5-22-2018

Health Behavior Change as a Function of Social Support And Individual Feedback

Katie Ghelfi-Dunbar
kghelfidunbar13@georgefox.edu

Health Behavior Change as a Function of Social Support And Individual Feedback

by

Katie Ghelfi-Dunbar

Presented to the Faculty of the

Graduate School of Clinical Psychology

George Fox University

in partial fulfillment

of the requirements for the degree of

Doctor of Psychology

In Clinical Psychology

Newberg, Oregon

Health Behavior Change as a Function of Social Support

And Individual Feedback

by

Katie Ghelfi-Dunbar

has been approved

at the

Graduate Department of Clinical Psychology

George Fox University

as a Dissertation for the PsyD degree

Signatures:

Mary Peterson, PhD, ABPP, Chair

Kathleen Gathercoal, PhD

Jeri Turgesen, PsyD

Date: 5/22/2018

Health Behavior Change as a Function of Social Support And Individual Feedback

Katie Ghelfi-Dunbar

Graduate School of Clinical Psychology

George Fox University

Newberg, Oregon

Abstract

The objective of this research was to examine the usefulness of increased social support and individual goal setting on health behaviors of traditional college students. Additionally, this study examined the effectiveness of the current required Lifelong Fitness course at George Fox University to explore factors associated with health behavior change. Past research indicates there are a variety of risks to sedentary lifestyle (Finn & Watson, 2017). Research also reveals social support and self-efficacy to be important factors in facilitating change in health behaviors. College students experience many changes due to development and change in environment, making this an opportune time to intervene. Physiological markers including body fat percentage and muscle mass, as well as self-report of change in activity, nutrition, and health self-efficacy assessed the impact of the intervention and the relationships between variables. Results displayed significant positive changes in activity monitoring, food monitoring, and self-reported minutes of activity per week. Results did not show significant decrease in body fat, though students were shown to move toward healthier body fat percentage based on whether they had "at risk" low or high fat percentage. Lastly, gender was a significant factor in movement toward healthy fat percentage.

Chapter 1

Introduction

Health behaviors such as physical activity and poor nutrition choices are a problem in America. Only fifty percent of Americans meet the physical activity recommendation, which states adults should get a minimum of 150 minutes of physical activity per week. This is the standard set by the U.S. Department of Health and Human Services (2008). Physical activity is a major predictor of lifespan, significantly reducing the risk of adverse health outcomes, and the impact of many chronic illnesses (Jonas, 2009). Obesity long been associated with both physical activity and nutrition and correlates with many serious health conditions such as cancer, cardiovascular diseases, gastrointestinal problems, metabolic/endocrine disease and more. Obesity also increases mortality rates and shortens lifespan by approximately 5-10 years (Fruh, 2017). Both developed and developing countries are showing significant increases in rates of obesity in younger and younger aged cohorts (Fruh, 2017). Thus, it is imperative people make healthy lifestyle choices.

College students

College students are particularly at risk for weight gain caused by poor diet and inactivity due to developmental changes as well as new social influences (Trost, Owen, & Bauman, 2002, Vrazel, Suander, & Wilcox, 2008). In fact, a study done by King, Vidourek, English, & Merianos reported between the years of 1991-1999 weight gain among college students was higher than that of the general population (2014). Similar to the general American population, over half of college students in the United States do not meet the recommended guidelines for physical activity and many college students become overweight. Additionally, it was noted the students who became overweight in college had a much higher risk of continued obesity in later

adulthood. Research has explored this phenomenon and confirmed that weight gain is a common occurrence within the college population (Hoffman, Policastro, Quick, & Soo-Kyung, 2006). Similarly, a study on college students indicated that 70 percent of students gained weight between the beginning of their freshmen year and the end of sophomore year (Racette, Deusinger, Strube, Highstein, & Desinger, 2005). In exploring a potential a contributor to college weight gain, Bray and Born (2004) examined patterns of physical activity during college transitions, comparing physical activity of students during the end of high school to activity during the first two months of college. Significant declines in frequency and duration of physical activity were found, with 50% of students who had been active in high school becoming significantly less active during the first year of college. Though most students know the benefits of regular physical activity, the American College Health Association-National College Health Assessment revealed that little progress has been made in finding ways to increase the activity levels of college students (2007).

Risk factors for obesity

College students encounter a variety of external factors when they enter college (Childers, Haley, & Jahns, 2011). Many of these factors contribute to a person's willingness and ability to engage in health behaviors during this important developmental transition. College students cite stress to be the most common a barrier to health behaviors and academic success (American Health Association, 2012). A study conducted by the American Psychological Association (APA, 2012) found a strong relationship between stress and obesity. In this study, people who were overweight or obese reported difficulty relieving stress in healthy ways, though were 50 percent more likely to attempt to relieve their stress than the general population. Over 50 percent of obese individuals report stress levels have a strong impact on their physical health,

whereas only 37 percent of the general population believe this to be the case (APA, 2012). In the same study, respondents report some other reasons for not exercising are lack of motivation, personal obligations, and time management.

Protective Factors

Although risk factors significantly increase risk for limited physical activity and poor nutrition, research has also identified protective factors that mitigate weight gain. Marr and Wilcox (2015) found a high internal health locus of control or belief that one is in control of their personal health outcome predicts health behaviors including dietary habits, exercise, and lower rates of excessive drinking. In this study, self-report measures were obtained from college students to determine the extent that high internal locus of control predicts health behavior. They found that high internal locus of control significantly impacted health behavior; though social support and high self-efficacy facilitated this relationship. This suggests that physical activity and dietary health are heavily related to self-efficacy and social support.

As previously stated, social support is a significant protective factor in maintaining health behaviors. Varzle & Wilcox studied the physical activity of women and concluded that social support, including having someone to exercise with is an important factor in activity levels (2008). In fact, social support was found to be one of the most consistent predictors of exercise participation (Trost, Owen, & Bauman, 2002, Vrazel, Suander, & Wilcox, 2008). Kim et al. (2015) also found relationships between social support and self-efficacy with students, stating that peer support facilitates self-efficacy, which determines physical activity. King, English, and Merinos (2014) found social support to be important for college students as they often move from their families and may need additional support. This study suggests that social support be a consideration when designing intervention strategies for college students to increase activity

levels. Marr and Wilcox (2015) also recommend inclusion of social support in health interventions with college students based on their findings. Research has a long history showing that peer support is a significant factor for health behavior in students and other adults alike (Sparling, 2002). Dennis (2011), found that increased social connection involving both emotional and intellectual closeness lead to improved health behavior. The above summary highlights the role of locus of control, or self-efficacy and social support are significant factors that can be leveraged to improve health behavior.

