Predicting Healthy Lifestyle Success in the College Environment using the
Transtheoretical Model

by

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ABSTRACT

Background: Research was conducted among college students to explore strategies of health intervention development that may better target and promote healthy lifestyles in the college environment, helping to fight overweight and obesity in the U.S. Objective: To investigate if a correlation exists between Transtheoretical Model (TTM) stages of change in regards to a personal health goal and the self-reported frequencies of healthy eating and exercise among a college student sample. Hypotheses: Participants that are in more advanced stages of readiness to change according to the TTM may state that they follow healthy eating/exercise habits more often which can enable them to achieve more personal goal success. Methods: The researcher-designed health-related survey was administered to college students, obtaining a sample of 634 student responses. Data was analyzed using SPSS and Ordinal Logistic Regression. The independent variables of stage of change, gender, education, and living situation, are compared with frequency of healthy eating and exercise methods. Results: Statistical significance was found among the results (Tables 1 & 2). Those in the maintenance stage are more likely to report more frequent healthy eating and exercise practices compared to other stages ($p < 0.001$). Conclusion: Healthy lifestyle success may be predicted by the report of maintenance stage or advancement towards maintenance stage of change regarding a health goal due to its correlation with healthy eating and exercise frequency. Programs promoting the TTM stage of change advancement for more personal goal success can contribute to more frequent healthy eating and exercise habits, which can lead to healthier lifestyles in the college environment.

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CHAPTER I

INTRODUCTION AND STATEMENT OF THE PROBLEM

Chapter I outlines the contents of the research study. It will discuss the national and world-wide epidemic of overweight and obesity, the detriment it causes and its resulting cost. It will discuss the age of Americans at greatest risk for becoming overweight and obese and theoretical framework that may positively impact the epidemic. The components of Chapter I include the introduction, statement of the problem, purpose of the study, hypotheses of the study, and limitations of the study. Chapter II is the review of the literature, and Chapter III is the methodology of this research. Chapter IV will discuss the results found from the study, and Chapter V will encompass the summary, discussion, limitations and the conclusion of the research, and the recommendations for future research efforts, followed by the references, appendices, tables, and figures.

Introduction

The epidemic of overweight and obesity is causing preventable diseases and premature death for millions of Americans, and others world-wide. Generations are becoming overweight or obese at a younger age, and this may lead to a shortened life expectancy. Specifically, college students have an even greater risk that is causing them to suffer from higher rates of overweight and obesity. This research will address the specific devastation that overweight and obesity can inflict, and specific risks that many college students face in the Chapter II review of literature. The theoretical framework of the Transtheoretical Model (TTM) will be identified, success against overweight and

obesity will be reviewed, and research of self-efficacy, motivation, and self-confidence

will be discussed in Chapter II and applied to answer the purpose of the research. In the

journey of battling obesity, there is hope that change in the college environment may

make a dent in the rising incidence.

Statement of the Problem

With the overweight and obesity epidemic being such a deadly risk to the

population world-wide, interventions need to be continuously sought out and

implemented until significant change occurs. College students across the United States

are at specific risk due to their age and likelihood of adapting life-long lifestyle habits at

this time. Programs and interventions are offered at colleges across the nation, but

overweight and obesity numbers still rise. Young adults today are in danger, and have the

potential to negatively affect the rate of overweight and obesity for years to come. If

lifestyles do not become healthier, there will undoubtedly be more excessive spending of

health care dollars, and an increase in preventable diseases and premature death among

the general population.

Purpose of the Study

The purpose of this study is to investigate if the TTM in regards to personal health

goal readiness can help to predict lifestyle success in self-reported frequencies of healthy

eating and exercise practices among a college student sample. This can assist health

professionals in developing more successful health programs for college students. If

programs are more effective, more may develop healthier lifestyles which can help fight

the overweight and obesity epidemic. The following research question was addressed in

this study: Will people that are further along in the TTM in regards to personal health

goals, report following healthy eating and exercise habits more frequently?

The following formula represents the purpose of the study.

$$P(D \geq g \,|\, X) = \frac{1}{1 + \exp[-(\alpha_g + \beta X)]}$$

The equation of proportional odds model is a representation of a maximum likelihood

model, which calculates a probability of a variable being in a particular category. In the

equation, P represents the probability and $(D \geq g \,|\, X)$ the comparison among the

categories from the hypothesis. The $1 + \exp[-(\alpha_g + \beta X)]$ represents the regression;

because the equation is exponentiated, the results lead to an iterated model. The α_g

represents the threshold to each category (Kleinbaum & Klein, 2002).

Hypotheses of the Study

This research and statement of the hypotheses was designed to reject the null

hypotheses, thus accepting by default the alternative hypotheses.

- Null Hypothesis 1: Participants that are in more advanced stages of change in
  regards to a personal health goal according to the Transtheoretical Model will
  state that they do not follow healthy eating habits more often.

- Alternative Hypothesis 1: Participants that are in more advanced stages of change
  in regards to a personal health goal according to the Transtheoretical Model will

state that they follow healthy eating habits more often which can enable them to achieve more personal goal success.

- Null Hypothesis 2: Participants that are in more advanced stages of change in regards to a personal health goal according to the Transtheoretical Model will state that they do not follow exercise habits more often.

- Alternative Hypothesis 2: Participants that are in more advanced stages of change in regards to a personal health goal according to the Transtheoretical Model will state that they follow exercise habits more often which can enable them to achieve more personal goal success.

Limitations of the Present Study

The second survey dissemination occurred after the New Year, when people may reflect different attitudes towards a healthier lifestyle due to a New Year's Resolution. Because of this, respondents may have considered themselves in a different stage of the TTM than they otherwise would have been during other periods of the year. A second limitation is that self-staging of the TTM may be affected due to students just returning from summer break and winter break for the two disseminations; they may have considered themselves in another stage later into a semester, having more time to adjust to school lifestyle habits and personal health goals.

Although the methods of dissemination among the two surveys were different, both were representative of a convenience sample, which is a sample acquired by volunteers, or acquired by availability. Both disseminations were kept in the final results to represent behaviors of more college students.

The survey asked participants to stage themselves in the TTM without specific definitions or explanation of the theoretical framework's function. This explanation was not included in the survey to achieve comprehension level appropriateness. Self-staging is also subjective, thus students may practice similar habits in different capacities; however extensive research has been found among the self-reporting area in smoking, and results show self-staging to prove very accurate (Patrick, et al., 1994; Velicer, Prochaska, Rossi, & Snow, 1992).

Summary

The research may assist in predicting success among college students in regards to healthy eating and exercise practices. Chapter II is an overview of the current literature that supports the purpose of this research, and Chapter III will provide the explanation of the methodology of this research. Chapter IV will reveal results of the study, and lastly Chapter V will hold conclusions of the research, discussion of results found, and will present suggestions for future research in the field.

CHAPTER II

REVIEW OF LITERATURE

Purpose

The purpose of this study is to investigate if the Transtheoretical Model (TTM) in regards to personal health goal readiness can help to predict lifestyle success in self-reported frequencies of healthy eating and exercise practices among a college student sample, to promote healthier lifestyles and to fight the overweight and obesity epidemic. The review of literature will review obesity as a world-wide problem, the theoretical framework of the TTM in research, the population at risk for becoming overweight or obese, positive research towards healthy lifestyles combating obesity, barriers to college students in healthy lifestyle, and the importance of self-efficacy, motivation, self-confidence and academic success in healthy lifestyle practices.

Operational Definitions

-Anthropometrics- measurements of the human body; typically involves height or length, and weight (Anthropometrics, n.d.).

-Autonomy- the state of existing or acting separately from others (Autonomy, n.d.).

- Behavioral- of, related to, or involving the way a person acts or behaves; involving the manner of conducting oneself (Behavioral, n.d.).

-Body Mass Index (BMI) - a number calculated from a person's weight and height. BMI provides a reliable indicator of body fatness for most people and is used to screen

for weight categories that may lead to health problems (CDC, Healthy weight- it's not a diet, it's a lifestyle!, 2013).

-Cognitive- of, relating to, or involving conscious mental activities, such as thinking, reasoning, or remembering (Cognitive, n.d.).

-Competence- the ability to do something well: the quality or state of being competent (Competence, n.d.).

-Energy Expenditure- expending or using calories for energy (Expenditure, n.d.).

- Epidemic- an occurrence of disease that is temporarily of high prevalence (Epidemic, n.d.).

-Equation of proportional odds model- a representation of a maximum likelihood model, which calculates a probability of a variable being in a particular category (Kleinbaum & Klein, 2002).

-Obesity for adolescents- a BMI at or above the 95th percentile for children of the same age and sex (Barlow, 2007).

-Obesity for adults- an adult with a BMI greater than or equal to 30 (CDC, Overweight and Obesity, 2013).

-Ordered logit (OL)- In ordinal logistic regression, a coefficient that for a one unit increase in the predictor, the response variable level is expected to change by its respective regression coefficient in the ordered log-odds scale while the other variables in the model are held constant (UCLA, 2014).

-Overweight for adolescents- is defined as a BMI at or above the 85th percentile and

lower than the 95th percentile for children of the same age and sex (Barlow,

2007).

-Overweight for adults- an adult with a BMI from 25-29.9 (CDC, Overweight and

Obesity, 2013).

- Personal health goal- as discussed in the student survey, any goal related to health, well-

being, weight management, healthy eating, or healthy exercise habits.

-Secondary Disease- A disease that follows and results from an earlier disease (Disease,

n.d.); Obesity would be the primary disease; diabetes would be caused from

obesity, making it a secondary disease.

-Self-Confidence- believing in oneself and one's powers or abilities (Self-Confidence,

n.d.).

-The Self-Determination Theory (SDT) is a theoretical framework used in exercise

behavior examination, and it assumes that humans are active beings that are

challenged by mastering goals and motivation, and adapting new experiences to

achieve higher sense of self (Sibley, Hancock, & Bergman, 2013).

-Self-Efficacy- capacity for producing a desired result or effect from oneself;

effectiveness of oneself (Self-efficacy, n.d.).

-Transtheoretical Model (TTM) - a construct that incorporates past behaviors and

behavioral intention to characterize an individual's readiness to change across an

ordered sequence of discrete categories. The five stages of change are

precontemplation (not intending to change), contemplation (thinking about

change), preparation (expressing proximate intention to meet the behavior

change), action (actively making changes), and maintenance (sustaining the

behavior change) (Laforge, Velicer, Richmond, & Owen, 1999).

-Visceral Fat- adipose tissue, or fat tissue, that surrounds the organs of the torso; belly fat

(Fat, n.d.).

Overview of Obesity and Population at Risk

The well-known epidemic of overweight and obesity has become a common,

socially-accepted occurrence across the United States. But of what exactly are Americans

becoming tolerant and accepting: Premature deaths, preventable diseases, and excessive

spending of healthcare dollars. Weight gain is caused from calorie intake being greater

than the rate of energy expenditure. In other words, if one eats more calories than they

burn, weight gain will result. According to the Centers of Disease Control and

Prevention, more than one-third of all American adults are obese (35.7%), and another

one-third of American adults are overweight. In 2009-2010, 16.9% of children under the

age of 19 were obese. Secondary diseases are strongly associated with being overweight

and obese, such as heart disease, type 2 diabetes, stroke, and certain types of cancers;

these are the leading causes of preventable death (Overweight and Obesity, 2013). In

2008 the estimated medical cost of obesity was $147 billion in the United States, and

those that were obese were found to spend $1,429 more in healthcare than individuals of

normal weight (CDC, Overweight and Obesity, 2013).

It is becoming more common for Americans of all ages to be at risk for overweight and obesity, and secondary diseases, not just older adults that have had a lifetime of exposure to risks. Because of the effects of overweight and obesity from the past few decades, sustained life expectancy is projected to drop for the first time in over a century. Projection up to a five year decrease has been made for Americans, if obesity is not aggressively managed. Due to this affliction of youth being at risk, the younger generation should be a specific focus of prevention efforts (NIA, 2005).

Research has identified that among the ages of 18 and 29 is when lifestyle habits are more often established for life (Gordon-Larsen, Adair, Nelson, & Popkin, 2004; Mokdad, Serdula, Deitz, Bowman, & Marks, 1999). Specifically, college students were found to be more at risk compared to those who do not attend college (Mokdad, Serdula, Deitz, Bowman, & Marks, 1999) for reasons that will be discussed. According to Healthy People 2010, this age group was found to be of great importance by indentifying postsecondary education institutions to focus on promotion of physical activity to help battle overweight and obesity (USDHHS, Healthy People 2010: National health promotion and disease prevention objectives, 2000).

With the knowledge gained from this overview of obesity and the population at risk, the next section will discuss research that has been conducted successfully on the obese population in general to develop a foundation for the specific population in this research.

Research of Physical Activity and Healthy Eating on Obesity

Physical Activity as a Part of Overweight and Obesity Treatment

The purpose of this study was to combine physical activity, diet, and cognitive-behavioral therapy to aid in weight loss in obese patients. Participants included 328 patients (223 women) in a varying age group of 19-79 years of age, receiving treatment at a spa specializing in weight reduction. The participants were staying at the facility from six to forty-nine days. Physical activity for increased energy expenditure was initiated by means of exercise machines, Nordic walking, aerobic activities in group classes, and resistance training. A reduction diet was the main form of nutrition intervention for limited energy intake, including a 1,150 kilocalorie diet distributed among five meals per day. A clinical psychologist also provided psychotherapy for each participant, for individualized recommendations for proper plan of care and success. Eating disorders that lead to obesity were discussed and treated as deemed appropriate by the psychologist (Poděbradska, Stejskal, Schwarz, & Poděbradsky, 2011).

Statistical analysis was completed using MS Excel 2010 and Matlab 7. The factors of focus in the study were body weight, fat weight, visceral fat, BMI, and muscle proportion (Poděbradska, Stejskal, Schwarz, & Poděbradsky, 2011). The results yielded statistical significance ($p < 0.001$) in weight loss for men with an average of 6.18 kilograms (13.60 lbs) and 4.28 kilograms (9.42 lbs) in women during their stay. There were also positive reductions in body fat, and visceral fat ($p < 0.001$). The change in fat weight relied on the physical activity within the targeted heart rate zone, while visceral fat changes depended on the number of day the activities were practiced throughout their stay (Poděbradska, Stejskal, Schwarz, & Poděbradsky, 2011).

