Exercise Motivators and Exercise Causality Among Andrews University Students: a Correlational Study

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ABSTRACT

EXERCISE MOTIVATORS AND EXERCISE CAUSALITY AMONG ANDREWS UNIVERSITY STUDENTS: A CORRELATIONAL STUDY

by

Anna T. Piskozub

Chair: Winston Craig
ABSTRACT OF GRADUATE STUDENT RESEARCH

Thesis

Andrews University

School of Health Professions

Title: EXERCISE MOTIVATORS AND EXERCISE CAUSALITY AMONG ANDREWS UNIVERSITY STUDENTS: A CORRELATIONAL STUDY

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Purpose of the Study

A healthy, fit body and well-developed mind have been known to be very effective in helping students succeed academically, socially, behaviorally, and emotionally. Understanding what motivators influence students in exercise participation, and how such motivators may influence choice in undertaking physical activities can be valuable information when planning college physical fitness courses and wellness activities. Further, it may reverse the trend of the findings that Andrews University students’ fitness declines while being in college as measured by 10 years of Microfit aggregated data.

The purpose of this study was to identify the most important exercise motivators that influence Andrews University undergraduate students’ choices and behaviors toward
acquiring a more physically active lifestyle. A second purpose was to investigate whether the exercise causality orientation profiles’ strength of Andrews University students was autonomous, controlled, or impersonal in the regulation of their behavior toward exercise.

Method

This was a quantitative study utilizing a non-experimental and correlational research design. This study employed two survey questionnaires: The Exercise Motivations Inventory-2 (EMI-2) and The Exercise Causality Orientations Scale (ECOS). The EMI-2 included 51 items identifying 14 exercise motivators: enjoyment, challenge, revitalization, affiliation, competition, social recognition, positive health, stress management, strength and endurance, nimbleness, weight management, appearance, health pressure, and ill-health avoidance. Responses for EMI-2 survey were measured on a 6-point Likert-type scale. The Exercise Causality Orientations Scale included 21 questions identifying three exercise causality orientations: autonomous, control, and impersonal. The ECOS responses were measured on a 7-point Likert-type scale.

The data were collected from 316 undergraduate students registered for Spring 2013 semester at Andrews University. In addition, four demographic items were part of the study. Data were statistically analyzed by using descriptive statistics, bivariate, and correlational analysis. The multiple linear regression analysis was employed to identify which of the 14 exercise motives are the significant predictors of exercise causality orientations profiles to be autonomous, control and impersonal among Andrews University students. The \( t \) test for independent sample was used to determine whether
significant differences existed for exercise motivators and exercise causality orientations between students from the School of Health Professions and from the other schools.

Results

The study revealed significant exercise motivation predictor variables for three exercise causality orientation profiles: autonomous, control, and impersonal, among Andrews University undergraduate students during the Spring 2013 semester. In addition, it exposed significant differences in the exercise motives and exercise causality orientation between the students from the School of Health Professions and other schools.

The three significant exercise motivation predictors of autonomous exercise causality orientation arranged according to their importance were positive health, strength and endurance, and affiliation. Positive health and strength and endurance motives were positively correlated to the autonomous exercise causality orientation. However, the third significant exercise motivation predictor of affiliation was negatively correlated to the autonomous exercise causality orientation.

Also, three exercise motivation predictors were found to be significantly correlated with the control exercise causality orientation. The strongest predictor was social recognition, next, weight management, and the third, affiliation. All three exercise motivation predictors were positively correlated to the control exercise causality orientation.

The impersonal exercise causality orientation was significantly correlated with four exercise motivation predictor variables, which were social recognition, health pressures, affiliation, and competition. Three of them were positively correlated with the impersonal exercise causality orientation. Social recognition appeared to be the highest
predictor, followed by health pressure and affiliation. The fourth one of competition was negatively correlated to the impersonal exercise causality orientation.

The study revealed significant differences in the exercise motives and exercise causality orientation between the students from the School of Health Professions and other schools. The students from the School of Health Professions were found to be significantly higher when it comes to the exercise motives and exercise causality orientation. Eight out of 14 tested exercise motivation predictors were found significantly higher in intrinsic motives such as: enjoyment, revitalization, and affiliation, and extrinsic motives such as: positive health, strength and endurance, nimbleness, appearance, and ill-health avoidance. The significant differences for the exercise causality were found to be higher for the autonomous and control exercise causality orientations.

Conclusions

The empirical findings gained from this study may impact how our educational institutions address the concerns for regular physical activity participation among college students. This may lead to employing motivational strategies in wider offerings in the fitness and wellness-oriented courses across Adventist universities and colleges.
EXERCISE MOTIVATORS AND EXERCISE CAUSALITY AMONG ANDREWS UNIVERSITY STUDENTS: A CORRELATIONAL STUDY

A Thesis
Presented in Partial Fulfillment of the Requirements for the Degree Master of Science

by
Anna T. Piskozub
2013
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ACKNOWLEDGMENTS

My educational journey in the MS program started four years ago. I had the deep desire to further my knowledge about the impact of fitness and nutrition on the overall well-being of people. During my studies I had to balance multiple responsibilities of working full time, teaching exercise classes in the morning, and running group personal training for women in the evening.

Today, I can say that I am deeply grateful to God, my Lord and my Savior for taking me through this program. The Bible verse from Jeremiah 29:11, which says “For I know the plans I have for you,” declares the LORD, “plans to prosper you and not to harm you, plans to give you hope and a future,” has been and always will be my inspiration.

God blessed me abundantly with wonderful colleagues and professors. I would like to thank Dr. Winston Craig, Dr. Elsie Jackson and Dr. Tevni Grajales for giving me consistent support and encouragement through prompt feedback and guidance. Dr. Elsie Jackson and Dr. Craig helped me with the proper language, flow, and the logic of my writing. Dr. Tevni Grajales’ research tutelage and availability helped me to stay focused, and encouraged me through all the stages of the thesis writing. The dissertation secretary, Bonnie Proctor, relentlessly edited and corrected the format of my thesis. Finally, I must say thank you to Dr. Jerome Thayer, who supported me through my entire educational journey, helping me with my undergraduate and graduate studies.
CHAPTER I

INTRODUCTION

A healthy, fit body and well-developed mind are known to be important for meeting challenges encountered both in academics and throughout the lifespan. Within the last decade a growing number of research studies (e.g., Sallis & Owen, 1999; Sacheck, Kuder, & Economos, 2010) documented that regular physical activity provides physiological and psychological benefits which influence the quality of life and overall well-being of those who exercise (Penedo & Dahn, 2005; Pertruzello, Landers, Hatfield, Kubitz, & Salazar, 1991; Powell, 1988). Regularly implemented, aerobic exercise improves cognitive performance among populations of all ages (Clarkson-Smith & Hartley, 1989; Colcombe et al., 2002; Wu et al., 2008; Yaffe, Barnes, Nevitt, Lui, & Covinsky, 2001).

There is an intuitive belief among health and educational professionals that there is a close connection between the mind and body. This belief is based on research evidence showing that regular exercise will actually enhance the development of specific types of mental processes. To mention a few, these are the ability to memorize, make decisions, plan, and to solve problems (Colcombe et al., 2006). Several studies documented that students who are physically fit perform better academically than students who are not physically fit (Grissom, 2005). Researchers showed that exercise stimulates brain activity and leads to a higher cognitive performance (Buck, Hillman,
In spite of the growing knowledge of health benefits that exercise yields, there is a downward trend in physical activity participation. Statistics concerning lack of physical activity among youth and young adults are very alarming. Almost 50% of youth, ages 12-21, are not vigorously active on a regular basis (United States Department of Health and Human Services, 2000, as cited in Castelli et al., 2007).

This unhealthy trend continues among college-age young adults. College students do not engage in sufficient levels of physical activity to derive health benefits according to research reports. In one of the studies, researchers concluded that inadequate diets and lack of physical activity are the main cause of increased overweight and obesity among college students (Magoc, Tomaka, & Thompson, 2012). Another study, named The 2011 Behavioral Risk Factor Surveillance System, reports that among U.S. adults ages 18 to 24 years, 43% reported physical activity levels below the recommended guidelines of 150 minutes per week of moderate intensity activity; and among adults 25-34 years, 50.2% reported levels below the recommended guidelines (Centers for Disease Control and Prevention, 2012).

Is the fitness trend at Andrews University similar to the national one? A study headed by Dr. Peter Pribis found that physical fitness levels among students of Andrews University are on a decline. His research was based on aggregated data from Microfit tests administered between 1996 and 2008. The results revealed that students graduating from high schools and entering Andrews University are not in the fit category as measured by the Microfit test. Their physical fitness declines further as they attend the University. Dr.
Pribis recommended the need for implementation of strategies which will reverse this unhealthy trend and increase students’ physical fitness during their college years (Pribis, Burtnack, McKenzie, & Thayer, 2010).

Interestingly, another study at Andrews University focused on identifying the health behavior changes in relationship to the type of instruction in *Fit for Life*, a required undergraduate course. Dr. Lynn Merklin (2010) investigated whether the instruction was effective in promoting health behavior improvement. The findings suggested that various instructional methods should include goal setting, monitoring, or behavior contracts. Students should be given autonomy to make the best decision based on their needs and interests. The goal should be to increase exercise by finding practical ways to encourage students to enjoy and commit to exercise (Merklin, 2010). In an overview of empirical studies, researchers in school physical education used the self-determination theory (SDT) to assess students’ motivation toward exercise.

The self-determination theory (Deci & Ryan, 1980; 1985; 1991) is a general motivation and personality theory whose main idea consists of human behavior being motivated by three primary and universal psychological needs: autonomy (this includes people’s efforts to feel they originate their actions and can determine their own behavior. It is a desire to feel an internal locus of causality), competence (this consists of controlling the result and experiencing efficiency) and relatedness (this refers to the effort made to relate to others and be concerned for them, as well as feeling accepted by others and experiencing satisfaction with the social world). The satisfaction of the basic psychological needs is going to be related with motivation felt by the subjects. (Moreno Murcia, Lopez de San Roman, Martinez Galindo, Alonso, & Gonzalez-Cutre, 2008, p. 23)

The findings suggest that meeting psychological needs of exercise choice, perceived competence, and relatedness impacts motivational regulations of participants and predicts various cognitive, affective, and behavioral outcomes in physical education (Ntoumanis & Standage, 2009). Implementation of strategies and instructional methods

3
based on meeting students’ basic psychological needs for autonomy, competence, and relatedness appears to create a motivational climate toward physical activity (Moreno Murcia et al., 2008; Ntoumanis & Biddle, 1999).

Naturally, it would be appropriate to ask, What motivates or what would motivate Andrews University students to exercise? Individuals regulate their chosen behaviors toward exercise based on their personal goals and interests. The exercise causality orientation theory proposes that individuals can seek to be autonomous, controlled, or impersonal in the regulation of their exercise behavior.