Feedback is a well-established way to help inform and promote physical activity (Hirvonen, 2015). In fact, providing tailored goals and recommendations has shown to be a motivational component of health behavior change. Hirvonen also found providing feedback to people based on their current BMI and fitness level improved exercise behavior and BMI. Combining self-monitoring, goal setting, and feedback have been successful factors in many health programs (Finn & Wilcox, 2017) that target exercise and nutrition. Ongoing monitoring of activity has also found to be beneficial when used in conjunction with feedback. Self-monitoring of goals, nutrition, and exercise appears to be an important component of positive health change (Fruh, 2017). These interventions facilitated increased physical activity, better nutrition and decreased alcohol consumption; therefore, creating long-term reduction in chronic health conditions.

There is varying information in the literature regarding gender and health behavior change. Some studies conclude that females benefit from non-performance based goals due to social norms that females are less motivated by competition (Morris & Kavussanu, 2008). More recent research suggests females and males benefit from creating approach goals rather than avoidance goals (Lochbaum & Podlog et al., 2013). This indicates goals are more effective when

they are geared toward action rather than behavior avoidance. Lochbaum and Podlog also found females were actually more receptive to performance-based goals, which contradicts stereotypes that women are less competitive.

Summary

It is evident that college students face many challenges in developing health behaviors during this important developmental period including increased stress, environmental changes and changes in social support. Thus, it is important to find ways to mitigate these risk factors and increase protective factors such as social support. Research has shown the serious consequences of poor health behaviors, students who have limited physical activity and poor eating habits are at a high risk for physical, emotional, and social consequences both currently and in later life (King, 2014). Given the potential impact of changes in diet and activity, the transition from high school to college may be a pivotal time for lifestyle change as students may be creating lifelong habits (Barfield, 2012). It is important to learn what protective factors and barriers to health behavior change precede successful health changes within the university population.

Purpose of the study

This study adds to current research by further exploring ways in which social influence and individual feedback can be improved in order to enhance college health education programs and to evaluate the effectiveness of the intervention currently in place. Due to sedentary lifestyle trends across the United States, public health officials and other organizations have implemented measures to promote physical activity but have not seen significant increases in activity. Implementing a program that increases social support to positively influence health behavior will add to this growing field of research. It is hypothesized that students who were part of the small groups will engage in more physical activity, which may lead to decreased body fat and healthier

eating than students in the large groups due to the strengthening of social support. Social support may also increase students' belief they have the ability to sustain new habits, as measured by changes in health self-efficacy scores and body fat percentage.

Study Design

The empirical design of this study will assess the pre-post impact of an intervention developed to increase peer support and, establish personal goals for activity and healthy eating. The goal-setting component of the intervention was designed to reinforce health self-efficacy as students observe their progress toward achieving their goals during the 14-week semester. The intervention group will be compared to students receiving treatment as usual (TAU) in the form of a large seminar lecture and discussion groups. The sample is comprised of traditional undergraduate students who are enrolled in a required course (Life Long Fitness) designed to establish health behaviors. The decision to integrate the intervention into the course aligns with previous research that found college students are more likely to engage in exercise during the week in comparison to adults who typically exercise during the weekend (Keating et al. 2014), thus students were encouraged to engage in physical activity during the scheduled class meetings.

Hypotheses

H1: All Students participating in the class intervention (TAU) group will show a greater reduction in body fat composition between the time the first and the fifteenth week course.

H2: All Students participating in the small group (enhanced social support) will show a greater reduction in body fat composition than students receiving the intervention (TAU).

H3: Students participating in the class intervention (TAU)will show a significant increase in monitoring their activity level as measure by the *Self Rated Abilities for Health Practices Scale* SRHAP.

H4: All students participating in the class intervention (TAU) will show an increase in activity as measured by self-report of minutes per week.

H5: Students in the enhanced intervention group (enhanced social support) would show greater increase in both monitoring and actual activity than the TAU group.

H6: Gender will influence health behavior change as measured by the body fat percentage change. Given the mixed findings in the research, the impact of gender on change is exploratory, therefore, non-directional.

Chapter 2

Methods

Participants

The participants included the 291 students enrolled in the ten sections of the Lifelong Fitness course. The participants included 168 females and 123 males with an average age of 18.9 (SD=0.9). The enhanced social support (ESS) group was comprised of 18 traditional undergraduate students from George Fox University's Lifelong Fitness class. The ESS group received their intervention simultaneous to TAU over the course of one semester. Participants were all female and the average age of the students was 19. All students in selected sections were given the choice to join the study. Students in the course were excluded from the study if they fail to participate in the small group assignments within the course.

Measures

The Self Rated Abilities for Health Practices Scale (SRAHP) is a 28-item, 5-point scale to measure self-perceived ability to implement health-promoting behaviors. The SRAHP demonstrates acceptable levels of internal consistency and test/retest reliability; Cronbach's alpha for the total scale was .94. SRAHP contains four subscales: Exercise, Nutrition, Responsible Health Practice, and Psychological Well Being. Each subscale has seven items. Respondents are asked to rate the extent to which they are able to perform health practices related to these four domains. An example of an item for the Health Practices subscale is "I am able to get help from others when I need it." Items are rated from 0 (not at all) to 4 (completely). Ratings for each subscale are summed to yield subscale scores. Subscale scores are summed to obtain a total score. Total scores range from 0-112. Higher scores indicate greater self-efficacy for health practices.

BodPod: Body composition was measured by air-displacement plethysmography using the BOD POD®. Lean body mass and body fat percentage information were obtained using the Bod Pod technology available to all Lifelong Fitness students. The range of error for this test is ± 1 to 2.7%.

Demographics. Participants were asked at the end of the surveys to report their demographic information. The information included was gender, year in college and age.

Procedures

Participants were enrolled in a Lifelong Fitness course where demographics and pretest measures were obtained within the first two weeks of 15-week semester (Spring 2016). Participants completed posttest measures during the 15th week of the semester. All pretest and posttest measures were a requirement of the course. As part of the course, small groups of students met three separate times for 40-50 minutes during the semester. These groups consisted of 3-6 students and a group leader, who was a Psy.D student; goals were tailored to each student's needs and values. During these sessions students identified goals, obstacles to obtaining goals, and brainstormed ways to overcome barriers. A motivational interviewing technique called the 5 A's Behavior Change Model Adapted for Self-Management Support Improvement (Assess, Advise, Agree, Assist, and Arrange) was used to structure these groups and facilitate change (Glasgow et al. 2002). In addition, each participant created SMART goals to facilitate personal health behavior change. During these meetings, students engaged in discussion with each other and collaboratively discussed ways to attain personal goals and ways to overcome barriers to their goals.

Students in the TAU and the treatment group attend the Lifelong Fitness course 3 days a week for 50 minutes. They are required to log activity throughout the duration of the semester.