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The research supported that motivation, physical activity, and diet regimen can lead to weight loss. It is important to highlight in this research that participants were kept motivated to achieve their goal, and the participants that had the most success were the ones that had more internal motivation to succeed. Limitations included not having a control group for the study due to ethical reasons, and the varying lengths of stay among participants (Poděbradska, Stejskal, Schwarz, & Poděbradsky, 2011).

Fit Into College: A Program to Improve Physical Activity and Dietary Intake Lifestyles among College Students

This study conducted a 10-week program among college freshmen to improve physical activity, physical fitness, dietary habits, body weight, and related perceptions in accordance with the TTM continuum of behavior change. Thirty college freshmen in good health that lived on campus participated in this study. Intervention was administered by college juniors or seniors enrolled in majors relating to health (fitness interns). The upperclassmen were selected to be fitness interns to provide peer-modeling and enhancement of self-efficacy for participants. The interns met with their assigned freshman once per week after formal sessions to follow up and individualize their plans. Physical activity levels were measured using the International Physical Activity Questionnaire (IPAQ), and dietary intake was recorded through diet recall interviews (Topp, et al., 2011). Weekly intervention sessions included cognitive and behavioral objectives to be achieved including: introduction/benchmarking fitness level, meeting the gym equipment, nutrient or caloric density, grocery store field trip, basic pantry/dining/vending machine, motivation maintenance, navigating dining areas,

exercises for the residence hall, cooking class for residence hall cooking, and lastly being fit for life (Topp, et al., 2011).

Seventy-five percent of the original sample of 40 completed the entire program implemented (75% were female, 57% participated in a sport in high school). Fifty percent were classified as overweight or obese prior to the study. Results showed positive trends for changes in physical activity, physical fitness, dietary intake, body weight, and perceptions. Statistical significance was found among decreased minutes spent in moderate physical activity ($p < 0.05$) and increased number of sit-ups in testing ($p < 0.05$). Perceived benefits of regular exercised increased significantly ($p < 0.05$), and barriers to fruit and vegetable consumption and exercise decreased significantly ($p < 0.05$) (Topp, et al., 2011). Participants increased their overall consumption of fiber, and decreased intake of fat and refined sugars leading to fewer calories. The sample in this study was found to gain half the amount of weight normally gained by freshmen in their first year of college, compared to other studies (Topp, et al., 2011). Limitations in this study include the convenience sampling, and the small size of the sample. Impact of intervention over a longer period is recommended for future studies.

Theoretical Framework: Transtheoretical Model Applied in Research

The Transtheoretical Model (TTM) or the Stage of Change Model is a helpful health tool to identify the stage of readiness to change that a person is in regarding a health practice, and can be applied to numerous health topics to help move the person to the next stage of change, leading to a greater possibility of success. In research, the TTM has been applied to health concerns such as smoking cessation, adapting healthy eating or

exercise habits, and weight loss. The five stages of change of the TTM include precontemplation (preceding change by 6 months/haven't considered change), contemplation (considering a change within 6 months due to awareness of a problem), preparation (intending to take action within 30 days), action (change in behavior occurring for less than 6 months), and maintenance (change in behavior occurring for more than 6 months(see Figure 1) (Chang, 2007). The following research applies the TTM to health-related concerns.

Stage Distributions for Five Health Behaviors in the United States and Australia

This research discusses the TTM and it's leading to successful outcomes when different strategies are applied in accordance to the different stages of change. In the literature, the TTM has been applied to health behaviors in various settings and has proven successful towards positive change (Laforge, Velicer, Richmond, & Owen, 1999). Applying an intervention targeting those that are in the preparation stages and presenting it to all people that need to initiate a goal (those in precontemplation, contemplation, and preparation) would not prove effective. In this case, the majority of the population being educated would require additional remedial interventions prior to receiving preparation stage appropriate education. Thus, one single intervention would not be appropriate for all to succeed. Tailoring the intervention to the stage of change can increase success towards positive behavior not only among the "ready to change", but to the whole population (Laforge, Velicer, Richmond, & Owen, 1999).

In five independent surveys, five risk factors were investigated in the research including smoking, regular exercise, low fat diet, losing weight, and reducing stress.

Surveys were administered into different groups (two from the US and three from Australia, combined sample totaling 23,733). Results show promise that the populations can be identified by stage or by "stage matching", which can help intervention efforts be more directed, leading to greater chances of success due to the tailored interventions. Among the related factors investigated, the majority of the sample in regular exercise was in the maintenance phase, with similarly steady results among precontemplation, contemplation, and preparation. Fewer were in action compared to all other stages. The results of the low fat diet held the majority in the maintenance stage as well, with precontemplation in second highest category. Results among contemplation, preparation and action were steady and the minority of the sample was found to be here. Among weight loss the majority was included in precontemplation, with the second most in maintenance; contemplation, preparation and action held slightly varying differences but held the minority (Laforge, Velicer, Richmond, & Owen, 1999).

Stage-matching for interventions using the TTM have been fully demonstrated as useful in randomized trials for reduction of dietary fat among other health interventions (Campbell, et al., 1994; Greene, et al., 1998). Data was also found that assessing the stage of change can provide insight regarding the population that is actually "ready to change". For those in preparation or action stages, skill and technique-related behavioral strategies would lead to succesful change, and those in precontemplaton would benefit from health information that can inform them, then empower them to initiate the consideration of the change process (Laforge, Velicer, Richmond, & Owen, 1999).

This research reflects the importance and usefulness of the TTM stage of change model; applying it to health-related research can yield broadly applicable results (Laforge, Velicer, Richmond, & Owen, 1999).

Applicability of the Stages of Change and Weight Efficacy Lifestyle Questionnaire with Natives of Sarawak, Malaysia

In a community populated with high percentages of overweight and obesity in Malaysia, research was conducted using the TTM to view the stages of change in which this population fell when asked about personal weight loss. Two hundred seventy-one overweight or obese adults comprised the sample of respondents. The results revealed that 60.5% of those surveyed were in the precontemplation stage, meaning they had no intentions to begin efforts towards weight loss. The other results showed 20.7% being in the contemplation stage, 8.5% in the preparation stage, 8.9% in the action stage, and 1.5% was in the maintenance stage (Chang, 2007). With the highest percentage of people in the precontemplation stage, this may be a noteworthy reason as to why the community has such high rates of overweight and obesity.

This population is in need of health intervention, but implementation of a uniform program won't cause the necessary change. The research highlights the importance of uncovering the stage of change among each individual before beginning intervention (Chang, 2007). With health program implementation, tailoring information to the subject being educated will lead to more success (Gómez-López, Gallegos, & Extremera, 2010). Among control variables, results were consistent in stage of change among age, race, sex, income of the household, and self-perception of weight when compared to the TTM.

Education level compared to stage of change showed variance, however. The author suspects the more educated the individual was, the more aware of health problems and the more motivated they may have been to modify their behavior/advance in the stages of change (Chang, 2007).

Subjects that fall within the different stages need to be educated differently to be most effective; the approach must match the stage of change. Chang explains that those evaluated to be in the preparation or action stages of the TTM would benefit from strategies of skill and technique to continue success. Those in the precontemplation or contemplation stages of the model would most benefit from motivation to change, or being educated on why change is necessary. Respondents were interviewed at random to see why they had not taken action to lose weight, and many responded that they did not know how (2007). The desire to lose weight is present in this sample, but many remain in the precontemplation stage because they feel as though they cannot do it alone.

Applying the TTM to this population allowed researcher to uncover the stages participants felt in regards to health change, and if there would be hope for change within this population they would need to progress through the stages of the model. With most being in precontemplation, little progress of stage advancement can be made without proper education and tailoring interventions to the participants. The TTM can inform researchers how to approach education dissemination, which is vital so that information is understood and applied.

Does the Transtheoretical Model of Behavior Change Provide a Useful Basis for

Interventions to Promote Fruit and Vegetable Consumption?

This research was conducted to determine if the TTM constructs lead to successful or unsuccessful stage transitions for fruit and vegetable (FV) consumption of five or more servings each day. In addition to the five stages of change previously discussed, the movement between stages relies on 10 change processes (Horwath, Schembre, Motl, Dishman, & Nigg, 2013). The first five are Experiential Processes: Consciousness raising (CR) involves raising awareness of a need to consume more FV; Environmental reevaluation (ER) is assessing effects of one's FV intake on others; Dramatic Relief (DR) is experiencing and expressing one's feelings on limited FV consumption; Self reevaluation (SR) is reappraising how one feels about oneself in regards to eating FV; Social liberation (SO) would be considering the effect of others or the environment to influence one's ability to consume FV (Horwath, Schembre, Motl, Dishman, & Nigg, 2013). The following are the Behavioral Processes: Counterconditioning (CC) would be substitution of FV for less healthy foods; Helping relationships (HR) is opening up about one's feelings about the problem with someone who cares; Reinforcement management (RM) is receiving a reward from self or others for implementing changes; Self-liberation (SL) involves committing to the action of eating more FV; Stimulus control (SC) is promotion of FV eating by using cues; Interpersonal systems control (IP) would be being around those that consume FV and avoiding those that do not; and Planning ahead (PA) involves being proactive about eating enough FV (Horwath, Schembre, Motl, Dishman, & Nigg, 2013).

The article confirms in order to achieve advancement through the model interventions need to be tailored to the change processes. Seven hundred adults in Hawaii were recruited by phone call to participate in a phone interview and questionnaires (41,463 call attempts occurred). The National Cancer Institute Fruit and Vegetable screener was used for the assessment of FV intake. Among analyses that were completed at baseline, 6 months, 12 months, 18 months, and 24 months TTM stage progression (> 0) was deemed successful, and stage regression or no change (≤ 0) was considered unsuccessful; with the exception of being in the maintenance phase without change, it was considered to still be successful (Horwath, Schembre, Motl, Dishman, & Nigg, 2013).

The results indicated those that had progressed into another stage were more likely to be older than 55 year s of age, have an income of > $49,999 annually, were more likely to be married, and had some college education. Throughout the different times of analyses, fewer participants were able to be contacted. Little variation occurred until the fourth time point analyses; precontemplation held 30.1% to32.5%, 34.4% to 39.9% in preparation, and 21.3% to 26.1% in maintenance. Contemplation included 2.1% to 5.3% and action included 2.5% to 5.4% (Horwath, Schembre, Motl, Dishman, & Nigg, 2013). At the fifth time point analysis, 23.8% were in precontemplation, 40.3% were in preparation, and 28.9% were in maintenance. The percentage of participants in contemplation and action experienced little change. Greater scores among behavioral processes overall, consciousness rising and self-liberation indicated successful transition from precontemplation (p < 0.001). Self-liberation seemed to be the only behavioral process that displayed consistent ability to indicate stage transition overall (Horwath,

Schembre, Motl, Dishman, & Nigg, 2013). Thus, being able to choose and commit to increasing FV consumption will be the best way to advance through the stages of change and to increase success.

Although the research was conducted well, few statistically significant results were found. The study proved its strength by its longitudinal design and its large sample size. Limitations include the small sample size among those in the stages of contemplation and action. Future research opportunities lie in tailoring messages of self-liberation and applying them to those in the precontemplation stage. Motivation may lead those to choosing and committing to change, which will lead them to stage advancement.

Research of Barriers to Healthy Lifestyles in the College Environment

With such a vast need for overweight and obesity prevention education among younger adults, the college environment was explored in this thesis research. Nationally in 2007, 18.2 million students were enrolled in college. Thirty-nine percent of 18 to 24 year olds attended college, and the percentage is increasing due to job demands and other reasons (NCES). Most colleges and universities in the United States provide facilities and programs to encourage physical activity among their students to help promote a healthy lifestyle. Research finds it is essential for these postsecondary institutions to have these programs available, also to tailor them to suit the interests and needs of a diverse student body (Lower, Turner, & Petersen, 2013). The objectives of Healthy Campus 2020, a branch of Healthy People aim to increase the proportion of students that report receiving information from their college regarding both nutrition and physical activity by ten percent by 2020. Healthy weight initiatives aim to increase the proportion of students at a

healthy weight according to a Body Mass Index (BMI) of 18.5-24.9 by ten percent, and to decrease the proportion of students that are obese according to a BMI greater than or equal to 30 by ten percent. Healthy Campus also aims to see a six and six-tenth percent increase in students that report eating five or more fruit and vegetable servings per day over the decade, and a ten percent increase in students reporting meeting aerobic physical activity recommendations and muscle strengthening activity recommendations (American College Health Association, 2010).

Colleges and universities are providing healthy food choices in many locations across their campuses from which students can easily access, to promote healthy eating. Campus gyms and recreation centers are known to provide not only options for physical activity, but also education for healthy eating practices. The services offered at colleges and universities are a huge asset to the population largely at risk for becoming overweight or obese; however the college student population is still at risk and still gains weight.

A contributing cause to the problem is the drastic transition made from living at home to living at college, and the impact it has on students. Research has uncovered that the experience of having to balance previously practiced lifestyle habits with new college courses and workloads, making new friends, and changes to calorie consumption related to food availability, types of foods consumed, and quantity of foods from college meal plans can be difficult (LaCaille, Daunter, Krambeer, & Pedersen, 2011). The imbalance more frequently leads to unintended weight gain which can remain into older adulthood to exacerbate the overweight and obesity epidemic. Similar to the equation of weight gain, weight loss occurs from calorie intake being less than the rate of energy expenditure; validating that healthy eating (consuming fewer calories) and exercise

(burning more calories) can both lead to weight loss. Living situation has also been found to influence healthy eating and exercise, related to habits adapted from spouses, siblings, and friends (Is Obesity Contagious? , 2008).

Multiple barriers and deterrents exist among college students in regards to healthy eating and exercise habits which puts them at risk for overweight or obesity. The following studies in this section explain the barriers of college students with eating healthy and exercising.