According to this theory, there are three causality orientations: an autonomy orientation, a control orientation and an impersonal orientation. When autonomy oriented, individuals seek out opportunities to be self-determining, regard the characteristics of events as sources of information to regulate their chosen behaviours, and regulate their actions on the basis of personal goals and interests. When control oriented, individuals rely on externally or internally imposed controlling events, such as extrinsic rewards and deadline to regulate their behavior. The impersonal orientation is characterized by a belief that behavioral outcomes are beyond one’s control. When impersonally oriented, individuals feel that they are unable to regulate their behavior to achieve desired outcomes, leading to a sense of incompetence and helplessness. (Markland, 2011, para.1)

The Exercise Motivations Inventory instrument assesses various reasons for exercising. For some individuals the reason to exercise is regulated by intrinsic motivators. In their exercise behavior they foster full sense of choice, accompanied by internal mitigation of wellness and sense of full volition (Silva et al., 2008). The reasons are intrinsic and focus on psychological nutriments such as revitalization, enjoyment, challenge, and affiliation. These reasons have behavioral domain and primarily have an intrinsic focus. Behaviors which are motivated extrinsically are performed in order to obtain physical outcomes. For example, increasing strength and nimbleness represents fitness-related outcome. While seeking social recognition, competition and health
interpersonal motives can be perceived as intrinsic or extrinsic motives. It depends on what the motive means to the individual (Texeira, Carraca, Markland, Silva, & Ryan, 2012). The 14 motives are measured by the Exercise Motivation Inventory-2 (EMI-2), which “differentially predicted perceptions of autonomy and exercise interest-enjoyment” (Markland & Hardy, 1993, p. 289).

The perception of autonomy and enjoyment and other affective reasons in the domain of exercise is explained by one of the self-determination subtheories named the organismic integration theory. This theory suggests that different levels of self-determination relate to different types of motivation. From less to more self-determination, three types of motivation are identified as: amotivation, extrinsic motivation, and intrinsic motivation. In amotivation, a subject has no intention of doing anything. In extrinsic motivation a subject can regulate his or her behavior by applying one of the four motivational forms: external, introjected, identified, and integrated regulation. The least self-determined is external regulation and reveals actions motivated either by external reward or coercion. Next is introjected regulation, which identifies actions being motivated by avoiding the feeling of guilt. The subsequent motivational form is identified regulation where the subject originates the activity because it is important. The last type of extrinsic motivation is identified regulation where several identifications are assimilated and organized hierarchically; however, the activity is not originated by enjoyment. The highest level of self-determined form of motivation is intrinsic motivation. In intrinsic motivation, activities are driven by interest and an adherent feeling of enjoyment (Deci & Ryan, 1985a).
In order to initiate, influence, and modify students’ behavior toward enjoying physical activity, it would be worthy for physical educators to understand what motivates or would motivate students to participate in physical activity. In addition, it would be useful to assess the strength of Andrews University students’ exercise causality orientation profiles to be autonomy, control, or impersonally oriented. Specifically, little is known about the relationships of current physical activity participation motives and the relationship to the three exercise causality orientation profiles: autonomous, control, and impersonal, among Andrews University students.

The Settings

Andrews University (AU) is operated by the Seventh-day Adventist Church. The majority of the students are Seventh-day Adventists. Students are not required to have a religious affiliation with Seventh-day Adventists to be admitted to AU as long as they are comfortable within its religious, social, and cultural atmosphere. The institution serves a worldwide Adventist community with a total of 130 programs and degrees. AU is recognized as one of the “Best National Universities” for 2013. In addition, Andrews University is ranked as fourth in Campus Ethnic Diversity with a diversity index of .73, and 13% of the student body is composed of international students. Seventh-day Adventists emphasize the importance of core Christian values. Students who choose to attend Andrews University agree to adopt a wholesome lifestyle and to maintain high standards of conduct (AU Bulletin, 2012/2013, p. 28).
The Background of the Problem

It is in the mission of Andrews University to create lifetime movers across life-span transitions. The Pribis et al. (2010) findings showed that AU students’ entry-fitness levels decline during their course of study. Their research was based on aggregated data from Microfit tests administered between 1996 and 2008. The results revealed that students graduating from high schools and entering Andrews University are not in the fit category as measured by the Microfit test. Their physical fitness declined further as they attended the University.

Statement of the Problem

Andrews University undergraduate students do not maintain an optimal healthy lifestyle through adherence to regular physical activity while being in college. Their physical fitness declines while being in college as measured by 10 years of Microfit aggregated data (Pribis et al., 2010).

Purpose of the Study

The purpose of this study was to identify the most important exercise motivators that influence Andrews University undergraduate students’ choices and behaviors toward acquiring a more physically active lifestyle. I also investigated whether the exercise causality orientation profile strength of Andrews University students was autonomous, controlled, or impersonal in the regulation of their behavior toward exercise.

Research Question

The general research question for this study was: Which of the 14 exercise motivators (enjoyment, challenge, revitalization, affiliation, competition, social...
recognition, positive health, stress management, strength and endurance, nimbleness, weight management, appearance, health pressure, and ill-health avoidance) are predictors of the three constructs of exercise causality: autonomous, control, and impersonal orientation among Andrews University undergraduate students during the Spring 2013 semester?

In order to answer this general research question, I utilized the following three research questions that are presented with the respective research hypothesis:

1. Which of the 14 exercise motivators—enjoyment, challenge, revitalization, affiliation, competition, social recognition, positive health, stress management, strength and endurance, nimbleness, weight management, appearance, health pressure, and ill-health avoidance—are significant predictors of the autonomy construct of exercise causality orientation among Andrews University undergraduate students during the Spring 2013 semester?

Hypothesis 1: All 14 exercise motivators—enjoyment, challenge, revitalization, affiliation, competition, social recognition, positive health, stress management, strength and endurance, nimbleness, weight management, appearance, health pressure, and ill-health avoidance—are significant predictors of the autonomy construct of exercise causality orientation among Andrews University undergraduate students during the Spring 2013 semester.

2. Which of the 14 exercise motivators—enjoyment, challenge, revitalization, affiliation, competition, social recognition, positive health, stress management, strength and endurance, nimbleness, weight management, appearance, health pressure, and ill-health avoidance—are significant predictors of the control construct of exercise causality orientation among Andrews University undergraduate students during the Spring 2013 semester.

3. Which of the 14 exercise motivators—enjoyment, challenge, revitalization, affiliation, competition, social recognition, positive health, stress management, strength and endurance, nimbleness, weight management, appearance, health pressure, and ill-health avoidance—are significant predictors of the impersonal construct of exercise causality orientation among Andrews University undergraduate students during the Spring 2013 semester.
orientation among Andrews University undergraduate students during the Spring 2013 semester?

Hypothesis 2: All 14 exercise motivators—enjoyment, challenge, revitalization, affiliation, competition, social recognition, positive health, stress management, strength and endurance, nimbleness, weight management, appearance, health pressure, and ill-health avoidance—are significant predictors of the control construct of exercise causality orientation among Andrews University undergraduate students during the Spring 2013 semester.

3. Which of the 14 exercise motivators—enjoyment, challenge, revitalization, affiliation, competition, social recognition, positive health, stress management, strength and endurance, nimbleness, weight management, appearance, health pressure, and ill-health avoidance—are significant predictors of the impersonal construct of exercise causality orientation among Andrews University students during the Spring 2013 semester?

Hypothesis 3: All 14 exercise motivators—enjoyment, challenge, revitalization, affiliation, competition, social recognition, positive health, stress management, strength and endurance, nimbleness, weight management, appearance, health pressure, and ill-health avoidance—are significant predictors of the impersonal construct of exercise causality orientation among Andrews University undergraduate students during the Spring 2013 semester.

4. Are there significant differences in the type of exercise motives and exercise causality orientations among the students from the School of Health Professions and other schools?
Hypothesis 4: There are significant differences in the type of exercise motives and exercise causality orientation among the students from the School of Health Professions and other schools.

Rationale for Study

Understanding what motivators influence students in exercise participation and how such motivators may influence choice in undertaking physical activities can be valuable information when planning college physical fitness courses and wellness activities. Further, identifying the exercise causality orientation of Andrews University students will help to determine how to help students to experience autonomy orientation in regulation of their exercise behavior. Specifically, finding out which exercise motivators are correlated with high levels of autonomous behavior could help in finding new ways of encouraging students to commit to exercise.

This study supports the fundamental teaching of the Seventh-day Adventist Church that promotes regular exercise interventions to facilitate healthy life behavior and lead to the improvement of overall health of the body and mind (General Conference of Seventh-day Adventists, 2007, p. 287). It is Andrews University’s mission that students will embrace a balanced lifestyle including time for intellectual, social, spiritual, and physical development (AU Bulletin, 2012/2013, p. 18).

Significance of Study

The empirical findings gained from this study may impact how our educational institutions address the concerns for regular physical activity participation among college students. This may lead to wider offerings in the fitness and wellness-oriented courses
across Adventist universities and colleges. The findings may provide significant
information to influence the following stakeholders:

1. It could help the instructors of these courses to better understand how exercise
motivators influence their students’ reasons for participating in physical activities classes.
Thereby impacting the course content and strategies used to help students experience
enjoyment and autonomy as they partake in physical activities.

2. Students may embrace more willingly physical activities through self-
determination, engaging in exercise behaviour freely and with no sense of control.

3. Community organizations may use the findings of this study to deliver physical
activity programs which are enjoyable and offer autonomy.

4. Other colleges and universities may wish to replicate this study in an effort to
increase the physical activity of their students.

Theoretical Framework

The Self-Determination Theory (SDT; Deci & Ryan, 1985a, 2002) became widely
used for examining motivational issues in physical activities (Frederick-Recascino, 2002).
This well-known theory provided appropriate framework to explore and explain the
relationships between variables in this study. SDT suggests that lived experiences can be
interpreted as informational, controlling, or amotivating (Deci, Eghrari, Patrick, & Leone,
1994; Deci & Ryan, 1985a, 2002). This interpretation will lead to motivational
consequences expressed by the type of motivation and quality of behavior. Events that are
interpreted as informational will result in intrinsic motivation and lead to a feeling of
enjoyment, flow, and fun (Vallerand, 2007). Events that are interpreted as controlling will
result in extrinsic motivation according to SDT. Extrinsic motivation varies with four
levels of hierarchy with the lowest motivation as external (reward or coercion) and the highest as integrated (valued behavior, realizing goals). Lack of interest and learned helplessness characterize amotivation. On the continuum of self-determination (Deci & Ryan, 2002, p. 16), amotivation is at the bottom level of self-determination continuum, while intrinsic motivation is at its highest level.

In this study two instruments were used: The Exercise Motivations Inventory-2 (EMI-2; Markland & Ingledew, 1997), and The Exercise Causality Orientations Scale (Rose, Markland, & Parfitt, 2001). The first instrument, Exercise Motivation Inventory-2 (EMI-2), was used to identify which of the 14 motivators are the most or the least important reasons to Andrews University students for exercise participation. The findings will provide valuable information about the type of motivation for exercise among AU students. According to Markland and Ingledew (1997), these 14 identified exercise motivators are either internally informational and highly autonomous or internally controlling and low autonomous. An example of informational exercise motivators are: enjoyment, challenge, revitalization, affiliation, and competition. Exercise motivators which are regulated by extrinsic motivation are: social recognition, positive health, stress management, nimbleness, weight management, appearance, health pressures, and ill-health avoidance. Extrinsic motivation has four forms of motivation and while ill-health avoidance may be at its lowest level of external regulation, seeking positive health may be at its highest level of integrated regulation. These extrinsic exercise motivators are regulated by behaviors that are performed in order to receive physical outcomes that are separate from behavior itself (Ryan, Frederick, Lepes, Rubio, & Sheldon, 1997). It is important to emphasize that according to SDT, a subject can transition on the continuum
of self-determination by internalizing and transforming previously controlled motivation into autonomous motivation (Silva et al., 2008).