During classes, they are taught how to use weights in the gym and given information on fitness, nutrition, and healthy lifestyle habits.

Data Analysis

Participants in the study were matched to students in the larger lab group based on pretest body fat percentage and gender in a paired matched sample t-test. The principle analysis for this study was a 2 X 2 MANOVA with 2 levels of time (1st and 15th week) and 2 levels of group (class vs. ESS). The dependent measures included body fat, activity, SRHAP.

A 2 x 3 ANOVA was used to examine the relationships between gender and expected body fat change within the Lifelong fitness course. Two levels of gender (male, female) and 3 levels of group (at risk low, healthy, at risk high).

Other analyses include paired samples t-tests to compare pre and post activity, fruit/vegetable intake, monitoring of activity, and monitoring of nutrition.

Chapter 3

Results

Table 1 shows the mean pre and post body fat percentage for the intervention and TAU group. A paired-samples t-test was conducted to compare health behavior change of students in the treatment group (n=18) with the health behavior change of students in the TAU condition (n=18). Health behavior change was measured by comparing body fat percentage pre and post intervention. A 2 (groups) x 2 (repeated-measures) ANOVA was used to examine the differences among these means. There is no main effect of group, $F(1,34)= 0.001$, $p= 0.97$. There is no main effect of time, $F(1,34)= 1.66$, $p= 0.21$. There is no interaction of group and time, $F(1,34)= 0.01$, $p= 0.92$. No statistically significant changes were found between the groups based on body fat percentage change, therefore hypotheses one and two were not met. The assumptions of the ANOVA were met.

Table 1
Mean body fat percentages for the intervention and comparison groups at the beginning and end the intervention.

Group	Time	Mean	SD
Intervention	Pre	25.74	7.51
	Post	25.25	7.55
Comparison	Pre	25.71	7.27
	Post	25.19	7.10

Notes: Intervention group=18; Comparison Group=18.

Although there were no group differences or interactions between intervention groups, there were individuals who displayed change. Thus, reliable clinical change was used to examine the demographic factors that predict change.

Reliable clinical change was measured for each individual in the study. A Reliable Change Index (RCI) is computed by dividing the difference between the pretest and posttest scores by the standard error of the difference between the two scores. If the RCI (Jacobson & Truax, 1991) is greater than 1.96, then the difference is reliable, a change of that magnitude would not be expected due to the unreliability of the measure. Conversely, if the RCI score is 1.96 or less then the change is not considered to be reliable, it could have occurred just due to the unreliability of the measure. Of the 4 participants who had reliable clinical change in body fat percentage, 3 were part of the treatment group and 1 was in the TAU group.

The demographic data of the participants who had reliable clinical change in body fat percentage was analyzed. Correlations were computed to determine variables that contribute to RCC. Table 2 shows the variables that correlated with RCC in body fat percentage.

Table 2
Correlations between RCC and self-report information

Measures	RCC
Pre Body fat	-.13
Pre Weight	.15
Pre Minutes Active	-.21
Pre Sleep	-.24
Pre-Track Activity	.31
Pre improved nutrition	.28
Pre improved activity	.542
Post track activity	.29
Post improve nutrition	.35
Post improved activity	.33
Has exercise partner	-.40
Health Self-efficacy	.45
My health is important to me	.25
My health important to others	.29

** p < .05; ** p <.01 Negative numbers indicate success by student in TAU*

The 291 students in the Lifelong Fitness course were evaluated to determine the effectiveness of the course as a whole. Paired samples t-tests were performed and significant

changes were found pre/post intervention on minute's active, increase in monitoring of activity, and monitoring food intake. Results supported hypotheses three and four which proposed that both TAU and intervention groups would show a significant increase in minutes active ($t(289) = -3.94$, $p = 0.001$) and monitoring activity ($t(289) = -3.30$, $p = 0.001$). There was no significant difference between in activity or monitoring between the TAU and intervention group, therefore hypotheses five was not met. Supplemental analyses (not part of original hypotheses also showed significant improvement in monitoring of food intake for both groups ($t(289) = -6.79$, $p < 0.001$). There were no significant differences found in fruit and vegetable intake for either group ($t(289) = -.66$, $p = 0.51$).

Supplemental Analysis

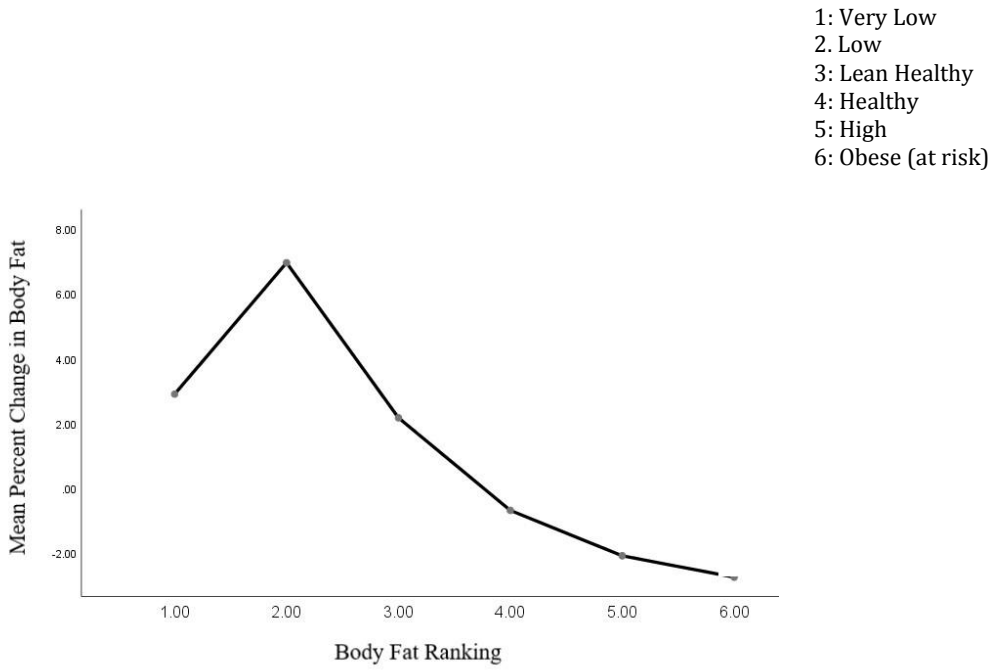
Changes in body fat percentage were computed to determine movement toward healthy fat percentage. Table 3 shows the means and standard deviations of fat percentage change by ranking, based on movement toward healthy fat percentage change. Figure 1 illustrates the mean body fat percentages based on risk category.