Psychosocial and Environmental Determinants of Eating Behaviors, Physical Activity, and Weight Changes among College Students: A Qualitative Analysis.

The purpose of the study was to identify reasons that contribute to and inhibit healthy eating, physical activity, and weight changes in the college environment. Numerous works in research have identified the time of greatest risk for weight gain, leading to overweight and obesity to occur between the ages of 18 and 29 (Gordon-Larsen, Adair, Nelson, & Popkin, 2004; Mokdad, Serdula, Deitz, Bowman, & Marks, 1999). Specifically, college students were found to be more at risk compared to those who do not attend college (Mokdad, Serdula, Deitz, Bowman, & Marks, 1999). With the development of eating and exercise habits during this age period, it is vital to investigate and understand what contributes to less than optimum habits, to help prevent overweight and obesity risks for the future (LaCaille, Daunter, Krambeer, & Pedersen, 2011).

Research was conducted at a mid-western university from six focus groups, with males and females separated (17 males and 32 females), and groups ranged from having 3 to 7 people. Participants completed questionnaires, and were asked specific open-ended

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questions to retrieve information regarding their eating and physical activity habits from past and present, and asked of their opinions of how the university impedes or contributes to their habits (LaCaille, Daunter, Krambeer, & Pedersen, 2011). Data regarding weight gain, determinants of eating behaviors and of physical activity, psychosocial determinants, and environmental determinants were investigated. The mean BMI of the group (based on self-reported anthropometrics) was 23.3 ± 3.3 for females and 24.5 ± 3.7 for males. Forty-three percent of the sample was living on campus at the time of the survey, with all-you-can-eat campus meal plans. The remainder not living on campus did not have campus meal plans (LaCaille, Daunter, Krambeer, & Pedersen, 2011).The qualitative software NVivo 2 was used in analyzing and organizing data to commonly practiced methods (LaCaille, Daunter, Krambeer, & Pedersen, 2011).

Men differentiated the gaining of weight versus muscle, and generally stated weight gain from muscle was positive, while weight loss from losing tone was negative (LaCaille, Daunter, Krambeer, & Pedersen, 2011). Women of the group identified being fearful of "getting fat". Concerns were expressed by the women on comments from male and female peers about their weight gain; they did not want to gain "that freshman 15". Women and men both attributed their weight gain to alcohol consumption; even if they were eating fewer calories with consuming alcohol, they still gained weight. Men specifically commented on alcohol binging, and when drinking late at night food is normally consumed which increased calories and lead to more weight gain (LaCaille, Daunter, Krambeer, & Pedersen, 2011).The men and women focus groups believed that motivation to eat well and their own self-control lead to positive behaviors. The transition from living at home to on-campus and needing to provide meals for themselves were

found to be both positive and negative in impact (LaCaille, Daunter, Krambeer, & Pedersen, 2011).

In the college environment, participants felt there were many factors that made a negative impact: the lack of healthy foods available, cost of healthy foods, availability of unlimited quantities of foods at the cafeteria, preparation of the foods in the cafeteria, lack of places to cook in the dorms, and the general busyness of the college student which lead to little time for healthy food preparation. One participant described the cafeteria as "eating three buffets a day", which was greatly perceived to inhibit self-control and cause weight gain from the excessive amount of calories consumed at one meal. Alcohol availability and consumption, along with cost and convenience of less healthy foods were also barriers to healthy eating. The researcher stated that healthy and unhealthy eating were self-defined by participants, and found they had an appropriate general idea: eating fruits and vegetables, milk, eating on a regular basis, and vitamin and mineral dense foods were considered healthy (LaCaille, Daunter, Krambeer, & Pedersen, 2011).

Determinants of physical activity were also due to having little time related to their college workload, and some had to adjust their time for physical activity to make friends and become established in the new environment. Transitioning to college also decreased their chances of participating in organized sports as they may have in high school. The university facilities and activities were believed to be readily available and well-advertised by the focus group, however barriers existed. Some women felt intimidated by the crowds, the additional cost for group exercise, the exercise machines and lack of knowledge in using them, and they felt as though males did not want them in

the more male-dominated areas of the gym (LaCaille, Daunter, Krambeer, & Pedersen, 2011).

The focus groups provided a lot of information regarding eating and physical activity behavior. In the crucial age of college-aged young adults and the development of lifetime habits, the research has identified a need that is not quite met. Eating and physical activity behaviors are affected by a complex combination of motivation and skills in self-regulation, as well as the unique physical and social environment that encompasses college life (LaCaille, Daunter, Krambeer, & Pedersen, 2011). Determinants exist in the college environment that prevents many from healthy eating and physical activity. Some may need extra education, encouragement in self-regulation skills and other aids to help them overcome the barriers to thrive in the area they desire to pursue. Limitations in the research include the small sample size and data being from only one university may not represent the responses from all college students, however the information obtained is quite useful and applicable (LaCaille, Daunter, Krambeer, & Pedersen, 2011).

Perceived Barriers by University Students in the Practice of Physical Activities

Involvement in physical activity decreases as adults get older, which can be a contribution to the reasons of overweight and obesity (Gómez-López, Gallegos, & Extremera, 2010). There is a world-occurring decrease of physical activity during the transition to college. When students enroll in colleges and universities and devote more time to studies, there is an increase of disregard for healthy lifestyle practices, and physical activity also decreases. With this knowledge, tactics need to be altered to

influence a diverse student body to better promote physical activity adherence and motivation (Gómez-López, Gallegos, & Extremera, 2010).

In the planning and design phase of health and wellness programs for college students, it is imperative to uncover what influences the audience in regards to participating versus not participating. The research studies the physical activity characteristics of students in a Spanish university to seek out barriers to physical activity. Three hundred twenty-three students that did not practice physical activity were selected from a larger sample of 1,834 students. The Questionnaire for the Analysis of Sports Habits and Lifestyles (CHDEV) was used in the study. Using SPSS, the results were analyzed and concluded that the main factors included external and internal barriers. The external lack of time reason relating to dedicating so much time to school and studies is the greatest barrier shown in the research. Other external barriers included fatigue after work, and not having facilities in close proximity. The internal barriers were summarized as not liking physical activity, not seeing its use or benefits, lack of capability, or laziness (Gómez-López, Gallegos, & Extremera, 2010).

The external barrier that should be highlighted is lack of time; this may indicate physical activity that doesn't require a long period of time devoted may be useful to this population. For the external barrier of lack of social support, offering small or large group physical activity options, possibly promoting friend involvement can promote participation. For the internal barrier of not finding physical activity useful or not liking physical activity, educational opportunities in the facility on physical activity or making physical activity more fun for those that stated they do not like it can promote participation.

The research is applicable to health program design to increase participation. The sample in this study was very appropriate, finding specific reasons behind non-participation. Using key wording in promotion featuring quick or express workouts, or fun and enjoyment may encourage participation. There is also a possibility people do not view physical activity as enjoyable due to lower self-confidence and self-efficacy in the skill, and once they learn properly enjoyment in the activity may increase.

Motivations and Barriers to Exercise among College Students

Motives and barriers were explored in this study, to help college students adhere to physical activity. According to the U.S. Department of Health and Human Services Healthy People 2010, 85% of Americans do not actively participate in higher-intensity physical activity (Understanding and Improving Health, 2000). This declines as the life cycle progresses, with the largest decrease occurring in young adulthood.

In the assessment of the data, it was found that those that exercised wanted to exercise more, and those that do not exercise desired to exercise (Ebben & Brudzynski, 2008). General health and maintaining fitness were the common themes of motives to exercise in the survey results. Other reasons included stress reduction, enjoyment/pleasure, and attractiveness/appearance. Factors that would lead those to exercise more include: more time, less school work, more motivation, fewer time commitments, and training for a sport (Ebben & Brudzynski, 2008). Barriers to exercise include not having the time as the most common reason. Other barriers included laziness as the second most common, and workload for school/studying. Open-ended questions were asked in the survey for this research, thus highlighting the advantage of getting more accurate input from participants (Ebben & Brudzynski, 2008).

Themes discovered that would lead those that did not exercise to participating in exercise include more time, more motivation and fewer demands. Also included were working out with a partner or group, and a better facility location (Ebben & Brudzynski, 2008). With this research, it is shown that those that do not exercise wish to in some manner; helping to understand each person's barriers can help them overcome and become active participants in physical activity.

Perceptions of the Availability of Recreational Physical Activity Facilities on a University Campus

This research explores the placement of physical activity infrastructure affecting perceived availability of the facilities. Environmental factors such as aesthetics, awareness, accessibility and opportunities for physical activity have been found to influence physical activity behaviors (Humpel, Owen, & Leslie, 2002), but little has been discovered regarding university infrastructure and placement of facilities. Barriers have been found to exist among students' perceptions of availability of physical activity facilities, which can lead to less facility utilization and less physical activity by students (Reed, 2007).

Four hundred sixty-seven students were surveyed at a southern university to collect data regarding perceptions of facility availability. Information was examined by gender and grade level. Results show many males and females from all grade levels were not aware of the variety of recreational and physical activity facilities available to them on the campus. Freshmen were found to perceive themselves as having access to fewer facilities compared to upperclassmen. Recreational facilities studied included tennis

courts, racquetball courts, exercise equipment, playing fields, basketball courts, the climbing wall, swimming pool, trails, intramural sports, aerobic classes, and a golf course (Reed, 2007).

Proximity and awareness of these facilities may influence student utilization. Having locations of physical activity facilities in centralized areas is only possible in the planning stages, however if facilities for physical activity are clearly made known to all students through increased awareness, this may lead to overcoming availability barriers. Increased signage and introductory sessions during freshmen orientation can help to spread awareness of availability according to the research. Living closer to campus was also associated with using more of the campus facilities to participate in physical activity. Promotion of environmental factors for physical activity is needed and can help students achieve more exercise, leading to healthier lives (Reed, 2007).

Changes in Eating and Physical Activity Behaviors across Seven Semesters of College: Living On or Off Campus Matters

This study explores how living on and off campus relates to dietary habits and physical activity patterns over seven college semesters. It has been identified that college students not only are at risk for weight gain, but they in fact gain weight almost six times more than the general population (Mihalopoulos, Auinger, & Klein, 2008). Those in the college environment are subjected to eating patterns low in fruits, vegetables and fiber, and high in alcohol, fast foods, and sugar-sweetened beverages. Proximity of student living areas and campus recreation centers has shown an impact on utilization, leading to fewer students exercising the further away they live (Greaney, et al., 2009). Since this is

most college students' first opportunity living on their own and developing their own routine and habits, they are at risk for adapting the unhealthy practices of this environment which may lead to unhealthy life-long habits (Small, Bailey-Davis, Morgan, & Maggs, 2013).

Seven hundred forty-six students were recruited for the sample, with 608 responding to the end of the seventh semester. Students reported their living situation throughout the semesters, determining if they lived on campus in the residence hall, or off campus in an apartment, with parents or other housing. Those living with parents were excluded from the study since nutrition and exercise habits can be quite different from that of living off campus alone or with a roommate. Results showed males and females had a 14% decrease in fruit and vegetable consumption across the seven semesters. Physical activity decreased by 31% by the last semester, which could possibly be from increasing class work and less time for activity. A positive impact was found in the rate of sugar-sweetened beverage consumption decreasing by 50% fewer days by students' senior year (Small, Bailey-Davis, Morgan, & Maggs, 2013). Results reflected those living off campus experienced declines in fruit and vegetable consumption by 7% fewer days and physical activity by 21% fewer days compared to when they lived on campus. Those living off campus may not have recreation centers in close proximity, and they may not live near close to a grocery store or a place where they can get fruits and vegetables as easily, like students that live on campus that have access to dining halls with fruits and vegetables (Small, Bailey-Davis, Morgan, & Maggs, 2013). This research implies that those that live alone or with roommates off campus may be at risk for less physical activity and eating healthy less frequently.

Research was conducted with the Framingham Heart Study data to observe if obesity can be influenced by people within one's social network. The Framingham Heart Study began in 1948 to identify common factors that lead to cardiovascular disease among a large sample and over a long period of time (n=12,067). Person-to-person spread of obesity was examined and results showed groups of obese people reached three degrees of separation. This shows the possibility of eating and physical activity habits being influenced by others in one's social network, specifically friends, siblings and spouses. Person-to-person spread of obesity was found to be at 57% influence for friends, 40% influence for siblings, and 37% influence for spouses (Is Obesity Contagious? , 2008). This research discusses the influence of poor eating habits in social networks spreading to others. In the same respect, positive eating and physical activity habits may also influence others in the same social network, leading to healthier lifestyles and possibly lower rates of obesity.

With the vast knowledge of barriers to healthy eating and exercise, the next section will discuss factors that can lead to positive health practices for implementation.

Research of Self-Efficacy, Motivation, Self-Confidence, and Academic Success in Healthy Lifestyle Practices

Physical Activity Behaviors, Motivation, and Self-Efficacy among College Students

The purpose of this study was to identify the benchmark of physical activity behaviors, self-efficacy and the motivation in college students related to physical activity. Self-efficacy, or one's self-confidence in specific situations, has been positively

correlated with physical activity behaviors. If someone feels capable to start and maintain a physical activity habit, self-efficacy in regards to physical activity may be related (Pauline, 2013).

Participants were acquired from a private institution in the Northeastern region of the United States. Eight hundred seventy-one undergraduate students participated (51.7% male). The distribution of participants among the four classes of freshman, sophomore, junior, and senior were very similar, ranging from 24.3% to 26.2% of the total sample (Pauline, 2013). The survey instrument Godin Leisure-Time Exercise Questionnaire was used and fashioned in self-reporting design for participants to estimate their average amount and frequency of mild, moderate, and strenuous exercise during their typical week. The Exercise Motivation Inventory-2 (EMI-2), used to determine accurate physical activity motivation included fourteen subscales. Physical activity self-efficacy was inventoried by three types (task, coping, and scheduling). SPSS was used for statistical analyses (Pauline, 2013).