The second instrument used in this study, The Exercise Causality Orientations Scale (ECOS), assesses the strength of general motivational orientations through seven scenarios that individuals find themselves in with regard to exercising. Each scenario is followed by a set of three responses corresponding to each of the three exercise causality orientations. The exercise causality orientation profiles are: autonomy, control, and impersonal. Rose et al. (2001) recognized that individuals can vary in their tendency to be of autonomous, controlled, or impersonally oriented across life domains. The ECOS is context-specific and allows assessing the strength of individuals’ exercise causality orientation profiles in the exercise domain. The inter-correlations among the orientations showed a positive correlation of .55 between impersonal and control and a negative correlation of -.53 between impersonal and autonomy. This is coherent with the Self-Determination theory. Both instruments assessed the motivational mechanism among Andrews University students toward physical activity by identifying the most valued exercise motivators and the degree to be self-determined to engage in physical activity as measured by the ECOS. Taking the research findings into account by employing the EMI-2 and ECOS, I would like to propose the following theoretical framework (see Figure 1).

**Limitations of the Study**

General limitations of this study relate to sample selection, sample size, and corresponding power analysis and generalizability. The sample population is comprised of undergraduate university students with a religious orientation representing the
Figure 1. A Graphic Summary of the Theoretical Framework of the Study.
Seventh-day Adventist Church. The health message is one of the fundamental beliefs in the church. Students with SDA upbringing are educated and acculturated into the health message.

The selection of exercise motivators might be reflected by the learned values and may not necessarily represent unbiased reasons to be physically active. In addition, the sample size is not a randomized sample from the general population, but is limited to one of availability and convenience. Social desirability may artificially boost the observed strength of the relationship between variables. Exigent factor is present in any study which employs survey.

In addition, Michigan’s cold winter lasts about 6 months and limits outside physical activity. Therefore, the ability to generalize the current findings is limited to SDA undergraduate students who are on campus in similar weather conditions.

**Definition of Terms**

*Quality of life:* A broad multidimensional concept that usually includes subjective evaluations of both positive and negative aspects of life. A model of quality of life encompasses five dimensions: physical well-being, material well-being, social well-being, emotional well-being, and development and activity (Centers for Disease Control and Prevention, 2008).

*Intuitive:* Known or perceived by intuition; directly apprehended (“Intuitive,” n.d.).

*Motivational regulation:* “The regulation of motivation (or motivational regulation) encompasses those thoughts, actions, or behaviors through which students act to influence their choice, effort, or persistence for academic tasks” (Wolters, 2003, p. 190).
**Relatedness**: “Individuals’ inherent propensity to feel connected to others, that is, to be a member of a group, to love and care and be loved and cared for” (Baumeister & Leary, 1995, as cited in Van den Broeck et al., 2010, p. 982). “The need for relatedness is satisfied when people experience a sense of communion and develop close and intimate relationships with others” (Deci & Ryan, 2000, as cited in Van den Broeck et al., 2010, p. 983).

**Participation motives**: Goal contents or motives in exercise (Ingledew, Markland, & Ferguson, 2009).

**Causality orientations**: “SDT proposes that people have dispositional tendencies in the way how they orient themselves in various environments, revealing motivational types and behavioral patterns” (Teixeira, et al., 2012, p. 3).

**The Autonomy Orientation**: Assesses the extent to which a person is oriented toward aspects of the environment that stimulate intrinsic motivation, are optimally challenging, and provide informational feedback. A person high in autonomy orientation tends to display greater self-initiation, seek activities that are interesting and challenging, and take greater responsibility for his or her own behaviour. (Deci & Ryan, 2013, para. 2)

**The Controlled Orientation**: Assesses the extent to which a person is oriented toward being controlled by rewards, deadlines, structures, ego-involvements, and the directives of others. A person high on the controlled orientation is likely to be dependent on rewards or other controls, and may be more attuned to what others demand than to what they want for themselves. (Deci & Ryan, 2013, para. 3)

**The Impersonal Orientation**: Assesses the extent to which a person believes that attaining desired outcomes is beyond his or her control and that achievement is largely a matter of luck or fate. People high on this orientation are likely to be anxious and to feel very ineffective. They have no sense of being able to affect outcomes or cope with demands or
changes. They tend to be amotivated and to want things to be as they always were. (Deci & Ryan, 2013, para. 4)

**Summary**

Chapter 1 presents the problem, purpose, significance, theoretical framework, and limitation of the study. This chapter was divided into nine sections: an Introduction, The Settings, The Background of the Problem, Statement of the Problem, Research Questions, Rationale for the Study, Significance of the Study, Theoretical Framework, Limitation of the Study, and Definition of Terms. Chapter 2 presents the literature review used to support the study.
CHAPTER II

LITERATURE REVIEW

Introduction

The aim of this chapter is to present an overview of pertinent empirical studies focusing on exercise motives and exercise behavior causality associated with Self-Determination Theory (Ryan & Deci, 1985a, 1985b). The instruments selected for this study are grounded in Self-Determination Theory. Those studies showing functional significance of exercise motives and exercise causality orientation from the Self-Determination Theory perspective will be presented. The literature review will address studies that provide wide evidence that various exercise motives are pursued by individuals as a result of underlying motivation type: extrinsic or intrinsic in regulating their exercise behavior (Deci & Ryan, 2000; Ingledew & Markland, 2008; Ingledew & Sullivan, 2002; Kuroda, Sato, Ishizaka, Yamakado, & Yamaguchi, 2012; Markland, 1999; Markland & Hardy, 1993; Ryan, Frederick, Lepes, Rubio, & Sheldon, 1997).

The general organization of this chapter will have two sections: The Role of Exercise Motives and Exercise Causality Orientations. The first section on the role of exercise motives provides information on how exercise motives have functional significance in influencing behavior to engage in exercise or physical activity. The second section on exercise causality orientations will emphasize studies which present
information on individual differences in orientation profiles to be autonomous, controlled, or impersonal in exercise behavior regulation (Rose et al., 2001).

The primary resources for the literature review come from EBSCO in Research Navigator, Google Scholar, PsycINFO, and the James White Library. The search to select appropriate resources included key words such as: exercise, physical activity, sports, motivation, intrinsic motivation, extrinsic motivation, self-determination, exercise motivators, exercise behavior, exercise causality, autonomy, enjoyment, competence, relatedness, physical objectivity, and basic psychological needs.

The Role of Exercise Motives

Studies show that individual adherence to exercise depends on the functional significance of exercise motives from the perspective of self-determination theory (Deci & Ryan, 1985a). Exercise motives are differentiated according to the extent to which their realization will satisfy autonomy, competence, and relatedness. Based on the satisfaction of these three primary psychological needs (autonomy, competence, and relatedness), individuals experience less or more autonomous motivational regulations (Deci & Ryan, 1985a). Highly autonomous motivational regulations yield intrinsic motivation toward exercise. For instance, exercise motives such as enjoyment, challenge, revitalization, affiliation, and competition are examples of internally informational, highly autonomous regulations and positively predict long-term exercise adherence (Teixeira et al., 2012).

In contrast, the less autonomous motivational regulations yield extrinsic motivation toward exercise. Extrinsic motivation varies with four regulation levels on the self-determination continuum from lowest to highest. These are external, introjected, identified, and integrated. The least self-determined regulatory styles represented by
external (reward or coercion) and introjected (feeling of guilt) are weak constructs for persistence at exercise. The subsequent motivational levels of identified regulation (subject originates the activity because it is important) and of integrated regulation (where several identifications are assimilated and organized hierarchically) positively predict exercise participation (Teixeira et al., 2012).

The lower level extrinsic motives, contrary to intrinsic, will not sustain long-term adherence to exercise or physical activity (Buckworth, Lee, Regan, Schneider, & DiClemente, 2007; Ingledew, Markland, & Medley, 1998; Maltby & Day, 2001; Markland & Hardy, 1992; Ryan et al., 1997; Silva et al., 2011). However, it is possible that individuals who are experiencing intrinsic motives such as feeling of enjoyment, challenge, and affiliation may also value extrinsic motives such as improving their physical appearance (Markland & Hardy, 1992). Ingledew et al. (1998) observed that in the beginning of adopting exercise behavior, individuals may value improvement of physical appearance. While this extrinsic goal of improving the bodily appearance is important in the beginning stage of exercise, experiencing intrinsic benefits such as enjoyment is essential to maintaining exercise behavior long-term (Ingledew et al., 1998).

In an earlier study, Markland and Hardy (1992) explored the differences in exercise motives among regular aerobics participants and individuals who participated in aerobics classes as part of a Weight Watchers program. Their findings indicated that the experience of enjoyment and competence in fitness, personal skills improvement, stress management, and affiliation were the leading exercise motives for the aerobics participants but not for the Weight Watchers group. The aerobics group scored significantly higher in the intrinsic motivation to exercise than did the Weight Watchers.
The results of this study suggest that the low level of intrinsic motivation among Weight Watchers’ aerobics participants was because the activity was undertaken primarily to lose weight. Overweight people feel tension and pressure to lose weight. In the lower levels of self-determination there was no desire to master a skill or experience personal improvement. The researchers concluded that the lack of internally informational motives is unlikely to promote long-term participation in regular exercise. Their observations that the motivational consequences that individuals adopt may predict exercise adherence were consistent in terms of SDT (Deci & Ryan, 1985a).

In another cross-sectional study led by Ryan et al. (1997), similar findings concluded that exercise body-related motives (extrinsic) contrary to internally informational (intrinsic) motives of enjoyment or improvement will not facilitate long-term adherence in exercise. The researchers launched two studies, one in college exercise classes and a second one at a college fitness center. The first study investigated the underlying exercise motives in relation to exercise adherence among participants in two different specialty exercise classes: Tae Kwon Do and Aerobics. The findings showed that the Tae Kwon Do participants scored higher than the Aerobics participants on intrinsic motivation by selecting enjoyment and competence as the main motives for exercise participation. Their adherence to exercise was better than the aerobics group. Regression analyses revealed that enjoyment motive and not the body-related motives reduced dropouts and mediated better exercise adherence.

In the second study the same group of researchers examined how appearance, health/fitness, and social interaction-related motives would impact attendance and adherence in exercise. Factor analysis and multiple regression analyses revealed that
longer exercise workouts were positively associated with intrinsic motives of enjoyment, competence, and social interaction. The post-workout ratings of enjoyment were positively associated with adherence to exercise.

A more recent cross-sectional study done with 251 British students by Ingledew et al. (2009) adds further support to the notion that autonomous exercise motives characteristic of intrinsic and identified motivation positively predict exercise participation. Their investigation tested a three-level model of motivation based on the Self-Determination Theory presented in the new study by Deci and Ryan (2000).

According to the model, dispositional motives (represented by life goals) influence participatory motives (exercise participation motives), which influence regulatory motives (exercise behavioral regulations), which influence behaviour (exercise participation). (Ingledew et al., 2009, p. 336)

The theoretical model was tested using partial least squares (PLS) analysis with the Smart PLS Version 2.0, and underwent twofold analyses. In the first analysis the model was tested for reliability, internal consistency, and validity. In the second stage, the structural model was tested for significance and variance in the endogenous variables.

The findings revealed that exercise participation motives would predict behavioral regulations. Affiliation ($p < .001$) and challenge motives ($p < .001$) positively predicted intrinsic regulation, while health/fitness ($p < .001$) and stress management ($p < .001$) motives positively predicted identified regulation. Social recognition ($p < .001$) motives positively predicted external regulation, and appearance/weight ($p < .001$) motives positively predicted external and introjected regulation.

Also, their findings supported that behavioral regulations would predict exercise participation. Intrinsic ($p < .01$) and identified ($p < .001$) regulation positively predicted
exercise participation. However, the more controlled regulations, such as external and introjected, showed no impact on predicting exercise participation (Ingledew et al., 2009).

The strength of this study is that its findings are consistent with existing research on how exercise motives impact behavioral regulations in exercise participation. The autonomous regulations that referred to higher levels of extrinsic (identified and integrated) and intrinsic motivation fostered exercise adoption and maintenance (Buckworth et al., 2007; Deci & Ryan, 2000; Ingledew & Markland, 2008; Markland & Hardy, 1992; Ryan et al., 1997).