Table 3
Mean body fat percentage change for Lifelong Fitness course participants based on category before intervention

Group	Mean Change	SD
At Risk (low body fat)	2.90	4.1
Low	6.96	7.42
Lean Healthy	2.20	7.50
Healthy	-0.70	4.80
Overweight	-2.11	6.00
Obese	-2.81	6.31

N=291

Figure 1
Change in body fat based on risk category



A 2 (genders) x 3 (too little, just right, and too much body fat) ANOVA was used to test hypothesis six, which suggested there would be a significant difference in the body fat change of men and women who started the semester with either too little, just right, or too much body fat. The mean change in boy fat percentage for these groups is shown in Table 1. The assumptions of the ANOVA were met, based on trimmed means as well as on medians.

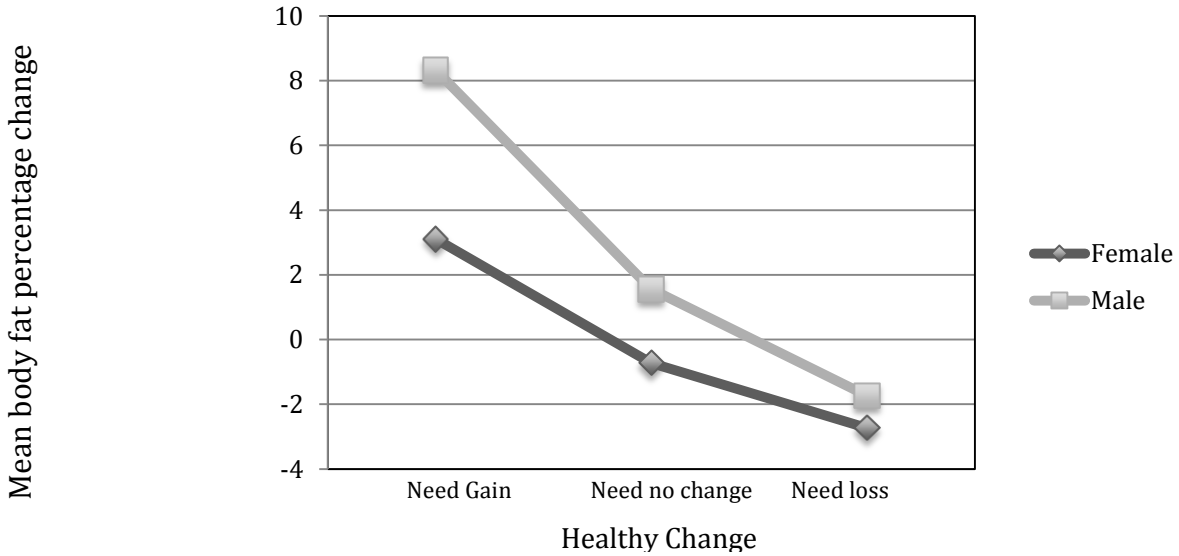
Table 1.

The mean change in boy fat percentage over the course of a semester for men and women who had too little, just right, or too much body fat.

Sex		Mean	Std. Deviation	N
Female	expect gain	3.11	3.10	12
	expect no change	-0.72	5.29	90
	expect loss	-2.73	5.77	66
Male	expect gain	8.32	8.60	10
	expect no change	1.56	6.48	58
	expect loss	-1.73	6.35	55

Hypothesis six was supported when analyses showed a significant main effect of gender, $F(1,291) = 8.4$, $p = 0.004$, indicating at, overall, women lost a higher percentage of their body fat than did men. There was a significant main effect of the initial amount of body fat, $F(2, 291) = 18.69$, $p < 0.001$, indicating students' body fat percentage moved toward healthy body fat percentage. In other words, students who had too little body fat at the beginning of the semester gained body fat and students who had too much body fat at the beginning of the semester lost body fat. There was no significant interaction of gender and expected body fat percentage change, $F(2, 291) = 1.27$, $p = 0.284$, indicating men and women responded in the same way to the expected body fat change groups. Figure 2 displays the means from Table 1, showing the body fat percentage change of men and women in the expected body fat percentage groups.

Figure 2



The mean change in boy fat percentage over the course of a semester for men and women who had too little, just right, or too much body fat.

Chapter 4

Discussion

The purpose of this study was to explore the impact of a Lifelong Fitness (LLF) class on the health behaviors of college students. Furthermore, we wanted to explore if whether small groups of students received enhanced social support would be more successful in improving health behavior than those students in the large group class. The results of the study yielded mixed findings.

Neither of the first two hypotheses regarding the expectation that students in either the large group class (TAU) or the small enhanced social support (ESS) group would show a reduction in body fat composition between the first and the fifteenth week course.

Results showed there were no significant differences in body fat composition change between or within the EES or TAU group. This finding suggests that the increased social support and individualized feedback offered in this study was not sufficient to facilitate a significant loss of body fat within a 14 week time period. While students in the intervention group did not lose significantly more body fat, three students in the intervention group and one student in the matched sample displayed reliable clinical change in body fat. Of these four students, the most common indicator of change was the belief that the course would be effective at increasing exercise prior to starting the class. This finding is consistent with previous research that concluded self-efficacy facilitates increase in exercise and healthy diet (Marr & Wilcox, 2015).

Hypotheses three and four suggested that students participating in the large class intervention (TAU) would show a significant increase in both monitoring and in their actual activity level as measured by the *Self Rated Abilities for Health Practices Scale (*SRHAP).

The results of the study supported both of these hypotheses. Students enrolled in the Lifelong Fitness class showed in increase in monitoring their daily activity. Part of the class requirement was to log activity, thus, it makes sense that students reported higher rates of activity monitoring at the end of the semester. Previous research suggests activity monitoring, in conjunction with specific activity goals are helpful at facilitating lasting health behavior change (Kennedy, 2017). The LLF course interventions to increase activity monitoring appear to be effective. The hoped for consequence in monitoring health behavior is to impact the actual behavior by raising awareness. In this study the increase in monitoring paralleled an increase in reported activity. This finding is important to note as sedentary lifestyle is linked to many chronic health conditions. Interventions to change activity level are increasingly important due to American obesity rates and sedentary lifestyle (Fruh, 2017).

The variables that predicted reliable clinical change (RCC) suggest that health behavior change is contingent on internal locus of control and intrinsic motivation as the students who displayed RCC in the treatment group identified health being personally important rather than simply important to others. This is consistent with current research regarding health behavior and self-efficacy. Fruh (2017), found nurse practitioners who utilize motivational interviewing, realistic goal setting, and frequent meetings with patients saw the greatest health behavior change and health benefits. Furthermore, she found that having patients take control of their health plans to promote self-efficacy benefitted patients most. This is consistent with the findings of the current intervention as the students with the higher self-efficacy and internal locus of control were the students who displayed the most health behavior change.