Results showed that 47.0% of women, 51.8% of men and of the total sample 49.4% participated in 20 minutes of vigorous physical activity 3 or more days each week. Only 17.6% of women, 13.3% of men, and 15.4% of the overall student body surveyed participated in 30 minutes or more 5 or more days per week. Lastly, 20.4% of women, 15.8% of men, and 18.2% of the total sample did not participate in moderate or vigorous physical activity (Pauline, 2013).

Results found a significant effect for physical activity and gender (p < 0.001), but not for class. Males and females differed on the amount and type of physical activity (p <

0.001) (Pauline, 2013). Motivation results showed significance that males and females have different motivational factors towards physical activity ($p < 0.001$). Males are more likely to be motivated to be physically active by challenge, competition, strength, and social recognition ($p < 0.001$). Females are more motivated by stress and weight management, appearance, and positive health in regards to physical activity ($p < 0.001$) (Pauline, 2013). Self-efficacy results showed significance differences between males and females as well ($p < 0.007$); males have a higher self-efficacy than females for coping and scheduling for exercise in their day. Males also participate in more moderate and vigorous exercise, while females were better than males in practicing mild exercise (Pauline, 2013).

As evidenced by this research, there is a need for promotion of physical activity at the college level. Female college students have a higher need for moderate to vigorous physical activity intervention; however males are still at need. Self-efficacy is an important tool that can allow one to reach success in physical activity. The authors suggest programming to assist with physical activity engagement under less than ideal personal conditions and in collaboration with busy schedules. Gender differences, motivation and self-efficacy should be considered while planning for health interventions (Pauline, 2013).

Play and Intrinsic Rewards

Flow Theory is explained in this research. Flow, also described as "optimal experience" is a holistic feeling that is experienced when one acts with total involvement according to Csikszentmihalyi, the developer of the concept (Beyond boredom and

anxiety, 1975). In an activity that requires skill for achievement to result, flow is a state in which one is so involved in this activity, nothing else at that time holds importance; the experience is so enjoyable itself that it doing it becomes a priority (Csikszentmihalyi, Flow: The psychology of optimal experience, 1990). Flow can be experienced if one feels a sport or activity evenly matches their perceived capabilities.

There is a need in research to find different methods to apply to health programs that can help people adhere to physical activity programs and habits. According to the flow theory, if one's skills are less than an activity calls for, anxiety may result and chances of one trying the activity again may decrease. If one's skills are greater than the activity requires, boredom may occur, and the likelihood of them trying the activity again may decrease. However, if skills are matched with the activity, and challenges increase along with skill, it will lead to enjoyment and increased chances of doing the activity again (Csikszentmihalyi, Play and intrinsic reward, 1975). It is possible that flow can be applied to the physical activity environment leading to success; if flow is experienced, it would cause one to enjoy the activity, leading to it being repeated and becoming a physical activity habit. Programs promoting skill acquisition and self-confidence in an activity may help increase the chances of enjoyment and experiencing flow during that activity.

University Students' Exercise Behavioral Regulation, Motives, and Physical Fitness

The research studies the relationships between behavioral regulation and motivation in physical activity. The Self-Determination Theory (SDT) is a theoretical framework used in exercise behavior examination, and it assumes that humans are active beings that are challenged by mastering goals and motivation, and adapting new

experiences to achieve higher sense of self (Sibley, Hancock, & Bergman, 2013). The SDT was applied to the evaluation of exercise behavioral regulations, which explains that motivation exists in extrinsic and intrinsic forms. Extrinsic regulation is explained as engaging in activity for the purpose of gaining an external reward, such as a prize, or money. Intrinsic regulation is defined as participating in an activity for its own purpose or for fun, curiosity, experience, or enjoyment. Motivation is driven by the psychological needs of competence, autonomy and relatedness. The extent of meeting these needs determines how one is motivated in a given setting, specifically physical activity setting. This can also provide insight of how well one is able to succeed in physical activity (Sibley, Hancock, & Bergman, 2013).

The purpose of the research was to examine relationships of motives in physical activity participation and behavioral regulation of exercise with fitness, among college students. It was hypothesized that better fitness would correlate with intrinsic motives and self-determined behavioral regulations, when compared with the SDT. One hundred ninety-four university undergraduate students from a physical activity class participated; one hundred twenty-four being women. Participants were surveyed using the Motives for Physical Activity Measure-Revised (MPAM-R), the Behavioral Regulation in Exercise Questionnaire 2 (BREQ-2), and the PACER test, and motives for physical activity, behavioral regulations, and aerobic fitness data were explored, respectfully (Sibley, Hancock, & Bergman, 2013).

Results were found that confirmed the hypothesis proving intrinsic forms of motivation were correlated with healthier levels of fitness. Intrinsic motivation and participation motives related to competence lead to greater performance ($p < 0.001$)

(Sibley, Hancock, & Bergman, 2013). Individuals that participate in physical fitness for external motivational purposes are less likely to be successful. Stated in previous research, a shift in motivation from extrinsic to intrinsic will more than likely take place from exercise adoption to the habit and adherence to regular exercise practices (Mullan & Markland, 1997). Results also showed positive correlation of better fitness with higher levels of competence and strong fitness motives ($p < 0.001$). Worse fitness was related to stronger appearance motives ($p < 0.001$). In summary, if people were to feel competent when it comes to a physical activity, they will do it more often, and it will lead to more success in fitness. If people are motivated to be physically active based on appearance motivations, the routine will not last as long or the intensity may not be as strenuous when compared to competence and fitness motives. It was also noted in the article that physical activity becomes more successful if it is enjoyable (Sibley, Hancock, & Bergman, 2013). This research can assist physical fitness educators in altering health programs to meet specific needs in regards to the behavioral regulation and motivation at hand.

Relationship between Student Recreation Complex Use, Academic Performance, and Persistence of First-Time Freshmen

Research was conducted to observe difference among three cohorts of first-time freshmen that use campus recreation facilities and freshmen that had not. Previous research pointed out that among freshmen that utilized recreational facilities and programs higher perception of benefit in regards to personal development was found (Bucholz, 1993). The three cohort group sample was 11,076 freshmen among students

attending the university in 1993, 1994, and 1995. The Student Recreation Complex (SRC) records were utilized to collect and track data (Belch, Gebel, & Maas, 2001).

Results showed the SRC users having higher GPA's in the first semester and among the first year compared to students that did not use the SRC. Persistence was higher among SRC users for first semester (92%) and one year (71%) compared to the non-users of 86% use for first semester and 64% use after one year. Results found that as the visits to the SRC increased, parallel GPA and persistence increases were found. An interesting finding revealed that SRC non-users had entered their freshmen year with higher GPAs and SAT/ACT scores than their SRC user counterparts (Belch, Gebel, & Maas, 2001).The research supports the statement that participating in recreational facility programs can enhance the college experience for freshmen, leading to greater satisfaction and increased persistence to succeed.

Summary

The review of literature has summarized the current research completed on the topic of discussion. The review of literature has recognized obesity as a world-wide problem, the theoretical framework of the TTM in research, the population at risk for becoming overweight or obese and specifically the population of college students at risk, positive research towards healthy lifestyles combating obesity, barriers to college students in healthy lifestyle, and the importance of self-efficacy, motivation, self-confidence and academic success in healthy lifestyle practices. With this knowledge there is still a gap in research if the likelihood of success may be better predicted by the frequency of self-reported healthy eating and exercise practices dependent on the stages

of the TTM in regards to a personal health goal. The research can be applied to the specific college environment if hypotheses are correct, for future program development. Results can also be adapted to other college environments.

CHAPTER III

METHODS

Hypotheses

This research and statement of the hypotheses is designed to reject the null hypotheses, thus accepting by default the alternative hypotheses.

- Null Hypothesis 1: Participants that are in more advanced stages of readiness to change according to the Transtheoretical Model will state that they do not follow healthy eating habits more often.

- Alternative Hypothesis 1: Participants that are in more advanced stages of readiness to change according to the Transtheoretical Model will state that they follow healthy eating habits more often which can enable them to achieve more personal goal success.

- Null Hypothesis 2: Participants that are in more advanced stages of readiness to change according to the Transtheoretical Model will state that they do not follow exercise habits more often.

- Alternative Hypothesis 2: Participants that are in more advanced stages of readiness to change according to the Transtheoretical Model will state that they follow exercise habits more often which can enable them to achieve more personal goal success.

Methods

The purpose of this study is to investigate if the Transtheoretical Model (TTM) in regards to personal health goal readiness can help to predict lifestyle success in self-reported frequencies of healthy eating and exercise practices among a college student sample. This can assist health professionals in developing more successful health programs for college students. This may enable health programs to promote healthy lifestyles more successfully and may help fight the overweight and obesity epidemic. The following research question was addressed in this study: Will people that are further along in the TTM in regards to personal health goals, report following healthy eating and exercise habits more frequently?

The type of research utilized is a Survey Research design, in which exploration will lead to insight regarding a college population and their tendencies towards healthy lifestyle practices. The results could later be applied in health program development at campus gyms or recreation centers, and possibly through other health organizations. Data was collected through an online survey and analyzed using the ordinal logistic regression model which was appropriate for the ordinal dependent variables that have order but the specific distance between categories is not known (Treiman, 2008).

Setting

This study was conducted at a Midwestern urban research university with relatively 13,000 enrolled students. According to the Undergraduate and Graduate Student Diversity Report from 2009, seventy-one percent of students at this school are Caucasian, seventeen percent are African American, two percent are Hispanic, one

percent is Asian, one percent is American Indian or Alaskan Native, and Native Hawaiian or Pacific Islander are both less than one percent (Ohio Board of Regents, 2009). Survey dissemination took place in August 2013 at a campus -wide welcome week event that featured festivities, games, and contests. A tent and table was set up at the event for the research, and the survey was presented to students on laptops. The researcher alongside university recreation center (campus rec) graduate assistants and staff invited students to participate in the survey. The second dissemination occurred in January and February 2014 through campus email and the random selection of students to complete the survey over a span of 2 weeks. Both occurrences of survey dissemination invited students to participate in a friendly environment or through a friendly email, with no projected influencing factors from the study.

Sample

Participants were 18 years or older in order to complete the survey. The first dissemination occurred face-to-face at a campus-wide welcome week event hosted by the university in August of 2013. Students walking by the survey table were asked to participate. A convenience sample design was utilized in this dissemination from approximately 800 students that attended the event, and 102 responses were gained. The desired sample size was not obtained at this even, so it was disseminated a second time to increase the sample.

Due to scheduling conflicts and time constraints and for better outreach, the second dissemination took place in January and February 2014 via email rather than another university event. Permission from the Institutional Review Board was obtained to

send emails inviting students to take the survey, with a hyperlink to the survey included in the email. Intending to obtain the most representative sample of the university's students, the survey was set to 2,500 randomized student emails.

The university Senior Research Analyst assisted the researcher by generating the randomized sample of students. To obtain a stable representation from the student census, it was recommended to not generate the randomized sample until the first couple weeks of the semester lapsed, to allow for late admissions and withdrawals. A 14th-day census was generated, and slightly fewer than 13,000 graduate and undergraduate students were enrolled in that current semester. Thirty-two were excluded from the population whom selected "Yes" for their confidentiality indicator on the university email settings. Still with slightly under 13,000 students as the population, a random number function was applied to each student by the Senior Research Analyst, and the data was sorted in ascending order of the random number assigned, and the first 2,500 were selected to receive the survey. Only first name, last name and student email were used during the dissemination process; with this being publicly available directory information, it met the criteria of IRB exemption for minimal risk survey research. The student names and emails were compiled into Microsoft Excel documents to be sent in two large mail merges through Microsoft Word.

Since there was a possible risk of students having already taken the survey in August and also being a part of the random student selection, a sentence was included in both student emails and on the consent form explaining that the survey had been administered at the specific university campus-wide welcome week event on the specific day in August 2013, and if they previously took the survey to disregard the email

requests. A convenience sample design was most feasible for collection, since it was reliant on volunteers. Among the 2,500 students selected, 532 responses were gained, thus making the sample (n=634).

The participants were among different age groups including 67.2% from ages eighteen to twenty-four, 13.9% were of ages twenty-five to thirty-four, 4.7 were of ages thirty-five to forty-four, 4.7% were of ages forty-five to fifty-four, and 2.4% were fifty-five and older. In regards to relationship status, 39.3% consider themselves single, 38.2% are dating, 11.7% are married, 2.9% are divorced and 1.1% is separated.

The participants that responded were 59.8% female, 32.8% male, and 0.4% transgender or other. Among the highest level of education obtained, 52.8% responded to completing some college, 15.6% responded at the level of high school/GED, 13.6% have a four year college degree, 7.3% have a two year college degree, 3.5% have a master's degree, and 0.2% has a doctoral degree. In their living situations and asked to select all that apply, 41.3% report that they live with their parent(s)/guardian(s)/grandparent(s), 21.9% live with a roommate (1 or more), 18.9% live with a spouse/significant other, 9.9% of respondents live alone, 9.1% live with children, and 3.0% responded as other.

Measurement Instruments

The researcher-made survey *Personal Health Goals on Healthy Eating and Exercise Examined Among College Students: For Future Program Development,* was designed with 18 questions using the survey software Survey Monkey, inquiring information including participants' perceived health status, their stage of change in regards to a personal health goal (any goal related to health, well-being, weight

management, healthy eating, or healthy exercise habits), how they prefer to meet their health goals: diet, exercise or both, and specific forms of healthy eating and exercise they practice, and the frequency in which they practice them. As previously indicated, basic demographical information such as age range, sex, living situation and marital status was also collected. The survey was comprised of eleven questions requesting a single answer from 2-7 choices, five questions request to choose all responses that apply, and two questions are included for purposes of entering into the prize drawing. The survey was most conveniently administered by computer with internet access, so reports can be generated directly from Survey Monkey, including SPSS spreadsheets. Multiple questions were asked to allow for a well-rounded analysis of the sample, although not all information will be applied for this research. The consent form of the survey was also an agreement that the participant was 18 years or older to complete the survey.

The survey tool was developed by the researcher and a panel of campus rec graduate assistants, while being supervised by a chairperson on the researcher's thesis committee. Multiple occurrences of testing with graduate students were conducted and revisions were made to better develop the survey's validity. The survey responses were collected and analyzed by Survey Monkey, so human error was not a concern in affecting reliability.