Kuroda et al. (2012) found that enjoyment and self-efficacy were reported by participants who successfully continued exercise for 3 months and were in the maintenance stage. A meta-analysis done by Ng et al. (2012) found positive association between patients’ psychological need satisfaction and autonomous motivation in relation to beneficial health outcomes. This study, done with weight-management program participants, revealed that in their effort to be successful in losing weight, participants needed affiliation (support and encouragement) along with enjoyable and fun exercise programs to build self-efficacy (Woolford, Sallinen, Schaffer, & Clark, 2012).

A substantial amount of research findings show either no significance or a trend of negative correlation between body-related motives (appearance improvement and weight-management) and long-term exercise behavior (Ingledew & Markland, 2008; Ryan et al., 1997; Segar, Eccles, & Richardson, 2008; Silva et al., 2011). Even though many studies found that improving appearance and losing weight motives are important to initiate exercise, their construct seems too weak to predict long-term exercise participation. Motives based on bodily objectivity represent lower levels of extrinsic regulations
(external and introjected). External and introjected behavior regulations do not predict long-term exercise participation (Kilpatrick, Herbert, & Bartholomew, 2005; Segar, Sprujit-Metz, & Nolen-Hoeksema, 2006; Thogersen-Ntoumani & Ntoumanis, 2006). In spite of these findings there is mixed evidence concerning the role of body-related motives to exercise (Teixeira et al., 2012). For example, appearance improvement and weight management motives appeared to be positively associated with exercise among females (Buckworth et al., 2007; Frederick, Morrison, & Manning, 1996; Markland & Hardy, 1992; Standage, Duda, & Ntoumanis, 2005).

Deci and Ryan (2000) suggested that female students, while feeling autonomous, competent, and related, at the same time are extrinsically motivated through introjected motivation to exercise (as cited in Standage et al., 2005). Women are under a lot of pressure from society and media to achieve a slim and attractive physique (Cusumano & Thompson, 1997). Additional research shows that striving for appearance-related outcomes in exercise was found to be associated less with long-term exercise adherence and lower well-being than participating in exercise for more autonomous reasons (McLachlan & Hagger, 2010).

**Exercise Causality Orientation**

The Exercise Causality Orientations Scale (ECOS) suggests that individuals have different orientation toward initiating and regulating their behavior. Peoples’ orientation toward exercise can be autonomous, controlled, or impersonal (Rose et al., 2001). Deci and Ryan (1985b) described in Self-Determination Theory each of these three causality orientations: autonomy, control, and impersonal.
Autonomy causality-oriented individuals demonstrate freedom of choice to originate their actions and determine their own behavior. They like to consider the characteristics of an event as sources of information to regulate their behavior. These individuals seek to be involved in an activity when it is personally important, valued, interesting, and brings enjoyment. Their behavior is regulated by higher types of extrinsic motivation (identified and integrated) along with intrinsic motivation. They see extrinsic rewards as evidence of competence and not a behavior-controlling factor. They are making autonomous decisions in their behavior toward exercise.

The control causality-oriented individuals unlike the autonomous regulate their behavior under self-pressure (introjected motivation) or when external rewards or punishments (external motivation) are imposed. They “tend to align with external directives and norms” (Deci & Ryan, 2000, as cited in Teixeira et al., 2012) by following orders. For example, if they are told to do something or because they must do something, their behavior is regulated by lower types of extrinsic motivation. These individuals lack the sense of self-determination, as they respond to external pressures or avoid negative consequences (Rose et al., 2001).

The impersonal causality-oriented individuals are unable to regulate their behavior to achieve desired outcomes and events. Their unintentional behavior is independent on the outcomes and leads to a sense of helplessness and incompetence (Deci & Ryan, 1985, as cited in Rose et al., 2001).

Based on Self-Determination Theory, the individuals’ desire to initiate and maintain exercise behavior will be subjective to their individual exercise causality orientation profile. Lived personal experiences often will affect positively or negatively
their sense of autonomy, competence, and relatedness underlying the motivation toward physical activity. For example, the study done by Chatzisarantis and Hagger (2009) with 215 British students showed that students’ autonomous regulation toward exercise can be enhanced. Only students in the autonomy-supportive condition by receiving choice in exercise and encouragement demonstrated increased participation in exercise. There was no change in exercise behavior regulation among the students who were in the neutral condition (Chatzisarantis & Hagger, 2009).

Several other studies suggested that controlled motivation (i.e., external and introjected) and amotivation have been associated with students’ boredom and unhappiness (Mouratidis et al., 2008; Ntoumanis, 2001; Standage et al., 2005, as cited in Chatzisarantis & Hagger, 2009). The degree to which individuals internalize their reasons for engaging and adhering to exercise may depend on the level of fulfillment of their psychological needs (Deci & Ryan, 1985a, 1991; Ryan & Deci, 2000, 2002). Deci and Ryan (1985b) stated that it is not realistic to classify people on the basis of one of the causality profile orientations. They suggested that people may have different orientations in different life contexts, where each person may have a predominant causality orientation. They may be predominantly autonomous, controlled, or impersonal within different life domains (Deci & Ryan, 1985b).

Exercise studies show that the level of fulfillment of the three basic psychological needs of autonomy, competence, and relatedness among secondary students, college students, and adults will affect their exercise causality orientation profile (Aaltonen, Rottensteiner, Kaprio, & Kujala, 2013; Collins, Martindale, Button, & Sowerby, 2010; Dupont, Carlier, Gérard, & Delens, 2009; Kwan, Hooper, Magnan, & Bryan, 2011;
Exercise programs which encourage choice, offer task-mastering climate, and peer support will promote self-determination to exercise. As a result there will be an increase in enjoyment among its participants. The feeling of enjoyment will boost their intrinsic and higher levels of extrinsic regulation toward exercise (Edmunds, Ntoumanis, & Duda, 2008). Researchers agree that promoting high levels of self-determination in exercise will foster long-term exercise participation (Ames, 1992; Kimball, Jenkins, & Wallhead, 2009; Moreno Murcia et al., 2008; Standage et al., 2005).

For example, Standage et al. (2005) conducted a cross-sectional study among 950 British secondary students. They examined a model of motivation based on the tenets of Self-Determination Theory. They found that need support (relatedness) had a positive effect on intrinsic motivation ($\beta = .68$) and introjected regulation ($\beta = .36$), and negative indirect effects on external regulation ($\beta = -.35$) and amotivation ($\beta = -.50$). Need satisfaction was indirectly predicted by perceptions of autonomy-support ($\beta = .64$), competence-support ($\beta = .65$), and relatedness-support ($\beta = .69$). Based on the above statistical finding this study supports SDT indicating that promoting students’ autonomy, competence, and relatedness in exercise predicted intrinsic motivation and better adherence to exercise.

Ames (1992) emphasized the importance of providing support from authoritative subjects (parents, teachers, trainers, etc.) to enhance participants’ competence in exercise or physical activity. His findings support the notion that authoritative subjects can create
motivational climate which will positively impact individuals’ motivation to participate in exercise. Emphasizing personal effort, improvement, and social comparison in exercise is essential to intrinsic motivation and conducive to physical education.

A group of researchers from Spain (Moreno Murcia et al., 2008) studied the influence of motivational climate perceived in peers and psychological needs (autonomy, competence, and relatedness) on self-determined motivation and enjoyment among 394 non-competitive exercise participants. Correlational analysis revealed that the task-involving motivational climate is positively and significantly related to the needs for autonomy ($r = .25, p < .01$), competence ($r = .24, p < .01$), and relatedness ($r = .52, p < .01$). The ego-involving (competition) climate was negatively correlated to relatedness ($r = -.17, p < .01$). In addition, the needs for autonomy, competence, and relatedness positively related to the self-determined motivation to exercise ($r = .22, p < .01; r = .34, p < .01$). Self-determined motivation was positively and significantly correlated with exercise enjoyment ($r = .56, p < .01$). The study supports the notion that exercisers are more committed to exercise if they experience enjoyment which increases their self-determined motivation (Moreno et al., 2008).

A study led by Kimball et al. (2009) suggests that college students’ predispositions to exhibit autonomous regulation in physical activities were based upon positive high-school physical education experiences. Affective responses to physical education are different for males, and females. This study suggested that the lack of transfer of relevant physical activity skills, knowledge, and understanding had an impact on the level of participation in physical activities in college. While it did not show to be a limiting factor for the males, it appeared that females experienced lack of comfort in exercise activities in
high school and reported lower exercise levels in college. Students who had a positive experience in high-school physical education upon transitioning to college exhibited autonomous regulations by feelings of perceived competence, self-efficacy, and higher levels of vigorous physical activities. These findings support the view of Self-Determination Theory that experiencing fulfillment of competence facilitates affective outcomes leading to enjoyment and thus autonomous regulation characterized by intrinsic motivation (Deci & Ryan, 1985a).

A lack of competence and autonomous regulation is characteristic of inactive individuals. A recent cross-sectional and longitudinal design study (2,308 participants), conducted by Aaltoen et al. (2013), compared motivation of physically active and inactive individuals. Only participants who were less active scored low on the self-determined motives related to mastery, enjoyment, relatedness, better fitness, and appearance. The study revealed that the less active group regulated externally their behavior toward physical activity by following and trying to please others.

The Limiting Factors

Texeira et al. (2012) explores the limiting factors of impersonal regulation to exercise. The first factor is that individuals are not sufficiently involved in exercise or value exercise benefits to make it a priority in their lives (Ryan, Williams, Patrick, & Deci, 2009, as cited in Texeira et al., 2012). Exercise behavior that is not valued enough to compete with other demands on time will be replaced by urgent life pursuits such as education, career, or family responsibilities. The second factor contributing to impersonal orientation toward exercise is that some individuals may not feel competent at exercise (Kimball et al., 2009). They may feel awkward, uncoordinated, and not skilled
sufficiently to exercise. Sometimes, their health limitations or weight stigma can create an additional barrier to engage in exercise or physical activity (Korkiagangas, Alahuhta, & Laitinen, 2009, as cited in Texeira et al., 2012).

The distinction in regulating behavior toward exercise is in the affective processes of individuals, whether they choose to exercise because of obligation or enjoyment. Many people start to exercise but their motivation for continuing exercise is short-lived. The reason for not maintaining exercise might be based on the type of motivation they experience. If participation in exercise or physical activity is based on controlled motivation, then participation in regular exercise or physical activity is created by feeling of pressure rather than importance and value (Ryan et al., 2009, as cited in Texeira et al., 2012).

**Summary**

The Self Determination Theory (Deci & Ryan, 1985a) became a widely used theoretical framework for empirical studies exploring motivational regulations in mediating adherence to exercise.

Exercise motives characteristic to intrinsic motivation were found to be a significant predictor of long-term exercise adherence exercise (Edmunds, Ntoumanis, & Duda, 2008; Ingledew & Markland, 2008). Also, higher extrinsic motives (integrated and identified) showed a positive correlation with initiating exercise participation. Mixed results were found in relationship to the role of lower levels of extrinsic motivation (introjected and external). While bodily objectivity was an important motive for the females, it was not for the males. The introjected and external regulation toward exercise showed short-lived exercise participation (Deci & Ryan, 2000; Ingledew & Sullivan,
Studies on exercise causality orientations propose that individuals differ in their motivational orientations in regulating their behavior toward exercise. Autonomy-oriented individuals show high levels of self-determination, which predict long-term adherence to exercise. The control and impersonal exercise causality orientations are not strong indicators for adherence to exercise (Rose et al., 2001).