The results of this study did not support the expectation (hypothesis five) that the ESS group would show significantly higher levels of activity monitoring and actual activity than the

large group. There could be several reasons for the lack of difference between the large class group and the ESS group. The most likely explanation is that meeting for three times during the semester wasn't a strong enough intervention to impact change beyond TAU.

There is varied information on weight gain in college. The common myth is that students gain "the freshman 15" in their first year of college. The literature concludes on average, college students' gain between 2.4-4.6 pounds in a year (Morrow, Heesch, et al. 2008). However, the students in the Lifelong Fitness courses were able to maintain a stable weight and on average did not significantly gain or lose weight. Contrary to expectation, students enrolled in the course did not show a decrease in body fat percentage. Further investigation was done to determine whether or not students made changes toward healthy body fat percentage based on their pre body fat percentage category (i.e. "at risk lean" "healthy" and " at risk obese"). This is important to note as weight gain in young adults often leads to chronic health conditions such as diabetes, cardiovascular disease, cancer, and gastrointestinal problems (Jonas, 2009). It is important to note that not all weight gain for young adults is negative and individuals should have different goals. Some students may still be developing or underweight, thus not all body fat increase should be seen negatively. Underweight individuals, similar to overweight people are at higher risk for health problems and increased mortality rate (Roth, Braun et al., 2014). Thus, it is important to tailor health plans and goals to each individual when possible.

The final hypothesis suggested that gender would influence health behavior change as measured by the body fat percentage change. Given the mixed findings in the research, the impact of gender on change was exploratory, therefore, non-directional. Guerin et al. (2012) did a meta-analysis of self-determination theory in order to examine demographic factors that influence motivation for health behavior change. No differences were found between genders.

However, Lochbaum and Podlog et al. (2013) conducted a study with 804 university students to examine the role goals have on health behavior change in males versus females. The study concluded females were more likely to maintain long-term health behavior change when performance goals were established as compared to non-performance based goals. Meaning women did better when goals were created based on time, frequency, and duration rather than noncompetitive goals. The current study found significant gender differences, with females moving toward healthy fat percentage at a higher rate than males during the LLF course. While males did display significant movement toward healthy body fat percentage as well, females were more likely to make these changes. Bhattacharyya and Dasgupta (2015) conducted a study that concluded women were more likely to engage in avoidance behavior towards exercise and other health behavior, which is contrary to the evidence found in the LLF course.

Limitations

There are several limitations to this study, most notably the short duration and limited number of intervention meetings. Furthermore, using body fat to determine health behavior change is a limitation due to the short-term nature of this study. Losing significant body fat in a short time frame may not be a realistic goal and future studies should use other measurements of health behavior change in addition to body fat percentage. This intervention was intended to be a pilot study to gain knowledge and skills for future intervention groups to facilitate increase in health self-efficacy but due to funding, no smaller group interventions were done with the George Fox University Lifelong Fitness groups.

Implications

The findings of this intervention suggest that the Lifelong Fitness class at George Fox University may be associated with positive health behavior change. A unique contribution to the

literature may be the need to revise the negative view of weight gain in college students to incorporate individual differences according to students' respective baseline of a healthy fat composition. While the Lifelong Fitness class was associated with an increase in both monitoring and actual activity, it was not associated with an increase in fruit and vegetable intake. It may be beneficial to evaluate the nutrition portion of the curriculum in order to have a well-rounded curriculum. This model of learning, practicing, and modeling health behavior to university students may be an effective intervention to facilitate health behavior change and should be explored further in future research. Though there was limited success with the small group intervention, it would be valuable to explore small group work further in future studies with increased number of meetings and personalization of curriculum.

Gender differences found in body fat percentage change suggests it may be helpful to create differential programs to support individuals based on gender and body fat category. Future research should explore which factors predict the gender differences in health behavior change and body fat percentage change in university health classes. Some potential factors may be societal stereotypes regarding male and female size as health behavior is often linked to positive body image (Tiggemann, 2015). Tiggemann also noted that Western culture males tend to have more flexibility within ideal appearance for body type and males also score much higher on body appreciation than females. This knowledge regarding gender differences in health behavior could help future interventions to target interventions categorically rather than treating all individuals the same.

Summary

Poor health behavior is a pervasive issue in the United States as many people struggle with exercise and nutrition habits. These behaviors frequently lead to obesity, excess body fat,

and many chronic health conditions and even shorten lifespan by 5-10 years (Fruh, 2017). Oftentimes, lifelong habits are formed in young adulthood, as this is a time of independent development. There is a unique opportunity for health-based interventions in the university setting to educate and give real life experience regarding healthy living.

The students in the Lifelong Fitness course at George Fox University (n=291) completed multiple pre-post measures including the SRAHP, bodpod measurements, and demographic data. Exploration of interventions that increase health self-efficacy is imperative to facilitating health behavior changes (Marr & Wilcox, 2015). Of these 291 students, 18 participated in small group interventions designed to increase health behavior through social support, goals setting, and motivational interviewing. Matched samples t-tests were completed to examine the effectiveness of the treatment group and no significant differences were found between TAU and treatment group. Due to the nature of the pilot study, it would likely be beneficial to explore small group work in the future despite low effectiveness of the current study. Of the 4 students in the matched sample that displayed reliable clinical change in body fat percentage, the highest correlation was the belief that the course would be effective at increasing exercise. Altogether, the LLF course participants displayed movement toward healthy body fat percentage, increase in minutes active per week, and increased monitoring of food intake and exercise.

The Lifelong Fitness course at George Fox University is similar to other university interventions that target health behavior of young adults. The fact that students in the course displayed stable weight, movement toward healthy body fat, and increased monitoring of health behavior suggests this may be a beneficial intervention though changes could still be made to improve the effectiveness of the course. Nutrition curricula effectiveness should be explored in the future in order to have a well-rounded understanding of successful interventions for this area

of health behavior. Additionally, health behavior interventions may benefit from tailoring programs to individuals based on current health category and gender in order to have best outcomes.

References

Alamian, Arsham, & Paradis, Gilles. (2012). Individual and social determinants of multiple chronic disease behavioral risk factors among youth.(Research article). *BMC Public Health*, *12*, 224.

American College Health Association. American college health association-national college health assessment (ACHA-NCHA), 2007 reference group data report. *J Amer Coll Health.* 2008: 56(5); 469-479.

American Psychological Association (2012), "Stress in America: Our Health at Risk," (accessed March 18, 2016), [available at http://www.apa.org/news/press/releases/stress/201 l/final-2011. Pdf].

Bhattacharyya, M., & Dasgupta, S. (2015). Obesity and Exercise in Relation to Gender Role Identity and Exercise Avoidance Motivation in Adults. *Journal of the Indian Academy of Applied Psychology*, *41*(3), 66-74.