Data Collection

Among the first survey dissemination, the students were asked to visit the tent to take part in the survey for a chance to win prizes. The table featured health and wellness visual aids, and signs for prize drawings. The students used one of three laptops in the

tent that were placed on different sides of the table for privacy. The written consent form was the first visible page for the survey, and students had to agree they were 18 years of age or older to participate. The entire survey took 5-7 minutes to complete, as the length of time was estimated and stated in the consent form. Once they finished the survey the researcher verbally expressed gratitude for taking the survey, and gave them either a coupon to a local restaurant or a granola bar immediately for completing the survey. Participants were appreciative to receive an incentive immediately while having the chance to win another prize later in the evening at the event. The winner of the researcher-awarded prize drawing was identified by survey ID number with a random number generator (Random.org).

The second dissemination of the survey was sent via email within a span of two days, to 1,500 then to 1,000 students due to the campus email count nearly surpassing the 2,500 student outgoing email limit per 24-hour period. The emails were designed and would be sent through the researcher's student email for the feel of personal contact via Microsoft Outlook. For sending emails in such a high quantity, the university Director of the Office of Assessment, whom also specializes in sending Microsoft Word mail merge emails and surveys to all university students, assisted the researcher in the email design and dissemination. The mail merge is a software function of Microsoft Word that allows a document to be sent to many people simultaneously via Microsoft Outlook email. The large list of emails can be uploaded to the mail merge using a Microsoft Excel formatted email list (Microsoft Office). In the mail merge document, unique changes can be made to each document sent, and through this research the first name was used to personalize the message to each participant to add to the feel of personal contact. The document

inviting the student to participate in the survey was inserted into an email to be sent to the 2,500 students. The survey link was also included in the email for participants to access the survey conveniently.

Before the survey was sent, the researcher met with the university Chief Technology Officer, Research Analysts and IT Operators in order for the emails to bypass spam protection for students to receive the survey. The researcher had to notify this group of individuals before the email was sent, to verify that it had successfully bypassed the spam protection. Verification was made on the end of the operators, and was visually confirmed by the researcher as evidenced by the completed survey result counter on the Survey Monkey website. The emails were sent on two consecutive days in January 2014. There was an additional reminder email sent a week later on two consecutive days in February 2014 to encourage students that hadn't taken the survey to do so if they wished. The emails were eye-catching, and specifically promoted the short 5 minute survey. Prizes were used to promote the survey, such as gift cards to local restaurants and donated university merchandise. The researcher felt the need to offer more prizes in the second dissemination since personal contact and gratitude was not possible when the participant received the survey information through email, and for the much larger targeted sample. The winners were identified by survey ID number with a random number generator (Random.org).

The survey closed two weeks after the first mail merge was completed. The data was collected and analyzed through Survey Monkey. Reports were produced with descriptive results, and results were able to be downloaded into SPSS format for analysis.

Data Analysis

The data analysis program SPSS was used accordingly for the data. Frequency distributions were produced to show the univariate analysis of variables representing *stage of change (wheregoal), frequency of healthy eating (followeatinverse),* and *frequency of exercising* (*followexerinverse)*. The independent variable stage of change represents which stage of the TTM the participant considered themselves (1-precontemplation, 2- contemplation, 3-preparation, 4-action, and 5-maintenance) in regards to their personal health goal reported in the survey. Personal health goals discussed in the student survey were defined as "any goal related to health, well-being, weight management, healthy eating, or healthy exercise habits". The stage of contemplation was selected to be a dummy variable in the analyses, due to the moderate responses in the category, and to its display of positive ordered logit results when it was used as a dummy during experiment. Due to the design of the survey questions, the dependent variables *frequency of healthy eating* and *frequency of exercise* were altered. The two questions were designed with the option of practicing the habit seven days per week as the first answer, and followed in decreasing order to the last option of less than one day per month. The inverse was taken to allow for a true positive correlation to be represented, and to match the increasing order of the question regarding the stage of change, which produced the variables now known as *followeatinverse* and *followexerinverse* for the dependent variables. To represent the frequency of the practices

of healthy eating and exercise, the altered variables had the following options for both: (1- less than one day per month, 2- one to three days per month, 3- one to two days per week, 4- three to four days per week, 5- five to six days per week, 6- seven days per week). To better group the responses, categories were aggregated. *Frequency of healthy eating* categories "less than one day per month", "one to three days per month" and "one to two days per week" were combined into "less than two days per week". *Frequency of exercise* categories "less than one day per month" and "one to three days per month" were combined into "less than three days per month".

The analysis of Ordinal Logistic Regression is appropriate and used for data with ordinal dependent variables that have order but the specific distance between categories is not known (Treiman, 2008). Ordinal logistic regression was used for the multivariate statistical analysis of the hypotheses using s*tage of change, frequency of healthy eating,* and *frequency of exercise.* Ordinal logistic regression was also used for the multivariate analysis of the control variables of *education*, *gender* and current *living situation* (*livsit),* along with the TTM and frequency of health practices.

With pairing s*tage of change* with *frequency of healthy eating,* and s*tage of change* with *frequency of exercise*, relationships can be compared and analyzed for correlation to determine if participants that are further along stage of change according to the Transtheoretical Model will state that they follow healthy eating habits and exercise habits more often which can enable them to achieve more personal goal success. Although the survey inquired numerous forms of healthy eating and exercise practices participants engaged in, the primary purpose of the research is to utilize the frequency in which participants practice these habits. Using the control variables of *education*, *gender*

and *living situation,* differences can be identified, which can help in specific ways for student healthy lifestyle success if applied to future research. Among different education levels, some research has pointed out that those in higher education levels are more aware of health risks secondary to poor diet and being sedentary (Chang, 2007). Throughout the research, gender differences exist in reasons to follow healthy eating and reasons for physical activity, which calls for tailoring programs to better serve the needs of both genders (LaCaille, Daunter, Krambeer, & Pedersen, 2011). Living situation has also been a commonly known factor in eating and physical activity; Living with others can influence habits towards healthier practices or unhealthier practices, and living alone can possibly influence results towards either direction as well (Is Obesity Contagious? , 2008).

Once all statistical analysis was complete, the null hypotheses were then tested and evaluated for rejection or acceptance.

CHAPTER IV

RESULTS

Chapter IV features the results of the current research to identify if specific stages of the Transtheoretical Model (TTM) can be correlated with self-reported frequency of healthy eating and exercise practices. Demographic information will be presented to describe the sample, the hypotheses and methods will be reviewed, and the results will be presented Chapter V will include the research conclusions, discussion and supplementary appendixes.

Hypotheses

This research and statement of the hypotheses is designed to reject the null hypotheses, thus accepting by default the alternative hypotheses.

- Null Hypothesis 1: Participants that are in more advanced stages of change in regards to a personal health goal according to the Transtheoretical Model will state that they do not follow healthy eating habits more often.

- Alternative Hypothesis 1: Participants that are in more advanced stages of change in regards to a personal health goal according to the Transtheoretical Model will state that they follow healthy eating habits more often which can enable them to achieve more personal goal success.

- Null Hypothesis 2: Participants that are in more advanced stages of change in regards to a personal health goal according to the Transtheoretical Model will state that they do not follow exercise habits more often.

- Alternative Hypothesis 2: Participants that are in more advanced stages of change in regards to a personal health goal according to the Transtheoretical Model will state that they follow exercise habits more often which can enable them to achieve more personal goal success.

Review of Methodology

The purpose of this study is to investigate if the Transtheoretical Model (TTM) in regards to personal health goal readiness can help to predict lifestyle success in self-reported frequencies of healthy eating and exercise practices among a college student sample. This can assist health professionals in developing more successful health programs for college students. This may enable health programs to promote healthy lifestyles more successfully and may help fight the overweight and obesity epidemic. The following research question was addressed in this study: Will people that are further along in the TTM in regards to personal health goals, report following healthy eating and exercise habits more frequently?

The type of research utilized is a Survey Research design, in which exploration will lead to insight regarding a college population and their tendencies towards healthy lifestyle practices. The results could later be applied in health program development at campus gyms or recreation centers, and possibly through other health organizations. Data was collected through an online survey and analyzed using the ordinal logistic regression

model which was appropriate for the ordinal dependent variables that have order but the specific distance between categories is not known (Treiman, 2008).

A survey designed by the researcher was disseminated to two convenience samples face-to-face and by email at a Midwestern urban research university with relatively 13,000 students over the months of August 2013 to February 2014. The study sample included 634 responses total. Frequency distributions were produced to show the univariate analysis of variables representing *stage of change (wheregoal), frequency of healthy eating (followeatinverse),* and *frequency of exercising (followexerinverse)*. The independent variable stage of change represents which stage of the TTM the participant considered themselves (1-precontemplation, 2- contemplation, 3-preparation, 4-action, and 5-maintenance) in regards to their personal health goal reported in the survey. Due to the design of the survey questions, the inverse was taken for the dependent variables *frequency of healthy eating* and *frequency of exercise* to be in ascending order starting with least frequent. With pairing s*tage of change* with *frequency of healthy eating,* and s*tage of change* with *frequency of exercise,* relationships can be compared and analyzed for correlation to determine if participants that are further along stage of change according to the Transtheoretical Model will state that they follow healthy eating habits and exercise habits more often which can enable them to achieve more personal goal success.

The following formula represents the purpose of the study.

$$P(D \geq g \mid X) = \frac{1}{1 + \exp[-(\alpha_g + \beta X)]}$$

The equation of proportional odds model is a representation of a maximum likelihood model, which calculates a probability of a variable being in a particular category. In the equation, P represents the probability and $(D \geq g \mid X)$ the comparison among the categories from the hypothesis. The $1 + \exp[-(\alpha_g + \beta X)]$ represents the regression; because the equation is exponentiated, the results lead to an iterated model. The α_g represents the threshold to each category (Kleinbaum & Klein, 2002).

Statistical Analysis.

The data obtained from the survey *Personal Health Goals on Healthy Eating and Exercise Examined among College Students: for Future Program Development* was analyzed using the statistical package SPSS for this research. The variables that were researched in the analyses are represented in Table 1. Some of the variables were altered to accommodate the ordinal logistic regression in the multivariate analyses. The questions regarding the dependent variables *frequency of healthy eating* and *frequency of exercise* were designed with the option of practicing the habit seven days per week as the first answer, and followed in descending order to the last option of less than one day per month. The inverse of the variables were taken to allow for a true positive correlation to be represented, and to match the increasing order of the question regarding the stage of change, which produced the variables now known as *followeatinverse* and

followexerinverse for the dependent variables. Some of the categories of *frequency of healthy eating* and *frequency of exercise* were aggregated due to lower response rates. *Frequency of healthy eating* categories "less than one day per month", "one to three days per month" and "one to two days per week" were aggregated to "less than two days per week". *Frequency of exercise* categories "less than one day per month" and "one to three days per month" were aggregated into "less than three days per month". Education results for "two year degree" and "four year degree" were aggregated to "two and four year degree". "Master" and "doctoral/professional degrees" were combined to "master and doctoral degree". Gender categories of" transgender" and "other" were removed, due to their combined total being less than 1%.

Frequency tables were developed to measure the number of students in each variable, and ordinal logistic regression was used to pair the hypotheses variables to determine if a correlation exists.

Frequencies of Variables.

The demographic information of age range and relationship status describing the sample but not used in the immediate analyses will be discussed. The participants were among different age groups including 67.2% from ages eighteen to twenty-four, 13.9% were of ages twenty-five to thirty-four, 4.7 were of ages thirty-five to forty-four, 4.7% were of ages forty-five to fifty-four, and 2.4% were fifty-five and older. In regards to relationship status, 39.3% consider themselves single, 38.2% are dating, 11.7% are married, 2.9% are divorced and 1.1% is separated.

The frequencies of the control variables are represented in Table 2. The participants that responded were 59.8% female, and 32.8% male. Among the highest level of education obtained, 52.8% responded to completing some college, and 15.6% responded at the level of high school/GED. The categories of four year college degree (13.6%), and two year college degree (7.3%) were aggregated into two and four year degrees (20.9%). Master's degree (3.5%) and doctoral degree (0.2%) were combined into 3.7% as master and doctoral degree. No students responded to having a professional degree. In their living situations and asked to select all that apply, 41.3% report that they live with their parent(s)/guardian(s)/grandparent(s), 21.9% live with a roommate (one or more), 18.9% live with a spouse/significant other, 9.9% of respondents live alone, 9.1% live with children, and 3.0% responded as other. A percentage total was not tallied for this category since a student may or may not be living with children, in addition to other categories.

The frequencies of the independent and dependent variables are represented in Table 3. Among the stages of change independent variable, 27.6% reported they are in the action stage in regards to a health goal, 19.6% responded as contemplation, 18.9% stated they are in preparation also 18.9% in the maintenance stage, and 8.2% responded as being in precontemplation. In regards to healthy eating frequency, 32.8% reported eating healthy 5-6 days per week, 25.4% responded 3-4 days per week, 18.3% stated 7 days per week, and 9.6% reported less than 2 days per week. Representing exercise frequency, 37.1% reported 3-4 days per week of exercise, 20.3% stated 5-6 days per week, 14.2% responded 1-2 days per week, 7.4% reported 7 days per week, and 7.1% stated less than three days a month.

Ordinal Logistic Regression.

The ordinal logistic regressions included comparisons of healthy eating frequency with stage of change, and exercise frequency with stage of change to test the hypotheses. Both dependent variables were tested in ordinal logistic regression separately against the controls, and separately against stage of change and controls combined to find differences in results due to the control variables. The ordered logit estimates will be represented as (OL) and the statistical significance as (p).

Healthy Eating Frequency

Table 4 represents the multivariate analysis of healthy eating frequency, stages of change and the control variables. Statistical significance was found in the stage of change model among healthy eating frequency with the stages of change action (OL 0.595; p < .001) and maintenance (OL 1.684; p < .001). As evidenced by the maintenance stage of change in regards to a health goal, the OL increased in comparison to those in the contemplation stage in the furthest stage of the TTM, or more are likely to report eating healthy more frequently in maintenance. The action stage OL indicates fewer eating healthy than those in maintenance, showing those in the more advanced stage are more likely to report practicing healthy eating more frequently.