In this chapter studies have focused on exercise motivation measured by exercise causality orientations, autonomy/need support and need satisfaction, exercise motives and exercise self-regulations and motivation (Teixeira et al., 2012). The Exercise Motivation Inventory and Exercise Causality Orientations Scale along with other instruments were used as constructs to examine their relation to exercise adoption and maintenance. None of the presented research investigated the relationship between exercise motives and exercise causality orientations profiles. Even though the context of the studies dealt with heterogeneous populations, no studies were done within Seventh-day Adventist college students’ population.

In order to extend the research findings presented in this literature review, this research aims to reveal if there is a significant relationship between exercise motives and exercise causality orientations among Andrews University students. In view of the presented research from the perspective of SDT (Deci & Ryan, 1985a), it is hypothesized that there is a positive relationship between exercise motives characterized by intrinsic and higher forms of extrinsic motivation (introjected and identified) to the autonomous orientation profile in exercise causality. It was projected that the exercise motives of
lower forms of extrinsic motivation (external and introjected) would predict positively the control and the impersonal orientation, and predict negatively the autonomous orientation profile in exercise causality.

This literature review chapter concludes the research findings in support of the present study. This chapter was divided into four sections: an Introduction, The Role of Exercise Motives, The Exercise Causality Orientations, and Conclusions. Chapter 3 addresses the methodology used to conduct this study.
CHAPTER III

METHODOLOGY

General Introduction

The purpose of this study was to determine if there is a significant relationship between exercise motives and exercise causality orientations among Andrews University students from the perspective of SDT (Deci & Ryan, 1985a, 1985b). The study specifically looked at the functional significance of the 14 independent variables of exercise motivators – enjoyment, challenge, revitalization, affiliation, competition, social recognition, positive health, stress management, strength and endurance, nimbleness, weight management, appearance, health pressure, and ill-health avoidance – in relationship to the dependent variables of exercise causality orientation: autonomy, control, and impersonal.

The theoretical framework (Figure 1) chosen for this study was based on the widely used motivation self-determination theory (Deci & Ryan, 1985a). According to the literature review, exercise motives characterized by intrinsic and higher forms of extrinsic motivation (integrated and identified) are expressions of high self-determination and autonomy. Individuals who are highly autonomous in their orientation toward exercise show long-term adherence in exercise, whereas the exercise motives of lower forms of extrinsic motivation (external and introjected) represent less self-
determination. Low levels of self-determination are characteristic of control or impersonal exercise causality orientation profile.

**Research Design**

This was a quantitative study utilizing a non-experimental and correlational research design. This type of research examines the covariation between two or more variables. Correlational research does not provide answers concerning cause and effect. Therefore, this study sought to observe statistical relationships between exercise motivators and exercise causality orientation profiles variables to determine whether or not their relationship is of statistical significance. In addition, the study aimed to reveal if there are significant differences among students from the School of Health Professions and other schools. This would allow determining if the criterion variable was some function of the predictor variable (Howell, 2010). The objective of this study was to identify the most valued exercise motives and their relationship to the three exercise causality orientations profiles criterions – autonomy, control and impersonal – among Andrews University students. The insight gained from this study can be valuable information when planning college physical fitness courses and wellness activities.

**Population and Sample**

The population for this study consisted of 316 undergraduate Andrews University students, enrolled for courses during Spring semester 2013. The students were comprised of 182 males and 134 females. In terms of the ethnic group, the larger group of 112 students was composed of White, not Hispanic ethnicity. The second largest ethnic group was Black or African American composed of 71 students. The Hispanic or Latino
participants, comprised of 55 students, emerged as the third largest group of respondents in this sample. The Asian ethnic group was comprised of 45 students, whereas the Multi-racial group was composed of 22 students. The smallest group identified in the Other category accounted for 10 students. One of the students did not mark his or her ethnicity; therefore a total of 315 students reported their ethnicity.

The majority of students in this sample were from the majors outside of the School of Health Professions and they accounted for 219 students. The demographic findings showed that 94 students were from the School of Health Professions. There were 3 missing records of students who did not identify whether they were from the School of Health Professions or from the other schools.

**Hypothesis**

This study utilized the following four research hypotheses that are presented with the respective null hypothesis:

Hypothesis 1: All 14 exercise motivators—enjoyment, challenge, revitalization, affiliation, competition, social recognition, positive health, stress management, strength and endurance, nimbleness, weight management, appearance, health pressure, and ill-health avoidance—are significant predictors of the autonomy construct of exercise causality orientation among Andrews University undergraduate students during the Spring 2013 semester.

Null Hypothesis 1: All 14 exercise motivators—enjoyment, challenge, revitalization, affiliation, competition, social recognition, positive health, stress management, strength and endurance, nimbleness, weight management, appearance, health pressure, and ill-health avoidance—are not significant predictors of the autonomy
construct of exercise causality orientation among Andrews University undergraduate students during the Spring 2013 semester.

Hypothesis 2: All 14 exercise motivators—enjoyment, challenge, revitalization, affiliation, competition, social recognition, positive health, stress management, strength and endurance, nimbleness, weight management, appearance, health pressure, and ill-health avoidance—are significant predictors of the control construct of exercise causality orientation among Andrews University undergraduate students during the Spring 2013 semester.

Null Hypothesis 2: All 14 exercise motivators—enjoyment, challenge, revitalization, affiliation, competition, social recognition, positive health, stress management, strength and endurance, nimbleness, weight management, appearance, health pressure, and ill-health avoidance— are not significant predictors of the control construct of exercise causality orientation among Andrews University undergraduate students during the Spring 2013 semester.

Hypothesis 3: All 14 exercise motivators—enjoyment, challenge, revitalization, affiliation, competition, social recognition, positive health, stress management, strength and endurance, nimbleness, weight management, appearance, health pressure, and ill-health avoidance—are significant predictors of the impersonal construct of exercise causality orientation among Andrews University undergraduate students during the Spring 2013 semester.

Null Hypothesis 3: All 14 exercise motivators—enjoyment, challenge, revitalization, affiliation, competition, social recognition, positive health, stress management, strength and endurance, nimbleness, weight management, appearance,
health pressure, and ill-health avoidance—are not significant predictors of the impersonal construct of exercise causality orientation among Andrews University undergraduate students during the Spring 2013 semester.

Hypothesis 4: There are significant differences in the type of exercise motives and exercise causality orientation among the undergraduate students from the School of Health Professions and other schools.

Null Hypothesis 4: There are no significant differences in the type of exercise motives and exercise causality orientation among the undergraduate students from the School of Health Professions and other schools.

Definitions of Variables

This section provides the conceptual definition of each variable with an example of the item in the scale associated with the variable. This study comprised a total of 22 variables. The subsequent 14 variables have not been explicitly defined by David Markland and Lew Hardy (1993). Dr. Markland in his e-mail explanation dated February 21, 2013, stated that the items in the subscales are self-evident (Appendix E). Since there were no conceptual definitions for the mentioned variables, I used logic to propose a conceptual definition to fit the meaning of the cluster of items within each subscale. The 14 variables and their proposed conceptual definitions are listed below:

1. Enjoyment: A state of positive or pleasant emotions which result in feelings of satisfaction, self-actualization, fun, and exhilaration as the result of participation in exercise. This state includes thoughts, feelings, and exercise behavior (e.g., “I enjoy the feeling of exerting myself,” or “I find exercising satisfying in and of itself”). This
variable was measured by a subscale composed of four items on a 6-point Likert-type scale.

2. Challenge: A state of emotions imbued with a sense of difficulty and contest in order to experience improvement by reaching a goal, mastering a skill, and measuring up to a personally set standard. This state includes thoughts, feelings, actions, and exercise behavior (e.g., “To give me goals to work towards,” or “To develop personal skills”). This variable was measured by a subscale composed of four items on a 6-point Likert-type scale.

3. Revitalization: A physical and mental condition of vitality or vigor. This condition includes thoughts, feelings, actions, exercise behavior (e.g., “Because it makes me feel good,” or “Because after exercising I feel refreshed”). This variable was measured by a subscale composed of three items on a 6-point Likert-type scale.

4. Affiliation: To form a community with people in order to experience friendly associations within the exercise context. This state includes thoughts, feelings, and an effort to relate to others and be accepted by them (e.g., “To spend time with friends” or “To enjoy the social aspect of exercise”). This variable was measured by a subscale composed of four items on a 6-point Likert-type scale.

5. Competition: A state of emotions imbued by the act of competing for dominion or a reward. This state includes thoughts, feelings, actions, and exercise behavior to stand out (e.g., “Because I like trying to win in physical activities” or “Because I enjoy competing”). This variable was measured by a subscale composed of four items on a 6-point Likert-type scale.
6. **Social Recognition**: The acknowledgment of setting personally a higher level of fitness achievement than others. This state includes thoughts, feelings, actions, and exercise behavior (e.g., “To show my worth to others,” or “To gain recognition for my accomplishments”). This variable was measured by a subscale composed of four items on a 6-point Likert-type scale.

7. **Positive Health**: A state of physical and mental vitality and freedom from disease or ailment. This state includes thoughts, feelings, actions, and exercise behavior (e.g., “To have a healthy body,” or “Because I want to maintain good health”). This variable was measured by a subscale composed of three items on a 6-point Likert-type scale.

8. **Stress Management**: A predetermined strategy for coping with psychological or emotional worries. This state includes thoughts, feelings, actions, and exercise behavior (e.g., “To give me space to think,” or “Because it helps reduce tension”). This variable was measured by a subscale composed of four items on a 6-point Likert-type scale.

9. **Strength and Endurance**: A state of feeling and being physically strong with capability for exertion or endurance in exercise. This state includes thoughts, feelings, actions, and exercise behavior (e.g., “To build my strength,” or “To increase my endurance”). This variable was measured by a subscale composed of four items on a 6-point Likert-type scale.

10. **Nimbleness**: A state of physical functionality characterized by being swift and flexible. This state includes thoughts, feelings, actions, and exercise behavior (e.g., “To
stay become more agile,” or “To get faster”). This variable was measured by a subscale composed of three items on a 6-point Likert-type scale.

11. **Weight Management**: A state of an individual effort made to lose weight or to maintain the desired body weight. This state includes thoughts, feelings, actions, and exercise behavior (e.g., “To stay slim,” or “To lose weight”). This variable was measured by a subscale composed of three items on a 6-point Likert-type scale.

12. **Appearance**: The outward or visible aspect of a person. Individuals who seek enhancement of their physical appearance will seek bodily improvements through exercise. This state includes thoughts, feelings, actions, and exercise behavior (e.g., “To have a good body,” or “To look more attractive”). This variable was measured by a subscale composed of four items on a 6-point Likert-type scale.

13. **Health Pressure**: An individual who is informed that lack of exercise puts him/her into a health risk feels pressured to improve his or her health through exercise. This state includes thoughts, feelings, actions, and exercise behavior (e.g., “Because my doctor advised me to exercise,” or “To prevent health problems”). This variable was measured by a subscale composed of three items on a 6-point Likert-type scale.

14. **Ill-health Avoidance**: An individual’s action to improve his or her health and prevent diseases and sickness. This state includes thoughts, feelings, actions, and exercise behavior (e.g., “To avoid heart disease,” or “To prevent health problems”). This variable was measured by a subscale composed of three items on a 6-point Likert-type scale.