Bray, S. R., & Born, H. A. (2004). Transition to university and vigorous physical activity: implications for health and psychological well-being. Journal of American College Health, 52(4), 181-188.

Brown, D., Bray, S., Beatty, K., Kwan, M.W. (2014). Healthy Active Living: A Residence Community-Based Intervention to Increase Physical Activity and Healthy Eating During the Transition to First-Year University. *Journal of American College Health.*

Barfield, J. P., & Hutchinson, J. (2012). Social-Cognitive Influences on Students' Physical Activity Behavior across the First College Year. *Physical Educator*, *69*(2), 171-187.

Centers for Disease Control and Prevention. *Obesity: Halting the epidemic by making health easier.* Atlanta, GA: Centers for Disease Control and Prevention; 2011. Available from: http://www.cdc.gov/NCCDPHP/publications/AAG/obesity.htm

Centers for Disease Control and Prevention. *Preventing chronic diseases: Investing wisely in health. Preventing heart disease and stroke.* U.S. Department of Health and Human Services; 2008. Available from: http://www.cdc.gov/nccdphp/publications/factsheets/Prevention /pdf/dhdsp.pdf

Dennis, M. R. (2011). Social control of healthy behavior between intimate college students. *Journal Of American College Health, 59*(8), 728-735.

Eysenbach, G., Hermsen, S., Renes, R., Whiteley, J., Ng, K., Kramer, J., & Kowatsch, T. (2017). Using Feedback to Promote Physical Activity: The Role of the Feedback Sign. *Journal of Medical Internet Research, 19*(6), Journal of Medical Internet Research, 2017, Vol.19(6).

Finn, Heather E., & Watson, Rebecca A. (2017). The use of health coaching to improve health outcomes: Implications for applied behavior analysis. *The Psychological Record, 67*(2), 181.

Fruh, S. (2017). Obesity: Risk factors, complications, and strategies for sustainable long- term weight management. *Journal of the American Association of Nurse Practitioners, 29*(S1), S3-S14.

Guérin, E., Bales, E., Sweet, S., Fortier, M., Drapeau, Martin, & Perreault, Stéphane. (2012). A Meta-Analysis of the Influence of Gender on Self-Determination Theory's Motivational

Regulations for Physical Activity. *Canadian Psychology/Psychologie Canadienne, 53*(4), 291-300.

Hirvonen, N., Enwald, H., Bath, P., Pyky, R., Korpelainen, R., & Huotari, M. (2015). Individual Factors Affecting Preferences for Feedback Message Tactics in the Contexts of Physical Activity. *Journal of Health Communication, 20*(2), 220.

Hoffman, D. J., Policastro, P., Quick, V., & Soo-Kyung, L. (2006). Changes in Body Weight and Fat Mass of Men and Women in the First Year of College: A Study of the "Freshman 15.". *Journal Of American College Health, 55*(1), 41-45.

Jacobson, N. S., & Truax, P. (1991). Clinical significance: A statistical approach to defining meaningful change in psychotherapy research. *Journal of Consulting and Clinical Psychology, 59*(1), 12-19.

Jonas, S. (2009). The New HHS Physical Activity Guidelines. *AMAA Journal*, *22*(1), 11-12.

Keating, X. D., Jianmin, G., Piñero, J. C., & Bridges, D. M. (2005). A Meta-Analysis of College Students' Physical Activity Behaviors. *Journal Of American College Health*, *54*(2), 116-125.

Kennedy, N. (2016). SP0175 Activity Monitoring To Support Patient Goals and Assess Progress. *Annals of the Rheumatic Diseases, 75*(S2), 42-43.

Kim, G. S., Lee, C. Y., Kim, I. S., Lee, T. H., Cho, E., Lee, H., & ... Kim, S. H. (2015). Dyadic effects of individual and friend on physical activity in college students. *Public Health Nursing*, *32*(5), 430-439. doi:10.1111/phn.12176

King, K. A., Vidourek, R. A., English, L., & Merianos, A. L. (2014). Vigorous physical activity among college students: using the health belief model to assess involvement and social support. *Archives Of Exercise In Health & Disease*, *4*(2), 267-279.

Lee, L., Kuo, Y., Fanaw, D., Perng, S., & Juang, I. (2012). The effect of an intervention combining self-efficacy theory and pedometers on promoting physical activity among adolescents. *Journal Of Clinical Nursing*, *21*(7/8), 914-922. doi:10.1111/j.1365-2702.2011.03881.x

Lochbaum, Podlog, Litchfield, Surles, & Hilliard. (2013). Stage of physical activity and approach-avoidance achievement goals in university students. *Psychology of Sport & Exercise, 14*(2), 161-168.

Marr, J., & Wilcox, S. (2015). Self-efficacy and Social Support Mediate the Relationship Between Internal Health Locus of Control and Health Behaviors in College Students. *American Journal Of Health Education*, *46*(3), 122-131.

Morris, R., & Kavussanu, M. (2008). Antecedents of approach-avoidance goals in sport. *Journal Of Sports Sciences, 26*(5), 465-476.

Morrow ML, Heesch KC, Dinger MK, Hull HR, Kneehans AW, Fields DA. 2008. Freshmen 15: fact or fiction? Obesity. 14: 1438-1443

Physical Activity Guidelines Advisory Committee. *2008 Physical activity guidelines for Americans.* Washington, D.C.: US Department of Health and Human Services; 2008.

Posadzki, P., Stockl, A., Musonda, P., & Tsouroufli, M. (2010). A mixed-method approach to sense of coherence, health behaviors, self-efficacy and optimism: Towards the

operationalization of positive health attitudes. *Scandinavian Journal Of Psychology*, *51*(3), 246-252.

Roh, Lucienne, Braun, Julia, Chiolero, Arnaud, Bopp, Matthias, Rohrmann, Sabine, & Faeh, David. (2014). Mortality risk associated with underweight: A census-linked cohort of 31,578 individuals with up to 32 years of follow-up. *BMC Public Health, 14*, 371.

Sparling, P. B., & Snow, T. K. (2002). Physical Activity Patterns in Recent College Alumni. *Research Quarterly For Exercise & Sport*, *73*(2), 200. DOI: 10.1080/02701367.2002.10609009

Tiggemann, M. (2015). Considerations of positive body image across various social identities and special populations. *Body Image*, *14*, 168-176.

Trost, S. G., Owen, N., & Bauman, A. E. (2002). Correlates of adults' participation in physical activity: review and update. Medicine & Science In Sports & Exercise, 34(12), 1996-2001.

Vrazel, J., Saunders, R. P., & Wilcox, S. (2008). An overview and proposed framework of social-environmental influences on the physical-activity behavior of women. American Journal of Health Promotion, 23(1), 2-12.