Statistical significance was found in the controls model among healthy eating frequency and high school/GED education level (OL -1.417; p < .01), and among some college (OL -1.050; p < .05) and two to four year degree students (OL -1.029; p < .05). The OL increases in comparison to students with masters/doctoral degrees the further

along the students are in education, or students with higher education are more likely to report healthy eating more frequently.

Statistically significant results were revealed in the stage of change with controls model among frequency of healthy eating, the control variables and stages of change of action (OL 0.589; p < .001) and maintenance (OL 1.735; p <.001), and for precontemplation (OL 0.714; p < .05). This indicates no change in statistical significance with the controls in the analyses; those in maintenance are more likely to report eating healthy more frequently when compared to contemplation, and in the action stage are less likely to report healthy eating when comparing to the maintenance category. High school/GED (OL-1.193; p < .05), some college (OL -0.878; p < .05), and two and four year degree students (OL -0.885; p < .05) were found to have similar OL estimates and similar significance as the comparison without the dependent variable; the frequency of healthy eating did not change the controls when paired with stage of change.

Exercise Frequency

Table 5 represents the multivariate analysis of exercise frequency, stages of change and the control variables. Statistical significance was found in the stage of change model in action (OL 0.618; p < .001) and maintenance (OL 2.266; p < .001), precontemplation (OL 0.196; p < .05) and preparation (OL 0.173; p < .05) when compared with exercise frequency. As evidenced by the preparation, action and maintenance stages of change in regards to a health goal, the OL increases in comparison to those in the contemplation stage the further along the students are in the TTM through the three stages, or more are likely to report they exercise more frequently through the

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three stages. The increase observed between action and maintenance is notable and will be discussed.

In the control model there is significance among those with roommate(s) (OL 1.103; $p < .001$), males (OL 0.453; $p < .01$), and those that live alone (OL 0.999; $p < .05$) or with parent(s)/guardian(s) (OL 0.735; $p < .05$). This implies if one resides with one or more roommates, reporting more frequent exercise will be 1.10 times more likely. Males are 55% less likely to report they exercise more frequently compared to females. Those that live alone are 1% less likely to report more frequent exercise, and those that live with parent(s)/guardian(s) are 26% less likely to report more frequent exercise.

Statistically significant results in the stage of change with controls model were revealed among frequency of exercise, the control variables and stages of change in action (OL 0.658; $p < .001$) and maintenance (OL 2.400; $p < .001$), precontemplation (OL 0.167; $p < .05$), and preparation (OL 0.197; $p < .05$). The OL estimates and statistical significance are similar with and apart from the control variables; reflecting the OL still increases in comparison to those in the contemplation stage the further along the students are in the TTM through the stages of preparation, action and maintenance with the controls, or more are likely to report they exercise more frequently with progression through the three stages when compared with the controls. Results showed significance among those with roommate(s) (OL 1.314; $p < .001$) when compared with stage of change and frequency of exercise. This implies reporting more frequent exercise will be 1.31 times more likely if one lives with one or more roommates. For those that live alone (OL 1.154; $p < .01$) and live with parent(s)/guardian(s) (OL 0.882; $p < .01$), significance increased when compared with the independent variable for frequency of exercise.

Reporting more frequent exercise will be 1.15 times more likely if one lives alone, and 12% less likely if one lives with parent(s)/guardian(s).

Summary

This chapter concludes the results of the study. Statistical significance was found among many variables and can lead to positive applications in the college setting. Chapter V will conclude the study and discuss specific findings from this research. Tables and the survey materials will be presented in the appendixes.

CHAPTER V

SUMMARY AND CONCLUSIONS

This is the final chapter of the research study. The summary includes an overview of the problem studied, the hypotheses, and the procedures used to conduct the study. This summary is followed by a discussion of the results, implications, and recommendations for future research.

Research Summary

College students across the United States are at specific risk of overweight or obesity due to their age, the influence of the college environment, and the likelihood of adapting life-long lifestyle habits at this time. Programs and interventions are offered at colleges across the nation, but overweight and obesity numbers still rise. Young adults today are in danger, and have the potential to negatively affect the rate of overweight and obesity for years to come. If lifestyles do not become healthier, there will undoubtedly be future excessive spending of health care dollars, and an increase in preventable diseases and premature death among the general population. Health program interventions need to be continuously sought out and implemented until positive change occurs.

Purpose and Hypotheses.

The purpose of this study is to investigate if the Transtheoretical Model (TTM) in regards to personal health goal readiness can help to predict lifestyle success in self-reported frequencies of healthy eating and exercise practices among a college student

sample. This can assist health professionals in developing more successful health programs for college students. This may enable health programs to promote healthy lifestyles more successfully and may help fight the overweight and obesity epidemic.

This research and statement of the hypotheses was designed to reject the null hypotheses, thus accepting by default the alternative hypotheses.

- Null Hypothesis 1: Participants that are in more advanced stages of change in regards to a personal health goal according to the Transtheoretical Model will state that they do not follow healthy eating habits more often.

- Alternative Hypothesis 1: Participants that are in more advanced stages of change in regards to a personal health goal according to the Transtheoretical Model will state that they follow healthy eating habits more often which can enable them to achieve more personal goal success.

- Null Hypothesis 2: Participants that are in more advanced stages of change in regards to a personal health goal according to the Transtheoretical Model will state that they do not follow exercise habits more often.

- Alternative Hypothesis 2: Participants that are in more advanced stages of change in regards to a personal health goal according to the Transtheoretical Model will state that they follow exercise habits more often which can enable them to achieve more personal goal success.

The following formula represents the purpose of the study.

$$P(D \geq g \mid X) = \frac{1}{1 + \exp[-(\alpha_g + \beta X)]}$$

The equation of proportional odds model is a representation of a maximum likelihood model, which calculates a probability of a variable being in a particular category. In the equation, P represents the probability and $(D \geq g \mid X)$ the comparison among the categories from the hypothesis. The $1 + \exp[-(\alpha_g + \beta X)]$ represents the regression; because the equation is exponentiated, the results lead to an iterated model. The α_g represents the threshold to each category (Kleinbaum & Klein, 2002).

Survey.

The type of research conducted was a Survey Research design, in which exploration would lead to insight regarding a college population and their tendencies towards healthy lifestyle practices. The data used in this study was obtained from an electronic survey designed and administered by the researcher through two survey disseminations in the college environment. The participants were at least 18 years of age and 634 students responded to the survey during the time of August 2013 to February 2014. The participants were all current students at the university.

The data was analyzed using the statistical software SPSS. Frequency distributions were produced to show the univariate analysis of variables representing *stage of change (wheregoal), frequency of healthy eating (followeatinverse),* and *frequency of exercising (followexerinverse)*. The independent variable *stage of change*

represents which stage of the TTM the participant considered themselves (1-precontemplation, 2- contemplation, 3-preparation, 4-action, and 5-maintenance) in regards to their personal health goal reported in the survey. Due to the design of the survey questions, the inverse was taken for the dependent variables *frequency of healthy eating* and *frequency of exercise* to be in ascending order starting with least frequent, Categories of the dependent variables were aggregated. *Frequency of healthy eating* categories were represented as (1-3) less than two days per week, (4) three to four days per week, and (5) five to six days per week. *Frequency of exercise* categories were represented as (1-2) less than three days per month, (3) one to two days per week, (4) three to four days per week, and (5) five to six days per week. Multivariate analyses were conducted using ordinal logistic regression. With pairing s*tage of change* with *frequency of healthy eating,* and s*tage of change* with *frequency of exercise*, separately and with control variables, relationships can be compared and analyzed for correlation to determine if participants that are further along stage of change according to the Transtheoretical Model will state that they follow healthy eating habits and exercise habits more often which can enable them to achieve more personal goal success.

Results

Healthy Eating Frequency.

The ordered logit estimates will be represented as (OL) and the statistical significance as (p). Displayed in table 4, statistical significance was found among healthy eating frequency with the stages of change action (OL 0.595; p < .001) and maintenance (OL 1.684; p < .001). As evidenced by the maintenance stage of change in regards to a

health goal, the OL increased in comparison to those in the contemplation stage the further along the students are in the TTM. This indicates students are 1.68 times more likely to report eating healthy more frequently compared to those in the contemplation stage if they are in maintenance. The action stage OL indicates fewer eating healthy than those in maintenance, showing those in the more advanced stage would report practicing healthy eating more frequently. This merits the rejection of Null Hypothesis 1: Participants that are in more advanced stages of change in regards to a personal health goal according to the TTM will state that they do not follow healthy eating habits more often, and acceptance of the Alternative Hypothesis 1: Participants that are in more advanced stages of change in regards to a personal health goal according to the TTM will state that they follow healthy eating habits more often which can enable them to achieve more personal goal success. Those in precontemplation responded to eating healthy more frequently than those in preparation; although lacking statistical significance, this may be due to some in precontemplation already being in somewhat of a "maintenance stage" and not considering how they eat to be a habit related to a health goal.

The OL increases in comparison to students with masters/doctoral degrees the further along the students are in education (high school/GED [OL -1.417; p <.01], some college [OL -1.050; p < .05] and two and four year degree [OL -1.029; p < .05]), or higher education is more likely to reflect reporting healthy eating more frequently. Although negative, the OL increases in value with the increase of education level.

Statistically significant results were revealed among frequency of healthy eating, the control variables and stages of change of action (OL 0.589; p <.001) of maintenance (OL 1.735; p <.001), and for precontemplation (OL 0.714; p < .05), which implies no

changes in statistical significance occurred with the control variables present in the analysis. Those in maintenance are more likely to report eating healthy more frequently when compared to contemplation, and in the action stage are less likely to report healthy eating when comparing to the maintenance, and those in precontemplation may already be in somewhat of a "maintenance stage" and not considering how they eat to be a habit related to a health goal. If one eats healthy on a frequent basis, they may not consider themselves in the midst of achieving a goal, in which they may categorize themselves as precontemplation.

The independent variable and controls also lead to statistical significance among those with high school/GED (OL-1.193; $p < .05$), some college (OL -0.878; $p < .05$), and with two and four year degree students (OL -0.885; $p < .05$). Having similar OL and statistical significance with the controls model indicates little variance with the controls present in the stage of change with controls analysis; the higher educated are more likely to report healthy eating and exercise more frequently.

Rejecting the null hypotheses supports if students are in more advanced stages of change in regards to a personal health goal, it is more likely to see reports of more frequent healthy eating, which can suggest that success will more likely result in the health goal.

Exercise Frequency.

Represented in table 5, statistical significance was found in action (OL 0.618; $p < .001$) and maintenance (OL 2.266; $p < .001$), precontemplation (OL 0.196; $p < .05$) and preparation, (OL 0.173; $p < .05$) when compared with contemplation in exercise frequency. As evidenced by the preparation, action and maintenance stages of change in

regards to a health goal, the OL increased in comparison to those in the contemplation

stage the further along the students are in the TTM through the three stages, indicating

more are likely to report they exercise more frequently through the three stages. The

action stage estimate represents fewer exercising than those in maintenance, and the

preparation stage estimate represents fewer exercising than those in action, showing those

in the more advanced stage would report practicing exercise more frequently. This calls

for the rejection of Null Hypothesis 2: Participants that are in more advanced stages of

change in regards to a personal health goal according to the Transtheoretical Model will

state that they do not follow exercise habits more often, accepting the Alternative

Hypothesis 2: Participants that are in more advanced stages of change in regards to a

personal health goal according to the Transtheoretical Model will state that they follow

exercise habits more often which can enable them to achieve more personal goal success.

The ordered logit estimates is noticeably larger in maintenance (2.266). The positive

relationship with maintenance implies a likelihood of 2.27 times more frequent practice

of exercise habits compared to the contemplation group. Those that are in maintenance

stage report exercising more frequently, which can show that if the health goal becomes a

habit past 6 months, it may be practiced more often, which could lead to more success in

healthier lifestyle achievement. Although the second most advanced stage, action is

defined as practicing a health habit for one day to six months; there may be less

commitment in this stage since little time may have lapsed. The action and maintenance

stage are the only two stages in which the health practice is actually practiced. The TTM

is a highly regarded model for health change, however in this study the "practicing"

stages are broad and may include all ranges of time. Those in precontemplation

responded to exercising more frequently than students in contemplation; this may be due to some in precontemplation already being in somewhat of a "maintenance stage" and not considering their exercise habits to be related to a health goal. If one exercises on a frequent basis, they may not consider themselves in the midst of achieving a goal.

In the control model there is significance among those with roommate(s) (OL 1.103; p < .001), males (OL 0.453; p < .01), and those that live alone (OL 0.999; p < .05) or with parent(s)/guardian(s) (OL 0.735; p < .05). This implies if one resides with one or more roommates, reporting more frequent exercise will be 1.10 times more likely. Those that live with parents/guardians are 26% less likely to report they exercise more frequently. Males are 55% less likely to report they exercise more frequently compared to females. Those that live alone are 1% less likely to report more frequent exercise, and those that live with parent(s)/guardian(s) are 26% less likely to report more frequent exercise.

Statistically significant results in the stage of change with controls model were revealed among frequency of exercise, the control variables and stages of change of action (OL 0.658; p < .001) and maintenance (OL 2.400; p < .001), precontemplation (OL 0.167; p < .05), and preparation (OL 0.197; p <.05). The OL estimates and statistical significance are similar with and apart from the control variables; reflecting the OL still increases in comparison to those in the contemplation stage the further along the students are in the TTM through the stages of preparation, action and maintenance with the controls, or more are likely to report they exercise more frequently with progression through the three stages when compared with the controls.

Results showed significance among those with roommate(s) (OL 1.314; $p < .001$) when compared with stage of change and frequency of exercise. This implies reporting more frequent exercise will be 1.31 times more likely if one lives with one or more roommates. For those that live alone (OL 1.154; $p < .01$) and live with parent(s)/guardian(s) (OL 0.882; $p < .01$), significance increased when compared with the independent variable for frequency of exercise. Reporting more frequent exercise will be 1.15 times more likely if one lives alone, and 12% less likely if one lives with parent(s)/guardian(s).