The three dependent variables are three exercise causality orientations: autonomy, control and impersonal. These variables were measured by The Exercise Causality Orientations Scale (ECOS), and are described as follows:
15. *Autonomy Oriented:* Individuals seek out opportunities to be self-determining, regard the characteristics of events as sources of information to regulate their chosen behavior, and regulate their actions on the basis of personal goals and interests (Rose et al., 2001). Self-determined goals and interests regulate behavior and actions that seek growth and improvement through exercise adherence (e.g., “Decide for yourself which type of exercise you would like to complete”). This variable was measured by one of three items listed under seven scenarios. The items in this scale were scored on a 7-point Likert-type scale.

16. *Control Oriented:* Individuals rely on externally or internally imposed controlling events, such as extrinsic rewards and deadline to regulate their behavior (Rose et al., 2001). The adherence to exercise is regulated by behavior that seeks to reduce or avoid negative consequences (e.g., “Attend a structured exercise class where an exercise leader is telling you what to do”). This variable was measured by one of three items listed under seven scenarios. The items in this scale were scored on a 7-point Likert-type scale.

17. *Impersonally Oriented:* Individuals feel that they are unable to regulate their behavior to achieve desired outcomes, leading to a sense of incompetence and helplessness (Rose et al., 2001). The feeling of inadequacy in exercise leads to amotivation (e.g., “As a reminder of how incapable you are at fulfilling the task”). This variable was measured by one of three items listed under seven scenarios. The items in this scale were scored on a 7-point Likert-type scale.

The demographics were measured by the following variables: Gender, Age, and Ethnicity.
18. *Gender:* The gender of the individual completing the survey (Nominal scale: Male, Female).

19. *Age:* The age of the individual completing the survey. The participants recorded a value ranging from 17 or higher.

20. *Ethnicity:* Groups identified by the United States Bureau of the Census on the base of race or ethnic background (Nominal scale; i.e., Asian, Black, or African-American, not Hispanic, Hispanic or Latino, White, not Hispanic, Multi-racial, and Other).

21. *Type of School:* Health Professions (e.g., Nursing, Dietetics, etc.) or Other School.

Further details about these variables are presented in the table of definitions of variables (see Appendix B). This table enlists a description of the conceptual, instrumental, and operational definitions for each variable with the explanation of the research instruments and a breakdown of the specific items related to each variable.

**Instrumentation**

The Exercise Motivations Inventory-2

The objective of The Exercise Motivations Inventory-2 (EMI-2) is to assess individuals’ motives for exercising and how these motives influence exercise participation. EMI-2 is an improved version of The Exercise Motivation Inventory (EMI) developed by Markland and Hardy (1993). The EMI was developed to examine the functional significance of exercise motives from the perspective of Deci and Ryan’s (1985a) Self-Determination Theory.
The development and initial assessment of the reliability and validity of the EMI appeared to be an adequate means of assessing individuals’ participation motives. Markland and Hardy (1993) developed the original pool of EMI items from two sources. The first source was gathering responses to open-ended questions from a sample of regular exercisers (N = 76) asked to state the three main reasons why they choose to exercise (n = 45 items). The second source was derived from the Personal Incentives for Exercise Questionnaire (Duda & Tappe, 1989), or evident in the exercise motivation literature (n = 31 items). The EMI in its final set contained 44 items obtained through elimination of iterative items using exploratory factor analyses (EFA). An additional 25 items were included with the original EMI items to form the initial EMI-2 item pool. Markland and Ingledew (1997) discarded 18 original EMI items in the process of confirmatory factor analyses hypothesis-testing. As a result, the revised EMI-2 contains 51 items. The 51 items define 14 constructs measuring “a broad range of males’ and females’ exercise motives” (Markland & Ingledew, 1997, p. 374). The EMI-2 is applicable to assess the reasons that exercisers and non-exercisers might have for taking up exercise, while the EMI was useful only to individuals who currently exercise. The factorial validity and invariance of the factor structure across gender were rigorously tested using confirmatory factor analytic procedures (Markland & Ingledew, 1997). Tenenbaum, Eklund, and Kamata (2011) indicated that EMI-2 is available in seven different languages, which suggests that the instrument “holds broad appeal as a method of assessing exercise motivation reflecting the archetypal intrinsic and extrinsic distinction” (p. 298). Cronbach alpha values reported in the literature range from .56-.95; however, it appears that health pressures (α = .69; Ingledew et al., 1998; Markland &
Evidence of structural validity for responses to the EMI-2 is difficult to appraise. The different solutions reported in the literature based on factor analysis tests make it difficult to interpret the evidence informing the measurement model underpinning the EMI-2. Studies have reported the results of measurement model analyses for EMI-2 scores based on a single-factor measurement model in adolescents (Ingledew & Sullivan, 2002), grouping conceptually related EMI-2 subscales together before evaluating structural validity (Markland & Ingledew, 1997), and not using the full complement of EMI-2 items (Dacey, Baltzell, & Ziachkowsky, 2008). A series of investigations has linked more intrinsic EMI-2 motives with later stage of change pertaining to exercise adoption defined by sustained exercise behavior (Dacey et al., 2008; Ingeldew et al., 1998; Ortis et al., 2007) and higher indexes of well-being. (Maltby & Day, 2001, as cited in Tenenbaum et al., 2011, p. 298)

According to Tenenbaum et al. (2011), the EMI-2 appears to be suitable to measure a broad variety of exercise motives that predict intrinsic or extrinsic underlying motivation for exercise behavior.

The Exercise Causality Orientations Scale

The Exercise Causality Orientations Scale (ECOS) was developed by Rose et al., (2001) to assess individuals’ tendency to be autonomy, control, or impersonally oriented in the exercise domain. The ECOS used the General Causality Orientations Scale (GCOS; Deci & Ryan, 1985b) as a template. The General Causality Orientations Scale was developed to assess individual differences in motivational orientations to initiate and regulate behavior. The General Causality Orientations Scale recognizes three orientations: autonomy, control, and impersonal based on Causality Orientations Theory (Deci & Ryan, 1985a, 1985b). The causality underlying the autonomy orientation is the freedom of choice, volition, and high self-determination. The control-oriented behavior is regulated by self-imposed feeling of guilt or pressures imposed by others and low self-
determination. Finally, the impersonal orientation characterizes individuals who feel unable to regulate their behavior toward a specific outcome, thus leading to a sense of incompetence. The GCOS has acceptable internal consistency, test-retest reliability, and construct validity (Deci & Ryan, 1985b). The Cronbach’s alphas for the three subscales were 0.69 (autonomy), 0.59 (control), and 0.77 (impersonal) (as cited in Rose et al., 2001).

Unlike the GCOS, The Exercise Causality Orientations Scale is exclusively designed to measure motivational orientations within one life domain: the exercise. The ECOS in the beginning of the study was composed of nine scenarios followed by three responses. Each response corresponded to each causality orientation. Rose et al. (2001) examined the instrument using structural equation modeling, and the concurrent validity of the scale was determined by correlational analysis between its subscale and other constructs in relation to the causality orientation. After examination of correlated traits/correlated uniqueness models, they reduced the number of items in order to produce the most acceptable fit for the model. As a result, the model was reduced to seven scenarios, where the comparative fit index (0.96) indicated that the model was a good fit.

The trait-factor correlations show that autonomy and impersonal traits have a negative relationship (-0.53) and the impersonal and control traits have a positive relationship (0.55). The authors (Rose et al., 2001) agreed that these results limit the discriminant validity of the scale, but they support the notion that individuals may have a certain level of each orientation. It was expected the subscales would be related. The reliability of the seven scenarios’ correlated traits/correlated uniqueness model was autonomy 0.70, control 0.65, and impersonal 0.68, supporting the internal consistency.
A 2-month retest of the seven scenarios’ correlated traits/correlated uniqueness model proved the best fit were autonomy 0.73 (0.59-0.82), control 0.77 (0.65-0.85), and impersonal 0.71 (0.57-0.81). In conclusion, the Exercise Causality Orientations Scale was found to be a factorially valid and reliable scale for measuring causality orientations for exercise in empirical research and the applied setting (Rose et al., 2001).

**Data Collection**

Before launching the study, necessary permission was obtained from the Institutional Review Board to conduct the study using Andrews University undergraduate students. Subjects were recruited through nine instructors of undergraduate courses in both schools who agreed to assist with the study.

The study was introduced with a brief description of the research and contact information. An announcement was made before passing out the survey packets that students who would fill out the survey could also submit their name and e-mail address on a small card to participate in a drawing of six gift Visa cards of $50 each. The award drawing was to encourage their participation. Students who agreed with the informed consent received the survey packets before the end of class. Completed surveys, composed of two instruments – Exercise Motivation Inventory and Exercise Causality Orientations Scale – were handed to me as the students exited the classroom.

Out of 330 distributed surveys, 327 were returned providing a response rate of 99%. The returned surveys were scanned and the data were transferred to the Statistical Package for Social Sciences (SPSS) Version 20 for data analysis.
Data Analysis

This was a quantitative study utilizing the correlational research design. Quantitative data obtained from the surveys were analyzed using SPSS Version 20. Three statistical procedures were employed in data analysis: Descriptive Statistics, Multiple Linear Regression Analysis, and $t$ test for Independent Samples. The descriptive statistics aimed to describe the set of data based on the received responses in regard to gender, age, college level, major, and ethnicity. The Multiple Linear Regression (MLR) analysis was used to observe statistical relationship between variables to determine if their relationship is of statistical significance ($p < .05$) or not. This allowed me to test each of the three null hypotheses, and based on the findings determine whether to either accept or reject the null hypotheses. A $t$ test for Independent Samples was used to test the fourth null hypothesis to determine whether there was a significant difference in the study variables among the students from the School of Health Professions and the other schools.

Summary

This chapter presented information on the research design, data collection procedures, description of population and sampling procedures, instrumentation, hypotheses, descriptions of the research instruments (The Exercise Motivation Inventory-2 and the Exercise Causality Orientations Scale), and the statistical procedures used in data analysis.
CHAPTER IV

DATA ANALYSIS AND RESULTS

General Introduction

The purpose of this chapter is to describe the sample’s demographic characteristics and to examine the correlation between exercise motivators and exercise causality orientation profiles among Andrews University undergraduate students. In addition, its aim is to reveal if there are significant differences among the students from the School of Health Professions and other schools. This chapter is organized into five sections: (a) data collection and screening, (b) the descriptive statistics, (c) the bivariate analysis to examine correlations between variables in the study, (d) hypothesis testing, and (e) summary of the findings. The findings of this study are presented in both text form as well as tables.

Data Collection and Screening

The data were collected from 327 undergraduate students registered for the Spring 2013 semester. The returned hard-copy survey responses were scanned and imported into SPSS Version 20. The data in the SPSS were compared with hard copies of the surveys to make sure that the scanner reported each response exactly. The data were screened and then analyzed using SPSS Version 20 to test the hypotheses.
A total of 11 surveys had some missing values. Two missing values included motivation, causality, and missing data regarding demographics. Nine surveys reported data in regard to the exercise motivation but not for the exercise causality. The incomplete 11 surveys were removed from the data set of 327, leaving 316 surveys for data analysis.

Descriptive Statistics

The first step of analysis was to run descriptive statistics of the data. The subjects in this research represented two groups of Andrews University undergraduate students: students from the School of Health Professions and students from other schools. Table 1 presents the data of the three demographic characteristics: gender, ethnic group, and school attended during the Spring 2013 semester.

Table 1 reveals that the total number of undergraduate students who participated in the study was 316. The students were comprised of 182 males (57.8%) and 134 females (42.2%). In terms of the ethnic group, the larger group of 112 (35.4%) students was composed of White not Hispanic ethnicity. The second largest ethnic group was Black or African American composed of 71 (22.5%) students. The Hispanic or Latino participants, comprised of 55 (17.4%) students, emerged as the third largest group of respondents in this sample. The Asian ethnic group consisted of 45 (14.2%) students, while the Multi-racial group was composed of 22 (7%) students. The smallest group identified in the Other category accounted for 10 (3.2%) students. One of the students did not mark his or her ethnicity; therefore a total of 315 students reported their ethnicity.