Appendix A
Self Rated Abilities For Health Related Practices Scale (SRAHP):

Appendix A
Self Rated Abilities For Health Related Practices Scale (SRAHP):

Scale and Scoring: The following scale asks whether you are able to perform various health practices within the context of your lifestyle and any disabilities you may have. This includes any assistance you have available to you, such as an attendant to help with stretching exercises, for example. Read each statement and use the following scale to indicate how well you are able to do each of the health practices, **not** how often you actually do it.

Self Rated Abilities for Health Practices Scale

0 = Not at all 1 = A little 2 = Somewhat 3 = Mostly 4 = Completely

I AM ABLE TO:

1.	Find healthy foods that are within my budget	1 2 3 4
2.	Eat a balanced diet	1 2 3 4
3.	Figure out how much I should weight to be healthy	1 2 3 4
4.	Brush my teeth regularly	1 2 3 4
5.	Tell which foods are high in fiber content	1 2 3 4
6.	Figure out from labels what foods are good for me	1 2 3 4
7.	Drink as much water as I need to drink every day	1 2 3 4
8.	Figure out things I can do to help me relax	1 2 3 4
9.	Keep myself from feeling lonely	1 2 3 4
10.	Do things that make me feel good about myself	1 2 3 4
11.	Avoid being bored	1 2 3 4
12.	Talk to friend and family about the thingsthat are bothering me	1 2 3 4
13.	Figure out how I respond to stress	1 2 3 4
14.	Change things in my life to reduce my stress	1 2 3 4
15.	Do exercises that are good for me	1 2 3 4
16.	Fit exercise into my regular routine	1 2 3 4
17.	Find ways to exercise that I enjoy	1 2 3 4
18.	Find accessible places for me to exercise in the community	1 2 3 4
19.	Know when to quit exercising	1 2 3 4
20.	Do stretching exercises	1 2 3 4
21.	Keep from getting hurt when I exercise	1 2 3 4
22.	Figure out where to get information on how to take care of my health	1 2 3 4
23.	Watch for negative changes in my body’s condition (pressure sores, breathing problems)	1 2 3 4
24.	Recognize what symptoms should be reported to a doctor or nurse	1 2 3 4

25.	Use medication correctly.	1 2 3 4
26.	Find a doctor or nurse who gives me good advice about how to stay healthy	1 2 3 4
27.	Know my rights and stand up for myself effectively	1 2 3 4
28.	Get help from others when I need it	1 2 3 4

- Range of Total Score = 0 - 112.
- Higher scores indicate greater abilities for health practices
- Subscales:
    - Nutrition: Items 1-7
    - Psychological Well Being: Items 8-14
    - Exercise: Items 15-21
    - Responsible Health Practices: Items 22-28
    - There are no reversed scored items.

Reliability and Validity Evidence

Psychometric properties of SRAHP were investigated in three samples: persons who attended a city wide health fair (n=188), undergraduate students in a health promotion class (n=111), and members of a statewide advocacy group for persons with disabilities (n=117).

Content Validity. An initial pool of 50 items was generated to assess health-promoting activities in the areas of nutrition, exercise, psychological well-being, and health responsibility. The number of items was reduced to 32 with the assistance of a rehabilitation nurse consultant. A 32-item measure was reviewed by a group of expert reviewers and was pilot tested with 15 adults. Content was modified based on feedback from the expert reviewers and pilot subjects, resulting in a 28-item, 5-point scale that asks respondents to rate how well they are able to perform each health practice.

***Sample 1: Health Fair Attendees*.**

Factor Analysis. Principal component factor analysis with Varimax rotation was performed to examine the factor structure of SRAHP with data from the Health fair attendees sample. A four-factor solution emerged, with each factor accounting for at least 5% of the variance. The items clustered under four factors: exercise, nutrition, psychological well-being, and responsible health practices. The four factors accounted for 61% of the variance. Factor loading for all items was greater than .48. The one exception was the toothbrush item on the Nutrition subscale, which demonstrated a higher loading on the exercise subscale. Because it does not fit conceptually in the Exercise subscale, it remains in the Nutrition subscale.

Reliability. The health fair attendees (n = 188) were 39% men, mean age of 37, 76% Anglo, and 54% married. Most (80%) had attended at least some college, 79% were employed, and 4% were retired. Eighty percent reported no chronic illness or disability. Cronbach's alpha for the health fair attendees was .94 for the total scale, and .92, .81, .90. and .86 for the Exercise, Nutrition, Psychological Well-Being and Responsible Health Practices subscales, respectively.

Validity. Scores on the General Self-Efficacy Scale (Sherer, Maddux, Mercandante et al.,1982) were moderately correlated with total scores on the SRAHP (r = .43). General Self-Efficacy Scale scores were most

highly correlated with the Responsible Heath Practices and Psychological Well-Being subscale of the SRAHP (r = .44 and r = .43, respectively). All correlations were significant at the p < .01 level.

***Sample 2: Undergraduate Students*.**

Test Re-test Reliability. SRAHP was administered twice at an interval of two weeks. The Pearson Correlations between the two administrations were .70, .63, .63, .69, and .73 for the total scale and the Nutrition, Psychological Well-Being, Exercise, and Responsible Health Practices subscales, respectively. Cronbach's alpha for the total scale was .94, and .81, .86, .89, and .88 for the Nutrition, Psychological Well-Being, Exercise, and Responsible Health Practices subscales, respectively.

Validity. The undergraduate students enrolled in a health promotion class completed the SRAHP, the Health-promoting Lifestyle Profile (Walker, Sechrist, & Pender, 1987), and the Barriers to Health Promoting Behaviors Among Persons with Disabilities Scale (Becker, Stuifbergen, & Sands, 1991). Table 2 shows Pearson correlations between the measures.

Sample 3: Adults with Disabilities.

To examine if the Self-Rated Abilities Scale could distinguish between persons with and without disabilities, scores of the health fair attendees were compared with a group of adults with disabilities (n = 117). These adults were recruited by mail through a statewide disability advocacy group. Eighty-eight percent were Anglo, 54% male, average age was 44 years, and 46% were employed full time. The participants reported twenty-two disabling conditions. Internal consistency reliabilities using Cronbach's alpha for this sample were .91, .76, .90, .86, and .77 for total scores, and the Nutrition, Exercise, Psychological Well-Being, and Responsible Health Practices subscales, respectively. The adults with disabilities reported a significantly lower total score on the Self-Rated Abilities Scale than the health fair attendees (t = 2.40, p < .01, df = 303). The health fair sample scored higher on all subscales except Responsible Health Practices. Only the differences on the Exercise and Nutrition subscales were statistically significant.

