=8 ) |
|---|---|---|
| Males | 5 | 4 |
| Females | 6 | 4 |

Each question from the focus groups is listed below with emerging themes from each.

**Question 1**: Describe your experience in the Healthful Living RIG.

*Helpfulness*: Both groups repeatedly mentioned that they had an open door policy with their fellow RIG members. One student described it well when he said, "I know if I ever needed anything, they wouldn't mind." Another described the bond a bit more in depth by stating, "We look out for each other." There was a strong supportive undertone.

*Group Closeness*: Both groups frequently expressed a team mindset. One student opened the topic by stating, "It is nice knowing familiar faces." A student in the other focus group stated, "Everyone hangs out with each other. Everyone knows each other." This theme of closeness and unity continues with students stating, "We all hang out with each other and have a good time together." This theme not only emphasizes the harmony of the group, but also that students chose to apply for this group due to the desire to belong and have a group to identify with upon entering college.

**Question 2**: Describe your favorite aspect of the Healthful Living RIG.

*Academic Accountability*: "It's good having people who know the assignments." "…you don't just have one person reminding you, you have your entire hall…" Both groups expressed how beneficial it has been for them to live in an environment with other students taking the same classes. They are able to stay on track with their academics due to assistance from each other. Another aspect of this theme was

that they felt more encouraged to complete assignments when they saw their classmates doing them in the dorm.

*Proximity*: Both groups mentioned repeatedly that they simply walked down the hall for any needs they might have. These needs could be academic or social-related.

**Question 3**: Describe your least favorite aspect of the Healthful Living RIG.

*Conflicts, Lack of Autonomy with Class Scheduling*: Subjects mentioned that pre-assigned RIG courses made their registration difficult. However, it should be noted that both groups also stated that being locked into various core classes that fill quickly did relive the stress of possibly not being able to obtain positions in those classes. The groups also made it evident that they would prefer input in how their schedules are organized and that this would not only make classes more enjoyable, but also more personal.

**Question 4**: What do you think would make this RIG more effective for healthy living?

*Programming Recommendations*: Focus group subjects stated a need for team building and introductory activities before the semester began. One subject gave an account of his first few days by stating, “I didn’t like how it waited until class started to get to know everybody. We got here and we had four days. I didn’t know anybody and I just stayed in my room all four days. I met everyone at class on Monday.” Students also mentioned a desire for more programming outside of academics. Various ideas were presented such as weekly dinners, intramural teams, adventure trips, healthy meal options, and campus involvement.

# CHAPTER IV

# DISCUSSION

The purpose of this study was to evaluate the effect of a Healthful Living Residential Interest Group program on students' exercise and nutrition habits, and physical fitness. The intervention Health Living RIG did not exhibit statistically significant increases in any of the three variables, body mass index; percent body fat and exercise recovery heart rate. The fitness-based control FYE course had significant increases in body fat percent from pre to post data collection despite only a slight decrease in student involvement in exercise. The math-themed control RIG showed significant increases in both body mass index and body fat. Though no statistical significance was found, it should be noted that the math-themed control RIG was the only group to increase their exercise recovery heart rate in the YMCA 3-minute Step Test, an indication of a decline in cardiorespiratory fitness. Decreases in recovery heart rate for the other two groups indicated an increase or maintenance of cardiorespiratory fitness. Fitness test values were consistent with survey results.

The subjects in this study were not generalizable to college populations. However, when compared to the results of the most recent National College Health Assessment data, the Healthful Living RIG and FYE course group are only slightly higher than the national means for physical activity frequency. The Math RIG was well below the national means with 20% of students meeting the physical activity guidelines for health compared to 49.2% (ACHA, 2009).

Additionally, fruit and vegetable consumption was consistent with previous research. Very low percentages of students consumed five or more servings per day (ACHA, 2009; Racette et al., 2005). This could indicate a gap in education or intervention approaches in previous research, as well as the current study.

Minalopous, et al (2008) reported a weight gain of 1.23kg in seven months for freshmen living on campus. This would yield an approximate weight gain of .6kg in 3.5 months, which is the length of the current study. The Math RIG for the current study exhibited similar gains. These students gained .8kg. The Healthful Living RIG gained .4kg and the FYE course gained .2kg. Interestingly, the FYE course

exhibited more of a body composition change than a body weight change, despite their exercise frequencies only slightly decreasing.

Results suggested that the interdisciplinary approach to improving or maintaining positive habits and physical health that one southeastern university made produced positive results. When university sectors work together, more resources become available allowing more opportunities for student program enhancement. Further research is needed to determine factors responsible for the positive outcomes of this Healthful Living RIG. Focus groups revealed a strong team dynamic and supportive theme within the intervention group. The community and social support aspect of this RIG should be investigated as it could, as shown in previous literature (Kahn, 2002), contribute to the adherence to activity and healthy behaviors. Additionally, longitudinal investigations of groups such as this should be performed in order to obtain information on retention and academic performance as a result of group membership.

The current investigation is limited in that the population sizes are small and not representative of other populations. Statistical power was difficult to obtain due to small group sizes. Efforts should be made to impact larger populations.