The majority of students in this sample were from the majors outside of the School of Health Professions and they accounted for 219 (69.3%) students. The
### Table 1

*Demographic Statistics*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Undergraduate</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>%</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
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<td></td>
</tr>
<tr>
<td>Male</td>
<td>182</td>
<td>57.8</td>
</tr>
<tr>
<td>Female</td>
<td>134</td>
<td>42.2</td>
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<tr>
<td><strong>Ethnic Group</strong></td>
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<tr>
<td>Asian</td>
<td>45</td>
<td>14.2</td>
</tr>
<tr>
<td>Black or African American</td>
<td>71</td>
<td>22.5</td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>55</td>
<td>17.4</td>
</tr>
<tr>
<td>White not Hispanic</td>
<td>112</td>
<td>35.4</td>
</tr>
<tr>
<td>Multi-racial</td>
<td>22</td>
<td>7</td>
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<tr>
<td>Other</td>
<td>10</td>
<td>3.2</td>
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<tr>
<td>Total</td>
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<td>99.7</td>
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<tr>
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<td>3</td>
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<tr>
<td>Total</td>
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<td>100</td>
</tr>
<tr>
<td><strong>School</strong></td>
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<td></td>
</tr>
<tr>
<td>School of Health Professions</td>
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<td>29.7</td>
</tr>
<tr>
<td>Other Schools</td>
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<tr>
<td>Missing</td>
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<td>.9</td>
</tr>
<tr>
<td>Total</td>
<td>316</td>
<td>100.0</td>
</tr>
</tbody>
</table>

demographic findings showed that there were 94 (29.7%) students from the School of Health Professions. There were three (.9%) missing responses of students who did not identify whether they were from the School of Health Professions or from other schools.

Table 2 presents the descriptive statistics for the age of the 316 undergraduate students who participated in the study. The mean age of the students was 21 years of age
The majority of the study participants (75%) were no older than 21 years of age.

Table 3 presents descriptive statistics for 14 exercise motivators and three exercise causality orientations. It presents the minimum, maximum, mean, and standard deviation of the respective data.

In regard to exercise motivators, the highest mean was observed for three predictors: Positive Health ($M=4.19$, $SD=0.84$), Strength and Endurance ($M=3.92$, $SD=1.00$) and Ill-Health Avoidance ($M=3.48$, $SD=1.18$). The predictors with the lowest mean observed are: Health Pressure ($M=1.58$, $SD=1.27$), Social Recognition ($M=1.85$, $SD=1.23$), and Affiliation ($M=1.97$, $SD=1.35$). Of the three criterion exercise causality orientations variables, the highest mean was for Autonomous Orientation ($M=38.09$, $SD=6.39$). The Control Orientation appeared to be next ($M=30.5$, $SD=7.73$), and the lowest mean was observed for the Impersonal Orientation ($M=21.92$, $SD=7.51$).

The Bivariate Analysis

The pattern of correlations between the types of exercise motivation variables and the exercise causality orientation variables is presented in Table 4. The table has three parts that present the correlations between the exercise motivators and exercise causality orientation profiles, and between exercise motivators and exercise causality orientation variables.

The correlations between exercise motivation predictors range from the highest of 0.807 ($p<0.01$) to the lowest of -0.120 ($p<0.05$). The strongest inter-correlation among the predictors was observed between Enjoyment and Revitalization with a regression
Table 2

Descriptive Statistics

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>Range</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Mode</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>316</td>
<td>39</td>
<td>17</td>
<td>48</td>
<td>21.10</td>
<td>19</td>
<td>4.59</td>
</tr>
</tbody>
</table>

Table 3

Descriptive Statistics for Exercise Motivators and Exercise Causality Orientation (N=316)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive Health</td>
<td>.00</td>
<td>5.00</td>
<td>4.19</td>
<td>.84</td>
</tr>
<tr>
<td>Strength &amp; Endurance</td>
<td>.00</td>
<td>5.00</td>
<td>3.92</td>
<td>1.00</td>
</tr>
<tr>
<td>Ill-Health Avoidance</td>
<td>.00</td>
<td>5.00</td>
<td>3.48</td>
<td>1.18</td>
</tr>
<tr>
<td>Appearance</td>
<td>.00</td>
<td>5.00</td>
<td>3.42</td>
<td>1.05</td>
</tr>
<tr>
<td>Weight Management</td>
<td>.00</td>
<td>5.00</td>
<td>3.33</td>
<td>1.48</td>
</tr>
<tr>
<td>Revitalization</td>
<td>.00</td>
<td>5.00</td>
<td>3.27</td>
<td>1.15</td>
</tr>
<tr>
<td>Nimbleness</td>
<td>.00</td>
<td>5.00</td>
<td>3.25</td>
<td>1.21</td>
</tr>
<tr>
<td>Enjoyment</td>
<td>.00</td>
<td>5.00</td>
<td>3.15</td>
<td>1.29</td>
</tr>
<tr>
<td>Stress Management</td>
<td>.00</td>
<td>5.00</td>
<td>3.01</td>
<td>1.29</td>
</tr>
<tr>
<td>Challenge</td>
<td>.00</td>
<td>5.00</td>
<td>2.79</td>
<td>1.23</td>
</tr>
<tr>
<td>Competition</td>
<td>.00</td>
<td>5.00</td>
<td>2.01</td>
<td>1.60</td>
</tr>
<tr>
<td>Affiliation</td>
<td>.00</td>
<td>5.00</td>
<td>1.97</td>
<td>1.35</td>
</tr>
<tr>
<td>Social Recognition</td>
<td>.00</td>
<td>5.00</td>
<td>1.85</td>
<td>1.23</td>
</tr>
<tr>
<td>Health Pressure</td>
<td>.00</td>
<td>4.67</td>
<td>1.58</td>
<td>1.27</td>
</tr>
<tr>
<td>Autonomous Orientation</td>
<td>9.00</td>
<td>49.00</td>
<td>38.09</td>
<td>6.39</td>
</tr>
<tr>
<td>Control Orientation</td>
<td>7.00</td>
<td>49.00</td>
<td>30.50</td>
<td>7.73</td>
</tr>
<tr>
<td>Impersonal Orientation</td>
<td>7.00</td>
<td>49.00</td>
<td>21.92</td>
<td>7.51</td>
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</table>

coefficient of 0.807 (p<0.01). Enjoyment was moderately correlated with Stress Management (r=.630, p<0.01) and with Challenge (r=.575, p<0.01). Subsequently, Stress Management was correlated moderately with Revitalization (r=.649, p<0.01).
Table 4

Correlations Between Exercise Motivation and Exercise Causality Orientation Variables (n=316)

<table>
<thead>
<tr>
<th>Variable</th>
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<th>6</th>
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<th>13</th>
<th>14</th>
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<td>1. Enjoyment</td>
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<tr>
<td>2. Challenge</td>
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<td>3. Revitalization</td>
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<td>.502**</td>
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<td>4. Affiliation</td>
<td>.338**</td>
<td>.445**</td>
<td>.287**</td>
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<td>5. Competition</td>
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<td>.461**</td>
<td>.240**</td>
<td>.468**</td>
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<td>6. Social Reco</td>
<td>.277**</td>
<td>.541**</td>
<td>.248**</td>
<td>.391**</td>
<td>.570**</td>
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<tr>
<td>7. Posit Health</td>
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<td>.408**</td>
<td>.510**</td>
<td>.139*</td>
<td>.058</td>
<td>.156**</td>
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<tr>
<td>8. Stress Mgm</td>
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<td>.472**</td>
<td>.649**</td>
<td>.354**</td>
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<td>.301**</td>
<td>.453**</td>
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<td>9. Strength Endu</td>
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<td>.472**</td>
<td>.529**</td>
<td>.128*</td>
<td>.270**</td>
<td>.289**</td>
<td>.677**</td>
<td>.344**</td>
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<td>10. Nimbleness</td>
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<td>.454**</td>
<td>.340**</td>
<td>.148**</td>
<td>.135*</td>
<td>.224**</td>
<td>.486**</td>
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<td>.500**</td>
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<td>11. Appearance</td>
<td>.221**</td>
<td>.372**</td>
<td>.281**</td>
<td>.120*</td>
<td>.128*</td>
<td>.416**</td>
<td>.414**</td>
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<td>12. Weight Mngt</td>
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<td>.053</td>
<td>.065</td>
<td>-.028</td>
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<td>.258**</td>
<td>.271**</td>
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<td>.186**</td>
<td>.272**</td>
<td>.222**</td>
<td>.358**</td>
<td>.131*</td>
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<td>.417**</td>
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<td>.308**</td>
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<td>.245**</td>
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<td>.135*</td>
<td>.225**</td>
<td>.080</td>
<td>.319**</td>
<td>.217**</td>
<td>.165**</td>
<td>.134*</td>
<td>.193**</td>
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<td>.271**</td>
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<td>.095</td>
<td>.075</td>
<td>.245**</td>
<td>-.027</td>
<td>-.095</td>
<td>.416**</td>
</tr>
</tbody>
</table>

* p<0.05, ** p<0.01
A strong moderate correlation was observed between the Strength and Endurance variable and Positive Health of 0.677 ($p<0.01$). Several moderate correlations were observed for Ill-Health Avoidance and Positive Health ($r= .605, p<0.01$), Social Recognition and Competition ($r= .570, p<0.01$), Weight Management and Appearance ($r= .551, p<0.01$) and for Nimbleness and Strength and Endurance ($r=.500, p<0.01$). The two weakest correlations were found between Appearance and Affiliation ($r= .120, p<0.05$), and between Ill-Health Avoidance and Affiliation ($r= .124, p<0.05$).

The correlations between the study criterions showed a weak correlation of 0.203 ($p<0.01$) between the Control and Autonomous Orientation. However, the Control Orientation was found moderately correlated with the Impersonal Orientation ($r=.416, p<0.01$). The Impersonal Orientation had a negative correlation of -0.95 with the Autonomous Orientation; however, it was insignificant.

The correlations between the three Exercise Causality Orientations profiles and the 14 exercise motivators ranged from a moderate correlation of 0.405 ($p<0.01$) to a weak correlation of 0.128 ($p<0.05$). The four top significant moderate correlations were observed between Autonomous Orientation profile and Strength and Endurance with a coefficient of 0.405 ($p<0.01$), Positive Health ($r=.396, p<0.01$), Revitalization ($r=.308, p<0.01$), and Enjoyment ($r=.299, p<0.01$). The three weakest significant correlations were observed for Social Recognition ($r=.128, p<0.05$), Weight Management ($r=.165, p<0.01$), and Ill-Health Avoidance ($r=.179, p<0.01$).

Contrary to the previous observation, the Control Orientation had its highest correlation coefficient of 0.319 ($p<0.01$) to Social Recognition. Its next noticeable correlation of 0.312 ($p<0.01$) was to Appearance and then a slightly smaller correlation of
The three lowest correlations for Control Orientation were observed for Strength and Endurance \( (r=.134, p<0.05) \), Revitalization \( (r=.135, p<0.05) \), and Health Pressure \( (r=.137, p<0.05) \).

The Impersonal Orientation had its highest correlation of 0.271 \( (p<0.01) \) to Social Recognition, the next was to Affiliation \( (r=.263, p<0.01) \), and the lowest of 0.245 \( (p<0.01) \) to Health Pressure.

**Hypothesis Testing**

This research has four hypotheses of which three were tested using Multiple Linear Regression analysis and one using the \( t \) test for Independent Samples with SPSS 20.