Table 1. Self-Rated Abilities for Health Practices Scale: Correlations of Self-Rated Abilities Scale with scores on the Barriers to Health Promoting Activities scale and the Health-Promoting Lifestyle Profile for undergraduate sample (n-111).

Health-Promoting Lifestyle Profile	Total	Nutrition	Psychological Well-Being	Exercise	Health Practice
Total	.69	.55	.65	.53	.63
Nutrition	.41	.48	.33	.31	.29
Self Actual	.61	.47	.65	.42	.56
Stress Mgt.	.49	.30	.55	.35	.48
Exercise	.47	.38	.32	.58	.28
Health Resp.	.51	.42	.41	.36	.57

Int. Support	.50	.31	.56	.35	.49
Barriers to Health Promotion	-.55	-.47	-.39	-.54	-.47

Table 2. Comparisons of Mean Self-Rated Abilities for Health Practices Scale(SRAHP): Scores of Disabled Persons and Health Fair Sample.

Health Fair Sample (n=188)			**Disabled Sample (n=177)**		
SRAHP Scale	**Mean**	**S.D.**	**Mean**	**S.D.**	**T-Values**
Exercise	19.88	6.38	16.68	7.62	3.80
Nutrition	22.15	4.53	20.59	5.02	2.74*
Health Practices	22.55	4.63	22.80	4.16	.49
Psychological Well Being	20.10	5.33	19.79	4.99	.51
Total SRAHP Score	84.69	16.91	79.87	17.03	2.40*

References

- Becker, H., Stuifbergen, A., Oh, H., & Hall, S. (1993). Self-rated abilities for health practices: A health self-efficacy measure. *Health Values, 17*(5), September/October, 42-50.

Publications

- Stuifbergen, A.K., Blozis, S.A., Becker, H., Phillips, L., Timmerman, G., Kullberg, V., Taxis, C. & Morrison, J. (2010). A randomized controlled trial of a wellness intervention for women with fibromyalgia syndrome. *Clinical Rehabilitation, 24*, 305-318.
- Callaghan, D. (2006). The influence of growth on spiritual self-care agency in an older adult population. *Journal of Gerontological Nursing, 32*(9), September, 43-51.
- Stuifbergen, A.K., Seraphine, A., Harrison, T., & Adachi, E. (2005). An explanatory model of health promotion and quality of life for person with post-polio syndrome. Social Science and Medicine 60, 383-393.
- Stuifbergen, A.K., Becker, H., Blozis, S., Timmerman, G., & Kullberg, V. (2003). A randomized clinical trial of a wellness intervention for women with multiple sclerosis. Archives Physical Medicine and Rehabilitation 84, 467-476.
- Stuifbergen, A.K., Seraphine, A. & Roberts, G. (2000). An explanatory model of health promotion and quality of life in chronic disabling conditions. Nursing Research 49(3), 122-129.
- Warms, C.A., Belza, B.L., Whitney, J.D., Mitchell, P.H., & Stiens, S.A. (2004). Lifestyle physical activity for individuals with spinal cord injury: A pilot study. American Journal of Health Promotion 18 (4), 288-291.

Terms of Use

The SRAPH is free to the public and does not require permission to be used, but should not be sold. The authors ask that the source of the SRAPH be cited in research publications: Becker, H., Stuifbergen, A., Oh, H., & Hall, S. (1993). Self-rated abilities for health practices: A health self-efficacy measure. *Health Values 17*(5), September/October, 42-50. Potential users of the SRAPH are cautioned that this instrument was intended for application to persons with disabilities. As a result, when it is used with non-impaired adults, SRAPH scores have a "ceiling effect." Users should be aware that any modification of the SRAPH might alter its reliability and validity, which would consequently need to be reassessed. For questions, email Heather Becker, PHD.

Translations

- Jones, E.G., Mallinson, R.K., Phillips, L., & Kang, Y. (2006). Challenges in language, culture, and modality: Translating English measures Into American Sign Language. *Nursing Research.*
- Meraviglia, Martha, RN, CNS, PhD, The University of Texas at Austin School of Nursing.

Appendix B
5 A's Model for Behavior Change Curriculum

First Session: Assess and Advise (40 minutes):

- First session theme: Assess, Advise, and wrap-up with Agree

Assess (20 minutes)

Introductions: -current behavior pattern, explain importance of healthy lifestyle (e.g. nutrition, exercising three days a week, sleep), personal barriers

- Administer survey: Health Quality of Life
- Get to know each person in the group.
- Group discussion on things that have worked and things that haven't.
- What does everyone enjoy doing?
- SMART goal-specific meaningful, action oriented, realistic, timely: Assessing how important the goal is and how confident they are they can make the goal.
- Briefly review BodPod print out one-on-one (if they have it)

*This part should take about 20 minutes

Advise (15 minutes)

Introduce the importance of being accountable to a peer.

- What behaviors would the student like to change?
- Set realistic goals: write them down- goal worksheet

Agree (5 minutes)

This will involve collaborative goal setting

-Talk about specific goals

- Decide on meeting time for peer exercise

-Have the group come up with three exercise options they would enjoy doing with a partner (within the group) and encourage them to set up a time to meet during the week.

- Homework: track goals, work out with partner at least twice before next meeting (week 6): email Katie or Garrett after they work out with a partner

Second Session: Agree and Assist (40 minutes)

- Second session theme: Briefly go over assess and advise. Focus on agree and assist.

Assess (5 minutes)

- Check-in on how things have gone since the last meeting.
- (worksheet will address the following: still verbally check in after they fill it out)
- Exercise and nutrition, barriers-list as many as possible (write them down)
- How many times were they able to meet up?
- How are goals going?
- When they did reach a goal, what helped them?

Advise (5 minutes)

- Partner discuss ways to keep each other accountable while I briefly check in with each student one-on-one
- Give recommendations for the barriers that have come up

Agree (10 minutes)

- Group discussion on their progress toward goal and strategize ways to reinforce progress
- Establish or re-establish agreed upon peer physical activity with peer.

Assist (20 minutes)

- Offer strategies that include action planning and problem solving
- Address barriers to change
- Help them commit to the change (i.e. schedule workout with partner)

Third Session: Arrange (40 minutes)

Assess (10 minutes)

- Review progress with the group
- Have attitudes towards fitness/health changed? If so, how?
- What strategy has been most helpful in attaining goals?
- Give Health and Wellbeing survey

Arrange (20 minutes)

- Follow up on action plans (talk about long term goals—five year plan (one year or five year goal)
    - What do they want life after college to be like?
    - What needs to be done to get there?
- Follow up on current goal and establish future goals
- Discuss what reinforced progress in the group and how they can use this for the future

- What would the group want to change about the small groups?
    - Encourage critical feedback so we can change things for next semester
    - Is there anything specific they thing would be helpful (i.e. working on fitness plans for class during lab)