The eventual aim of pilot studies such as this is a unified campus system in place for student health improvement and promotion. Pilot programs such as this are necessary in order to determine the measures universities must take to improve the health of their student bodies, graduating classes, and future working populations. Graduating classes are, after all, the future generations of Americans. Issues of weight and obesity can no longer be ignored by old health clinics and resident life programs. These alone, are no longer sufficient.

Philip Sparling (2007) makes note of university mission statements in his call to action for universities to deal with obesity and weight management. Georgia Southern University's mission statement includes such terms as *student growth*, *life success*, *wellness*, and *individual responsibility*. In order to truly achieve this, we must work together to encourage students to become the best "selves" they can possibly be; intellectually and physically "in shape." The mission of educational institutions, colleges and universities, is to send well-rounded, educated individuals into the workforce for productive,

successful careers. Not only should these institutions educate students in their specific major areas for fruitful professions, but also success in terms of long, active lives in good health. Students should be armed with the knowledge necessary to take charge of their own personal health. These individuals will no longer rely on physicians and medications but will, instead, be the administrators of their own quality of life.

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# APPENDIX A

## Research Questions, Delimitations, Assumptions, Limitations, and Definitions

**Research Questions:**

1. Does a Healthful Living Residential Interest Group positively affect exercise and nutrition habits and physical fitness compared to a control Residential Interest Group and FYE class?
2. Does the Healthful Living Residential Interest Group program illicit a positive increase in exercise and nutrition habits and physical fitness from baseline values?
3. What was the experience of participants in the Healthful Living Residential Interest Group and how could their experience have been enhanced?

**Limitations:**

1. Convenience sampling will be used meaning the sample size will be small and nonrandomized.
2. The results may be difficult to generalize to college freshmen.

**Delimitations:**

1. This study involves only university freshmen within certain groups, ages 18-19.
2. Only the American College Health Association (modified) National College Health Assessment II and fitness test data will be utilized.

**Assumptions:**

1. Each participant will respond to questionnaires thoroughly and honestly.
2. Participants will put forth maximal effort during fitness testing.
3. Participants will openly and honestly engage in focus group discussion.

**Definitions:**

1. Residential Interest Group (RIG) - groups of approximately 20 students sharing common areas of interest and fields of study. Students are required to take various courses with each other, allowing for relationship development. Types of course depend on the type of RIG the students are in. These groups typically reside within the same residential halls on campus. Programs are put on for each RIG by their community leaders, which are specific to each group.
2. First Year Experience Seminar Class (FYE)- two hour seminar that serves as an extension of orientation for each student. This required course during the first semester for all first-year

undergraduate students of Georgia Southern University. The curriculum is focused on the introduction to university life. University resources are discussed, time management is emphasized, and students discover their learning styles and how to accommodate them.

# APPENDIX B

## Annotated Bibliography

Bray, SR, Kwan, MTW. (2006). Physical Activity is Associated with Better Health and Psychological Well-Being During Transition to University Life. *Journal of American College Health*, 55(1), 77, 6pgs.

In this study, vigorous physical activity and psychological well-being were assessed. There was a general indication that students who participated in adequate levels of vigorous physical activity during the transitional first year had more positive psychological well-being. The authors also note that this particular population should be viewed as high risk. This study demonstrates a possible protective effect of physical activity on this population.

DeBerard, MS, Spielmans, GI, Julka, DC. (2004). Predictors of Academic Achievement and Retention Among College Freshman: A Longitudinal Study. *College Student Journal*, 38(1), 66-80.

Participants in this study were assessed during first week of freshman yr and beginning of next academic year. It was predicted that physical and mental quality of life will be related to greater academic performance and retention. The authors utilized surveys and found that health related quality of life related to retention.

Dyson, R, Renk, K. (2006). Freshman Adaptation to University Life: Depressive Symptoms, Stress, and Coping. *Journal of Clinical Psychology*, 62(10), 1231-1244.

This investigation used the BDI-II (among others) and found that college students experiencing increased levels of stress experience higher levels of depressive symptomatology. Freshmen who were dealing with the stress of their college transition were more likely to avoid dealing with these difficulties. Use of avoidant coping strategies relates to higher levels of depressive symptomatology. This population was vulnerable to the experience of stress and depressive symptomatology.

Frey, J., Fontana, A. (1991). The Group Interview in Social Research. *Social Science Journal*, 28(2), p175, 13 pgs.

This article addresses question structure in focus group formatted data collection. The authors state that the purpose of the research will determine the question structure. Often, phenomenological groups will utilize unstructured, open-ended questions. This allows for greater flexibility in probing and response patterns.

Higgins, JW, Lauzon, LL, Yew, A, Bratseth, C, Morley, V. (2009). University Students' Wellness—What Difference Can a Course Make? *College Student Journal*, 43(3).