Rejecting the null hypotheses supports if students are in more advanced stages of change in regards to a personal health goal, it is more likely to see reports of more frequent exercise practices, which can suggest that success will more likely result in the health goal.

Discussion

Personal health goals discussed in the student survey were defined as "any goal related to health, well-being, weight management, healthy eating, or healthy exercise habits". Examples of possible goals may be to increase fruit and vegetable intake, or decreasing fast food intake; taking the stairs between classes, or using the campus recreation services weekly. Whatever one's personal health goal is according to the stated definition, success can be encouraged through either physical activity or healthier eating practices. The TTM stages of change represent an attitude towards a health goal. In the literature review, some articles discuss one's self-confidence, self-efficacy and motivation can affect frequency and length of a time a health goal may be practiced; if one feels capable to reach a goal, they may be more likely to attempt and continue their pursuit of the goal. According to the results of this study, stage advancement reflects more frequent

practices of healthy eating and exercise which can influence goal success. If one's self-confidence, self-efficacy and motivation can influence goal pursuit and frequency of health practices, a positive environment nurturing these may lead to TTM stage advancement. This information can be applied to college health interventions, focusing on TTM stage advancement, education techniques specific to TTM stage, and efforts to increase self-confidence, self-efficacy and motivation. Programs featuring these areas can help to disseminate health information that may lead students towards goal success, which can be another prevention effort to fight the obesity epidemic.

Implications

With the results of this research, implications can be made that the variables can help to predict healthy lifestyle success. If students self-report eating healthy and exercising more frequently, they may be further along in the TTM in regards to their personal health goal compared to others that self-reported practices less frequently, possibly leading to more personal goal success and a healthier lifestyle. Among the students specifically in the maintenance stage, more make healthy eating and exercise practices habitual and are likely to practice them more frequently, which can lead them towards greater success in a personal health goal compared to those in lower stages.

Students with more education may report eating healthier more frequently. According to Chang, among different education levels, some research has pointed out that those in higher education levels are more aware of health risks secondary to poor diet and being sedentary (2007). Females may report they exercise more often than males, which may be due to females having the fear of becoming too heavy, while males prefer having extra weight to lead to bulking up (LaCaille, Daunter, Krambeer, & Pedersen,

2011; Pauline, 2013). The CDC suggests that improvements in physical activity habits for women can improve self-image and provide stress relief on the body image expectations of today (2011). This may indicate the need for gender-specific interventions, spending more efforts on females maintaining healthy weight, and self-esteem/self-image encouragement. Students that live with roommate(s) may report they exercise more frequently compared to other living situations, and those living alone or with parents tend to report they exercise slightly less frequently. This may imply living with a roommate may be encouraging in physical activity, they may exercise together, or they have less to focus on since they don't live with family, leaving for more time to exercise. Those that live alone don't have the influence of another person that's not family to exercise, which may explain the lower frequency responses.

With the stages of change compared with the controls, those that live alone or with parent(s)/guardian(s) further along in the TTM will report the exercise more frequently, and a higher rate of those living with roommate(s) further along in the TTM will report more exercise frequency. Stage of change impacts this sample in regard to frequency of exercise.

The results of both multivariate analyses reflect promising ideas for intervention strategies for college health programs. Working with the students to find out their personal health goal(s), which may or may not require education on goal-setting, and their stage of readiness to change in regard to that health goal can help to identify the type of education needed to maximize possibilities of success through intervention. According to Chang, subjects that fall within the different stages need to be educated differently to be most effective; the approach must match the stage of change (2007).

Since frequency of healthy eating and exercise has been identified as being reported more often the further along in the TTM the student stands, appropriate education and promotion of the healthy habits can advance them through the TTM model. Success with this process can lead to healthier lifestyles on a large basis.

Limitations

This section will discuss the limitations of the research. The second survey dissemination occurred after the New Year, when people may reflect different attitudes towards a healthier lifestyle due to a New Year's Resolution. Because of this, respondents may have considered themselves in a different stage of the TTM than they otherwise would have been during other periods of the year. A second limitation is that self-staging of the TTM may be affected due to students just returning from summer break and winter break for the two disseminations; they may have considered themselves in another stage later into a semester, having more time to adjust to school lifestyle habits and personal health goals.

Although the methods of dissemination among the two surveys were different, both were representative of a convenience sample, which is a sample acquired by volunteers, or acquired by availability. Both disseminations were kept in the final results to represent behaviors of more college students.

The survey asked participants to stage themselves in the TTM without specific definitions or explanation of the theoretical framework's function. This explanation was not included in the survey to achieve comprehension level appropriateness. Self-staging is also subjective, thus students may practice similar habits in different capacities; however extensive research has been found among the self-reporting area in smoking,

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and results show self-staging to prove very accurate (Patrick, et al., 1994; Velicer, Prochaska, Rossi, & Snow, 1992).

External validity cannot be confirmed in this research, since the results were from convenience samples, and due to randomized sampling not being possible for this type of research. Internal validity cannot be confirmed through a causal relationship in the research due to social threat, the research design and the results being self-reported estimates. A social threat is present to the research since it could not be conducted in a controlled environment. The research design being a survey disseminated to obtain a convenience sample cannot confirm causality. Self-reported results also cannot be controlled. The results can be adapted across other college environments due to the size of the sample and statistical significance, however cannot be generalized as presented due to the single university population, and causality cannot be confirmed due to the social threat and researh design.

Recommendations for Future Research

Recommendations for future research include the application of the findings to the college environment. Educating students in this format with tools for measuring success can determine if the model is effective as the results indicate it may be. With the knowledge that results were obtained from a single university, health professionals can adapt this concept as needed to other college environments for application.
Great opportunities lie within researching specific health goals on a qualitative basis. Learning more about how people set goals for themselves can reflect the success; for example if the goal is attainable, or if the goal is measurable for change. With this research being based on self-reported data, future research can involve comparing

findings with actual observation of healthy eating and exercise behaviors in a more controlled environment. Continuing to research avenues for health program intervention improvements, application of findings and testing effectiveness can help to find best methods for application on a larger scale. This topic will not soon become obsolete, continuous research is highly recommended.

Conclusion

It is appropriate for the results of this study to be applied to the surveyed college environment for health intervention and testing for results. If applied, knowledge obtained by students may help to reduce the rate in which students are becoming overweight or obese due to more frequent healthy eating and exercise, in which college students would greatly benefit. If healthier lifestyles are taught and practiced in the college environment, more students can learn and adapt healthier behaviors, in which may become life-long habits. The road to battling overweight and obesity is long, but small successes in education and intervention can lead to moving forward towards prevention.

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APPENDIX A
Institutional Review Board Letter

Youngstown
STATE UNIVERSITY

January 22, 2014

Dr. Joseph Lyons, Principal Investigator
Ms. Lauren Kocher, Co-investigator
Department of Health Professions
UNIVERSITY

RE: HSRC PROTOCOL NUMBER: 005-2014
        TITLE: Personal Health Goals on Healthy Eating and Exercise Examined Among
                College Student: For Future Program Development

Dear Dr. Lyons and Ms. Kocher:

The Human Subjects Research Committee has reviewed the modifications you submitted on
1/10/14 and 1/21/14 to the above-mentioned protocol. These changes represent minor
modifications and do not change the risk associated with your project. The modified
methodologies continue to meet the conditions for minimal risk survey research, therefore the
modifications are approved.

Any other changes in your research activity should be promptly reported to the Human Subjects
Research Committee and may not be initiated without HSRC approval except where necessary to
eliminate hazard to human subjects. Any unanticipated problems involving risks to subjects
should also be promptly reported to the Human Subjects Research Committee.

The HSRC would like to extend its best wishes to you in the conduct of this study.

Sincerely,

Dr. Scott Martin
Interim Associate Dean for Research
Authorized Institutional Official

SCM:cc

c: Mr. Joseph Mistovich, Chair
       Department of Health Professions

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APPENDIX B
Tables

Table 1

Variable Definitions (n=634 students)

Variable	In-Text Reference	Definition
Wheregoal	*Stage of change*	The stage of change the student felt they were in regards to a health goal. Precontemplation, contemplation, preparation, action, or maintenance.
Followeatinverse	*Frequency of healthy eating*	The Likert scale of how frequently the participant followed their pre-selected healthy eating practices. Choices ranged from seven days per week to less than 2 days per week.
Followexerinverse	*Frequency of exercise*	The Likert scale of how frequently the participant followed their pre-selected exercise practices. Choices ranged from seven days per week to less than 3 days per month.
Livsit	*Living situation*	All of the current living situations of the participant: living with parents/guardians/grandparents, roommate, spouse/significant other, living alone, living with children, and other.
Gender	*Gender*	The gender of the participant: male, female, transgender, and other.
Education	*Education*	The highest level of education obtained: high school/GED, some college, two year degree, four year degree, master's degree, doctorate degree

Source: Personal Health Goals on Healthy Eating and Exercise Examined among College Students: for Future Program Development

Table 2

Frequency Distribution of Control Variables

(n=634 students)

Variable	Frequency	Percent
Gender		
Male	208	32.8
Female	379	59.8
Total	587	92.6
Education		
High School/GED	99	15.6
Some College	335	52.8
Two and Four year degree	132	20.9
Master and Doctoral degree	23	3.7
Total	589	93.0
Living Situation		
Alone	63	9.9
With roommate(s)	139	21.9
With parent(s)/guardian(s)	232	41.3
With spouse/sig other	120	18.9
With children	58	9.1

Source: Personal Health Goals on Healthy Eating and Exercise Examined among College Students: for Future Program Development

Table 3

Frequency Distribution of TTM Stages of Change and Lifestyle Habit Frequencies

(n=634 students)

Variable	Frequency	Percent
Stage of Change		
Precontemplation	52	8.2
Contemplation	124	19.6
Preparation	120	18.9
Action	175	27.6
Maintenance	120	18.9
Total	591	93.2
Healthy Eating Frequency		
Less than 2 days/wk	61	9.6
3-4 days/wk	161	25.4
5-6 days/wk	208	32.8
7 days/wk	116	18.3
Total	546	86.1
Exercise Frequency		
Less than 3 days/month	45	7.1
1-2 days/wk	90	14.2
3-4 days/wk	235	37.1
5-6 days/wk	129	20.3
7 days/wk	47	7.4
Total	546	86.1

Source: Personal Health Goals on Healthy Eating and Exercise Examined among College
Students: for Future Program Development

Table 4

Ordinal Logistic Regression for Frequency of Healthy Eating (n=634 students)

Variable	Stage of Change	Controls	Stage of Change w/ Controls
Stage of Change (ref=Contemplation)			
Precontemplation	0.139t		0.174*
Preparation	0.088		0.117
Action	0.595***		0.589***
Maintenance	1.684***		1.735***
Control Variables			
Gender (ref= Female)			
Male		-0.176	-0.314t
Education (ref= Masters/Doctoral Degree)			
High School/GED		-1.417**	-1.193*
Some College		-1.050*	-0.878*
Two or Four Year Degree		-1.029*	-0.885*
Living Situation			
Alone		0.463	0.462
Roommate(s)		0.432	0.479
Parent(s)/Guardian(s)		0.585t	0.598t
Spouse/Sig. Other		0.409	0.479
Children		0.236	0.118t
Thresholds (ref= 7 days/wk)			
Threshold 3	-1.397***	-2.707***	-1.853***
Threshold 4	0.443*	-0.975t	0.022
Threshold 5	2.271***	0.757	1.891***
Chi Square	62.195***	16.685	77.305***
df	4	11	15

t p ≤.10 *p ≤.05 **p ≤.01 ***p ≤.001

Source: Personal Health Goals on Healthy Eating and Exercise Examined among College Students: for Future Program Development

Table 5

Ordinal Logistic Regression for Frequency of Exercise (n=634 students)

Variable	Stage of Change	Controls	Stage of Change w/ Controls
Stage of Change (ref=Contemplation)			
Precontemplation	0.196**		0.167*
Preparation	0.173*		0.197*
Action	0.618***		0.658***
Maintenance	2.266***		2.400***
Control Variables			
Gender (ref= Female)			
Male		0.453**	0.314t
Education (ref= Masters/Doctoral Degree)			
High School/GED		-0.650	-0.340
Some College		-0.744t	-0.559
Two or Four Year Degree		-0.902*	-0.733
Living Situation			
Alone		0.999*	1.154**
Roommate(s)		1.103***	1.314***
Parent(s)/Guardian(s)		0.735*	0.882**
Spouse/Sig. Other		0.587t	0.586t
Children		0.195	0.162
Thresholds (ref= 7 days/wk)			
Threshold 2	-1.608***	-2.216***	-1.111t
Threshold 3	-0.217	-0.897t	0.316
Threshold 4	1.898***	1.040*	2.532***
Threshold 5	3.669***	2.727***	4.398***
Chi Square	88.047***	33.674***	127.901***
df	4	11	15