This investigation assessed the influence of a health education course on first-year university students. Authors employed one-minute papers (n=346) and personal interviews (n=7). Results indicated that health education will prepare students for life after school. Results suggest health education in college may help students attain balance in their lives, as reasons for attending university sometimes outweigh need for balance. Positive attitude and health behavior changes were noted.

Hudd, SS, Dumlao, J, Erdmann-Sager, D, Manny, D, Dhan, E, Soukas, N, Yokozuka, N. (2000). Stress at College: Effects on Health Habits, Health Status and Self-Esteem. *College Student Journal*, 34(2), 217, 11pgs.

"Is there a relationship between stress and health behaviors?" This investigation surveyed dorm students. Respondents with increased stress levels reported lower exercise levels than those with lower reported stress levels. Non-stressed students reported eating fruits & vegetables "frequently."

Kitzinger, J. (1994). The Methodology of Focus Groups: the Importance of Interaction Between Research Participants. *Sociology of Health & Illness*, 16 (1).

This article states that the interview is "focused" because it involves a type of collective involvement, noting the discussion of health education as common. Interaction as a feature of data collection is a distinguishing aspect of this type of format. The conversation amongst participants is often revealing to the researcher as well as the participants themselves. Regardless of the selection method, participants are not uniform and thus can offer much insight. This often leads to the discovery of aspects of their personal experiences that may have changed various previous opinions. Such methods are often utilized to fill in the gaps left by surveys and identify group norms. It can also lead into conversations about often taboo or embarrassing subjects which might be left uncovered during one-on-one interviews.

McLafferty, I., (2004). Focus Group Interviews as a Data Collecting Strategy. *Journal of Advanced Nursing*, 48(2), 187-194.

This article notes that focus groups, as a data collection method, are a rich source of information. She also states that smaller groups are more manageable. This method is particularly valuable for reflecting the social realities of a cultural group.

Minalopous, NL, Auinger, P, Klein, JD. (2008). The Freshman 15: Is it Real? *Journal of American College Health*, 56(5), 531-533.

This investigation involved unmarried freshmen living on-campus and utilized online surveys (NCHA). Changes in weight and BMI in the 7 month period from the beginning of freshman year to time of survey was reported. 51.3% gained weight with the entire group averaging 2.7lbs. This rate of gain is 5.5 times that of general population.

Morgan, D. (1996). Focus Groups. *Annual Review of Sociology*, 22, 129-152.

This article defines a focus group as a research technique during which a group discusses a topic determined by the researcher. The interaction within the group is a source of data. A common combination of quantitative and qualitative data collection methods utilizes surveys as the primary method and focus groups as a means of clarifying the findings of the surveys. Participants both question each other and explain themselves to each other, making this type of interview different from a simple sum of individual interviews.

Nahas, MV, Goldfine, B, Collins, MA. (2003). Determinants of Physical Activity in Adolescents and Young Adults: The basis for High School and College Physical Education to Promote Active Lifestyles. *Physical Educator*, 60(1), 42, 15pgs.

This is an overview of factors that influence physical activity adoption and maintenance for high school and college students, particularly, theoretical behavioral models. It begins by listing evidence that physical activity patterns can be changed. The social-cognitive theory stands out here as relevant to this study. It is a powerful predictor of behavior and one of the strongest predictors of future activity. There are no unequivocal theories or definitive guidelines for promoting lifelong physical activity in school settings. The authors also note that research is limited in the area of promoting physical activity behavioral changes through physical education. However, based on previous studies, the authors list some general guidelines.

Nelson, MC, Story, M. (2009). Food Environments in University Dorms: 20,000 Calories Per Dorm Room and Counting. *American Journal of Preventative Medicine*, 36(6), 523-526.

Participants consisted of 100 dorm students. The research team completed food and beverage inventories in the rooms. The average number of calories per room totaled 22,888. More than 70% of students had each of the following: cereal/granola bars, salty snacks, main dishes, desserts/candy, sugar sweetened beverages.

Racette, SB, Deusinger, SS, Strube, MJ, Highstein, GR, Deusinger, RH. (2005). Weight Changes, Exercise, and Dietary patterns During Freshman and Sophomore Years of College. *Journal of American College Health*, 53(6), 245-251.

The authors state that weight gain and behavioral patterns during college may contribute to overweight & obesity during adulthood. Participants were 764 students (53% women, 47% men). Researchers collected weight and height for body mass index and classification purposes. They also utilized questionnaires to assess exercise and dietary patterns. At the start of freshman year, 29% overweight, 70% ate less than 5 fruits/vegetables per day. By the end of sophomore year, 70% of 290 reassessed had gained weight.

The American College Health Association. (2009). National College Health Assessment Spring 2008 Reference Group Data Report. *Journal of American College Health*, 57(5), 477-486.

This a report of data collected via the National College Health Assessment Survey. 8.5% of students reported eating 5 or more servings of fruits and vegetables daily. 45.5% reported exercising vigorously for at least 20 min or moderately for at least 30 min on 3 of the past 7 days. 49.2% reported exercising to strengthen or tone muscles on at least 2 of the past 7 days. 14.9% reported diagnosis of depression in lifetime---32% of these were within the past school year.