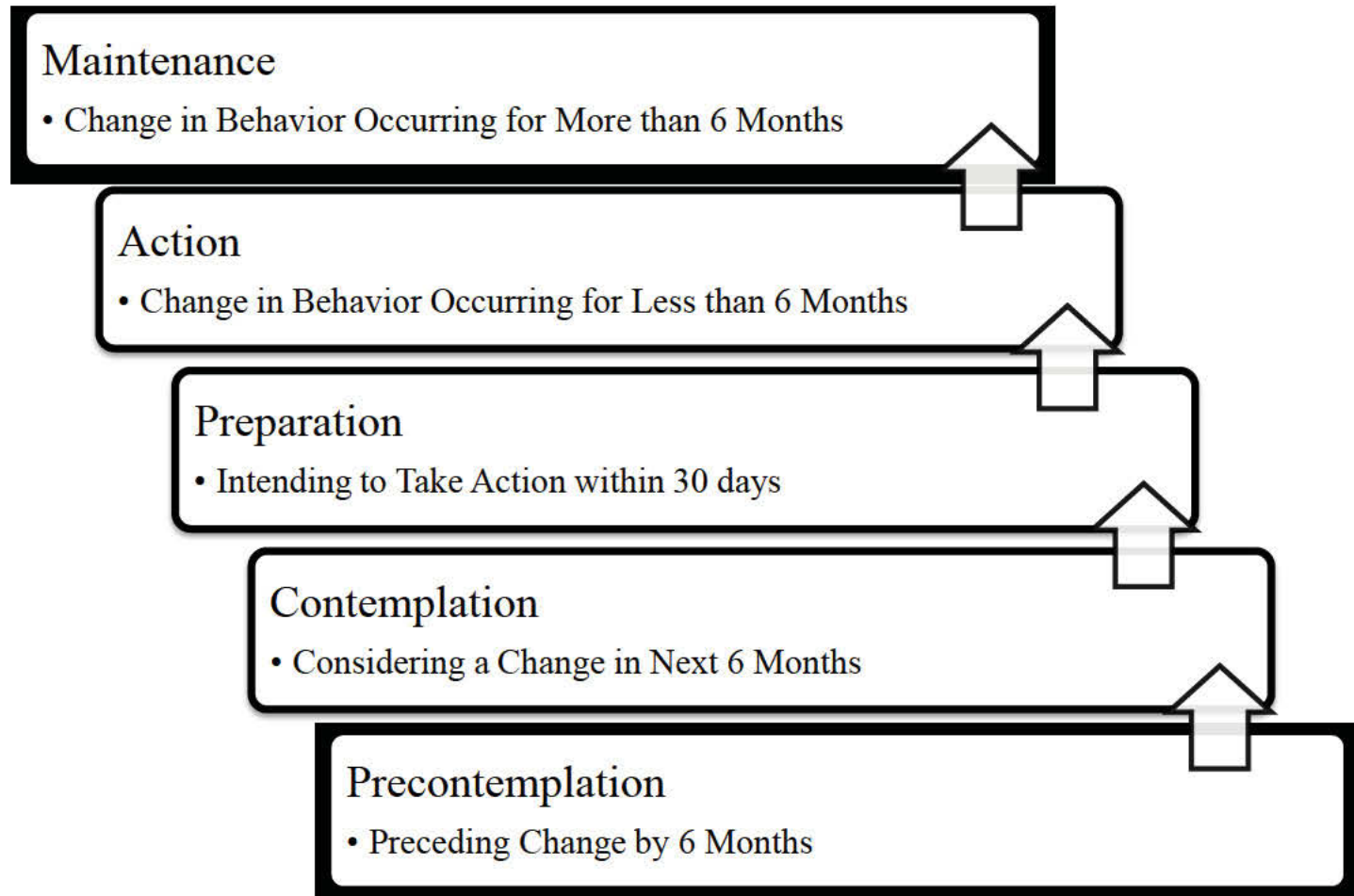t $p \leq .10$ *$p \leq .05$ **$p \leq .01$ ***$p \leq .001$

Source: Personal Health Goals on Healthy Eating and Exercise Examined Among College Students: For Future Program Development

APPENDIX C
Figures

Figure 1

The Transtheoretical Model Stages of Change

Maintenance
- Change in Behavior Occurring for More than 6 Months

Action
- Change in Behavior Occurring for Less than 6 Months

Preparation
- Intending to Take Action within 30 days

Contemplation
- Considering a Change in Next 6 Months

Precontemplation
- Preceding Change by 6 Months

(Chang, 2007).

APPENDIX D
Survey Instruments

Personal Health Goals on Healthy Eating and Exercise

Dear Sir or Madam,

I am a Registered Dietitian and Graduate Student at Youngstown State University working on my thesis research project to uncover preferred methods in healthy eating and exercise, reasons of following personal health goals, and to uncover the preferred method; exercising or healthy eating, among college students that attend Youngstown State University. Dr. Joseph P. Lyons is serving as my faculty advisor for this study. Your involvement in this project will contribute to data collection that can aid in the health and well-being of others, and can help professionals become more informed to develop future health programs. The results will be handled in a professional manner. The information you provide is being collected without identifiers, so your identity cannot be linked to the results of the survey.

It will take most participants about 5-7 minutes to complete this survey. We anticipate no risks to participants in this survey research.

Your participation in this research project is voluntary and you may withdraw from participating in the study by not submitting your survey, or by submitting a survey that is not completed. We understand your time is valuable. Your participation in this research project will help us gain a better understanding of what the preferred methods in healthy eating and exercise are among college students. We greatly appreciate your participation and support.

Please take a few minutes to complete this electronic survey with Survey Monkey. By completing this survey, you agree that you are 18 years of age or older, have read the above description and voluntarily consent to participate in this research project.

Regards,
Lauren Kocher, RD, LDN

*This survey was also administered at the YSU Campus Rec BBQ on August 22nd 2013. If you previously took this survey at the Campus Rec BBQ event, please do not participate in the survey-- thank you for your previous contribution!

If you have any questions regarding this research project please contact:
Dr. Joseph P. Lyons, Principal Investigator/Faculty Advisor
Youngstown State University
Phone: 330-941-3658
E-mail: jplyons@ysu.edu
For other questions, or concerns, please contact Dr. Edward Orona, Director of Grants and Sponsored Programs - Phone: 330-941-2377

*1. I am 18 years or older, and agree to participate in this survey.

◯ Agree

◯ Disagree

*2. How would you describe your health status? (rate overall with considering your well-being, weight status, medical problems, etc.)

◯ 1. In excellent health

◯ 2. In good health

◯ 3. In fair health

◯ 4. In poor health

Personal Health Goals on Healthy Eating and Exercise

*3. Where do you consider yourself in regards to a Health Goal? (A health goal can be any goal related to your health, well-being, weight management, healthy eating, or healthy exercise habits)

○ 1. Not ready for a health goal/ haven't considered a health goal

○ 2. Getting ready for a health goal/ considering a health goal

○ 3. Prepared to start a health goal

○ 4. I am currently working on a health goal and have been for 1-6 months

○ 5. I have been working on a health goal for 6 months or longer

○ 6. None of these (please specify)

[   ]

*4. Which do you prefer to practice on a normal basis to meet your Health Goals?

○ 1. Changes to eating habits

○ 2. Changes to exercise habits

○ 3. Both combined

○ 4. Neither (please specify)

[   ]

*5. Please select the eating habits that you follow:
Please check all that apply.

☐ 1. Focusing on fruits and vegetables

☐ 2. Focusing on whole grains

☐ 3. Focusing on low-fat dairy

☐ 4. Focusing on lean protein

☐ 5. High protein diet

☐ 6. High fiber diet

☐ 7. Low carbohydrate diet

☐ 8. Calorie counting/ carbohydrate counting

☐ 9. Protein shakes/nutrition shakes

☐ 10. I follow a well-known diet (please specify)

[   ]

☐ 11. Diet pills/diet supplement

☐ 12. Limiting saturated fat/ cholesterol

☐ 13. Limiting refined/ white starches

☐ 14. Limiting red meats

☐ 15. Limiting fast food/ fried foods

☐ 16. Limiting sugary foods/ sugary beverages

☐ 17. Vegetarian (consuming eggs and/ or dairy)

☐ 18. Vegan

☐ 19. None apply to me

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Personal Health Goals on Healthy Eating and Exercise

✱6. Please select on average how often you follow the eating habits you just selected:

○ 1. 7 days a week

○ 2. 5-6 days a week

○ 3. 3-4 days a week

○ 4. 1-2 days a week

○ 5. 1-3 days a month

○ 6. Less than 1 day a month

✱7. Why do you follow the selected eating habits?
Check all that apply.

☐ 1. For weight loss

☐ 2. To maintain current weight/body image

☐ 3. To help lessen a current health problem

☐ 4. To prevent future health problems

☐ 5. My family eats this way

☐ 6. Religious/ cultural preferences

☐ 7. To feel my best

☐ 8. Other (please specify)

Personal Health Goals on Healthy Eating and Exercise

✱8. Please select the normal exercise habits that you follow:

Please check all that apply

☐ 1. Aerobics/ Group Fitness

☐ 2. Baseball

☐ 3. Basketball

☐ 4. Bicycling/ Spinning

☐ 5. Boxing

☐ 6. Dancing

☐ 7. Elliptical/ StairMaster

☐ 8. Football

☐ 9. Gymnastics

☐ 10. Martial Arts

☐ 11. Pilates

☐ 13. Rock Climbing

☐ 12. Other (please specify)

☐ 14. Running/ Jogging

☐ 15. Soccer

☐ 16. Swimming

☐ 17. Tennis

☐ 18. Volleyball

☐ 19. Walking/ Hiking

☐ 20. Weight lifting (free weights or weight machines)

☐ 21. Yoga

☐ 22. Zumba

☐ 23. Interactive video games (such as Wii, Kinect)

☐ 24. None apply to me

✱9. Please rate how often you normally follow the exercise routine you just selected:

○ 1. 7 days a week

○ 2. 5-6 days a week

○ 3. 3-4 days a week

○ 4. 1-2 days a week

○ 5. 1-3 times a month

○ 6. Less than 1 day a month

Personal Health Goals on Healthy Eating and Exercise

✱10. Why do you follow the selected exercise habits? Check all that apply.

☐ 1. For weight loss

☐ 2. For toning/strength/body building

☐ 3. To maintain current weight/body image

☐ 4. To help lessen a current health problem

☐ 5. To prevent future health problems

☐ 6. My family exercises this way

☐ 7. To feel my best

☐ 8. I participate in intramural sports/ college sports

☐ 9. Other (please specify)

[   ]

✱11. How many people do you prefer to exercise with?
Please answer for each choice.

	Preferred	Indifferent	Not preferred
With a group/ team/ or class	○	○	○
With 1-3 other people	○	○	○
By myself	○	○	○

✱12. Please select the age group in which you belong.

○ 18-24 yrs

○ 25-34 yrs

○ 35-44 yrs

○ 45-54 yrs

○ 55-64 yrs

○ 65+ yrs

97

Personal Health Goals on Healthy Eating and Exercise

✱13. What is your gender?

◯ 1. Male

◯ 2. Female

◯ 3. Transgender

◯ 4. Other

◯ 5. Chose not to identify

✱14. What is the highest level of education you have completed?

◯ 1. High School/GED

◯ 2. Some College

◯ 3. 2 year college degree (Associate's Degree)

◯ 4. 4 year college degree (BA, BS)

◯ 5. Masters degree

◯ 6. Doctoral degree

◯ 7. Professional Degree (MD, JD)

✱15. What is your current status from the selections below?

◯ 1. Single

◯ 2. Dating

◯ 3. Married

◯ 4. Separated

◯ 5. Divorced

◯ 6. Widowed

✱16. Who do you live with?
Check all that apply

☐ 1. I live alone

☐ 2. I live with my roommate(s)

☐ 3. I live with my parent(s)/ guardian(s)/ grandparent(s)

☐ 4. I live with my spouse/ significant other

☐ 5. I live with my child(ren)

☐ 6. Other (please specify)

Personal Health Goals on Healthy Eating and Exercise

*17. Thank you for your time and contribution to this research! You have completed the survey.

WOULD YOU LIKE YOUR NAME ENTERED INTO A DRAWING FOR A PRIZE?
**YOUR NAME AND PERSONAL INFORMATION FOR ENTERING THE DRAWING IS IN NO WAY LINKED TO YOUR SURVEY RESULTS.

Lauren Kocher, RD, LDN
Graduate Student
Masters Program in Health and Human Services

◯ Yes

◯ No

18. Please enter the information below to be entered into the drawing for PRIZES!
**YOUR NAME AND PERSONAL INFORMATION FOR ENTERING THE DRAWING IS IN NO WAY LINKED TO YOUR SURVEY RESULTS.

First name	
Last name	
Banner ID (Y00######)	
Phone number	
Email	

Thank you for your time and being willing to participate in this survey.

Student Initial Email Invite

Subject title: Win Prizes for 5 minute Survey!

Hi <student's first name>! Hope your Spring Semester 2014 has gotten off to a great start.

My name is Lauren Kocher.
I am a Student in the Master of Health and Human Services Program at YSU, and a Registered Dietitian. I am conducting a short **5-7 minute survey** through this email for my thesis research to uncover the preferred methods of healthy eating and exercise among YSU students.

Your responses could help improve YSU wellness programs for students!

For filling out the survey, you can be entered into a drawing for prizes!
While the odds of winning depend on how many people respond, based on the response rate target, you would have a **1 in 25 chance to win a prize!**

I thank you so much in advance for your time and support to my research **to benefit campus students!!**

Sincerely,
Lauren Kocher, RD, LDN

Click here for survey! ███████████████████

P.S. This survey was also administered at the YSU Campus Rec BBQ on August 22nd 2013. If you previously took this survey at the Campus Rec BBQ event, please exit the survey, and thank you for your previous contributions!

Student Reminder Email Invite

Subject title: Reminder! 5 min survey, Win Prizes!

Hello <student's first name>,

Just a reminder, if you haven't taken the opportunity, **participate in the short survey (details below) for a chance to win some awesome prizes!!** Survey closes on February 6th! Don't miss out!!

You can click here for survey: ███████████████████

Thank you,

Lauren Kocher

Hi <student's first name>! Hope your Spring Semester 2014 has gotten off to a great start.

My name is Lauren Kocher.
I am a Student in the Master of Health and Human Services Program at YSU, and a Registered Dietitian. I am conducting a short **5-7 minute survey** through this email for my thesis research to uncover the preferred methods of healthy eating and exercise among YSU students.

Your responses could help improve YSU wellness programs for students!

For filling out the survey, you can be entered into a drawing for prizes!
While the odds of winning depend on how many people respond, based on the response rate target, you would have a **1 in 25 chance to win a prize!**

I thank you so much in advance for your time and support to my research **to benefit campus students!!**

Sincerely,
Lauren Kocher, RD, LDN

Click here for survey! ████████████████

P.S. This survey was also administered at the YSU Campus Rec BBQ on August 22nd 2013. If you previously took this survey at the Campus Rec BBQ event, please exit the survey, and thank you for your previous contributions!