**Hypothesis 1**

The first hypothesis stated that all 14 exercise motivators—enjoyment, challenge, revitalization, affiliation, competition, social recognition, positive health, stress management, strength and endurance, nimbleness, weight management, appearance, health pressure, and ill-health avoidance—are not significant predictors of autonomous orientation among Andrews University undergraduate students during the Spring 2013 semester. A Multiple Linear Regression was used to test this hypothesis. As it is presented in Table 5, it was found to be a significant model, where \( F(14, 301) = 7.27 \), significance = .000. Based on the presented analysis the first null hypothesis was rejected. The Multiple Linear Regression coefficient was .503, where \( R^2 = .253 \). The three significant predictor variables of autonomous orientation shown in Table 6 were: Affiliation \( (\beta = -.154) \), Positive Health \( (\beta = .216) \), and Strength Endurance \( (\beta = .170) \).
Table 5

**Descriptive Data for the Exercise Causality Orientation Profile Models**

<table>
<thead>
<tr>
<th>Exercise Orientations</th>
<th>$R$</th>
<th>$R^2$</th>
<th>Adjusted $R^2$</th>
<th>Standard Error</th>
<th>$F$</th>
<th>$df_1$</th>
<th>$df_2$</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Autonomous Orientation</td>
<td>.503</td>
<td>.253</td>
<td>.218</td>
<td>5.65</td>
<td>7.27</td>
<td>14</td>
<td>301</td>
<td>.000</td>
</tr>
<tr>
<td>2. Control Orientation</td>
<td>.465</td>
<td>.216</td>
<td>.179</td>
<td>7.00</td>
<td>5.92</td>
<td>14</td>
<td>301</td>
<td>.000</td>
</tr>
<tr>
<td>3. Impersonal Orientation</td>
<td>.465</td>
<td>.217</td>
<td>.180</td>
<td>6.80</td>
<td>5.95</td>
<td>14</td>
<td>301</td>
<td>.000</td>
</tr>
</tbody>
</table>

Table 6

**Significant Beta Coefficients for Exercise Causality Orientation Profile Model**

<table>
<thead>
<tr>
<th>Exercise Motives</th>
<th>Autonomous Orientation</th>
<th>Control Orientation</th>
<th>Impersonal Orientation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Enjoyment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Challenge</td>
<td></td>
<td>.154</td>
<td>.154</td>
</tr>
<tr>
<td>3. Revitalization</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Affiliation</td>
<td>-.154</td>
<td></td>
<td>.250</td>
</tr>
<tr>
<td>5. Competition</td>
<td></td>
<td></td>
<td>-.165</td>
</tr>
<tr>
<td>6. Social Recognition</td>
<td></td>
<td></td>
<td>.256</td>
</tr>
<tr>
<td>7. Positive Health</td>
<td></td>
<td>.216</td>
<td></td>
</tr>
<tr>
<td>8. Stress Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Strength Endurance</td>
<td></td>
<td>.170</td>
<td></td>
</tr>
<tr>
<td>10. Nimbleness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Appearance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Weight Management</td>
<td></td>
<td>.218</td>
<td></td>
</tr>
<tr>
<td>13. Health Pressures</td>
<td></td>
<td></td>
<td>.244</td>
</tr>
<tr>
<td>14. Ill-Health Avoidance</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Hypothesis 2

The second hypothesis stated that all 14 exercise motivators—enjoyment, challenge, revitalization, affiliation, competition, social recognition, positive health, stress management, strength and endurance, nimbleness, weight management,
appearance, health pressure, and ill-health avoidance—were not significant predictors of the control orientation among Andrews University undergraduate students during the Spring 2013 semester. A Multiple Linear Regression was used to test this hypothesis. As it is presented in Table 5, it was found to be a significant model, where $F(14, 301) = 5.92$, significance = .000. Based on the presented analysis, the second null hypothesis was rejected. The Multiple Linear Regression coefficient was .465, where $R^2 = .216$. The three significant predictor variables of control orientation as shown in Table 6 were: Affiliation ($\beta = .154$), Social Recognition ($\beta = .265$), and Weight Management ($\beta = .218$).

Hypothesis 3

The third hypothesis stated that all 14 exercise motivators—enjoyment, challenge, revitalization, affiliation, competition, social recognition, positive health, stress management, strength and endurance, nimbleness, weight management, appearance, health pressure, and ill-health avoidance—were not significant predictors of the impersonal orientation among Andrews University undergraduate students during the Spring 2013 semester. A Multiple Linear Regression was used to test this hypothesis. As it is presented in Table 5, it was found to be a significant model, where $F(14; 301) = 5.95$, significance = .000. Based on the presented analysis, the third null hypothesis was rejected. The Multiple Linear Regression coefficient was .465, where $R^2 = .217$. The four significant predictor variables of impersonal orientation shown in Table 6 were: Affiliation ($\beta = .250$), Competition ($\beta = -.165$), Social Recognition ($\beta = .256$), and Health Pressures ($\beta = .244$).
Hypothesis 4

The fourth and the last hypothesis stated that there were no significant differences in the exercise motives and exercise causality orientations among the undergraduate students from the School of Health Professions and other schools. The \( t \) test for Independent Samples was used to test the significant differences in the type of exercise motives and exercise causality orientations between the students from the School of Health Professions and from other schools. The findings shown in Table 7 indicate significant differences between the schools and the following exercise motivation variables: Enjoyment (\( t \) test = 2.016, \( df = 311 \), Sig. = .045), Revitalization (\( t \) test = 2.381, \( df = 311 \), Sig. = .018), Affiliation (\( t \) test = 2.479, \( df = 311 \), Sig. = .014), Positive Health (\( t \) test = 2.187, \( df = 311 \), Sig. = .029), Strength and Endurance (\( t \) test = 2.057, \( df = 311 \), Sig. = .041), Nimbleness (\( t \) test = 2.107, \( df = 311 \), Sig. = .036), Appearance (\( t \) test = 2.478, \( df = 311 \), Sig. = .014), and Ill Health Avoidance (\( t \) test = 2.337, \( df = 311 \), Sig. = .020).

Also, significant differences were found in the exercise causality orientation profiles. Students from the School of Health Professions were found to be significantly different in the autonomous orientation (\( t \) test = 3.357, \( df = 311 \), Sig. = .001) and control orientation (\( t \) test = 2.446, \( df = 311 \), Sig. = .015).

Major Findings of the Study

The study revealed significant exercise motivation predictor variables for three exercise causality orientation profiles – autonomous, control, and impersonal – among Andrews University undergraduate students during the Spring 2013 semester. In addition, it exposed significant differences in the exercise motives and exercise causality orientation between the students from the School of Health Professions and other schools.
Table 7

$t$ Test for Significant Difference by School

<table>
<thead>
<tr>
<th>Motives</th>
<th>School of Health</th>
<th>Other Schools</th>
<th>$t$ Test</th>
<th>$df$</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Enjoyment</td>
<td>13.47 4.81</td>
<td>2.016 5.30</td>
<td>.045</td>
<td>311</td>
<td>.045</td>
</tr>
<tr>
<td>2. Challenge</td>
<td>11.94 4.85</td>
<td>10.84 4.95</td>
<td>1.819</td>
<td>311</td>
<td>.070</td>
</tr>
<tr>
<td>3. Revitalization</td>
<td>10.49 3.17</td>
<td>9.48 3.53</td>
<td>2.381</td>
<td>311</td>
<td>.018</td>
</tr>
<tr>
<td>4. Affiliation</td>
<td>9.03 5.16</td>
<td>7.39 5.47</td>
<td>2.479</td>
<td>311</td>
<td>.014</td>
</tr>
<tr>
<td>5. Competition</td>
<td>8.84 6.81</td>
<td>7.77 6.24</td>
<td>1.353</td>
<td>311</td>
<td>.177</td>
</tr>
<tr>
<td>6. Social Recognition</td>
<td>7.66 5.02</td>
<td>7.32 4.91</td>
<td>.550</td>
<td>311</td>
<td>.583</td>
</tr>
<tr>
<td>7. Positive Health</td>
<td>13.04 2.33</td>
<td>12.36 2.61</td>
<td>2.187</td>
<td>311</td>
<td>.029</td>
</tr>
<tr>
<td>8. Stress Management</td>
<td>12.68 5.04</td>
<td>11.75 5.22</td>
<td>1.459</td>
<td>311</td>
<td>.145</td>
</tr>
<tr>
<td>10. Nimbleness</td>
<td>10.40 3.31</td>
<td>9.46 3.75</td>
<td>2.107</td>
<td>311</td>
<td>.036</td>
</tr>
<tr>
<td>11. Appearance</td>
<td>14.57 3.97</td>
<td>13.30 4.23</td>
<td>2.478</td>
<td>311</td>
<td>.014</td>
</tr>
<tr>
<td>12. Weight Management</td>
<td>14.18 5.44</td>
<td>12.94 6.10</td>
<td>1.705</td>
<td>311</td>
<td>.089</td>
</tr>
<tr>
<td>13. Health Pressures</td>
<td>4.47 3.71</td>
<td>4.89 3.87</td>
<td>-.884</td>
<td>311</td>
<td>.377</td>
</tr>
<tr>
<td>Orientation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Autonomous</td>
<td>39.91 5.63</td>
<td>37.30 6.59</td>
<td>3.357</td>
<td>311</td>
<td>.001</td>
</tr>
<tr>
<td>Orientation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Control Orientation</td>
<td>32.03 8.13</td>
<td>29.73 7.43</td>
<td>2.446</td>
<td>311</td>
<td>.015</td>
</tr>
<tr>
<td>17. Impersonal Orientation</td>
<td>20.79 6.91</td>
<td>22.45 7.75</td>
<td>-1.798</td>
<td>311</td>
<td>.073</td>
</tr>
</tbody>
</table>

The three significant exercise motivation predictors of autonomous exercise causality orientation arranged according to their importance were positive health, strength and endurance, and affiliation. Positive health and strength and endurance motives were positively correlated to the autonomous exercise causality orientation. However, the third significant exercise motivation predictor of affiliation was negatively correlated to the autonomous exercise causality orientation.

Also, three exercise motivation predictors were found to be significantly correlated with the control exercise causality orientation. The first stronger predictor was
social recognition, next, weight management, and third, affiliation. All three identified exercise motivation predictors were positively correlated to the control exercise causality orientation.

The impersonal exercise causality orientation was significantly correlated with four exercise motivation predictor variables, which were social recognition, health pressures, affiliation, and competition. Three of them were positively correlated with the impersonal exercise causality orientation. Social recognition appeared to be the highest predictor, followed by was health pressure and affiliation. The fourth one of competition was negatively correlated to the impersonal exercise causality orientation.

The study revealed significant differences in the exercise motives and exercise causality orientation between the students from the School of Health Professions and other schools. The students from the School of Health Professions were found to be significantly higher when it comes to the exercise motives and exercise causality orientation. Eight out of 14 tested exercise motivation predictors were found significantly higher in intrinsic motives such as: enjoyment, revitalization, and affiliation, and extrinsic motives such as: positive health, strength and endurance, nimbleness, appearance, and ill-health avoidance. The significant differences for the exercise causality were found to be higher for the autonomous and control exercise causality orientations. All of the above significant findings are presented in Figure 2.
Figure 2. A graphic summary of the major findings of the study.
Summary

This chapter presented the significant findings after examining the correlation between exercise motivation predictors and exercise causality orientation profiles among Andrews University undergraduate students. In addition, it exposed the significant differences in aforementioned variables among the students from the School of Health Professions and other schools.

The three significant predictor variables of autonomous orientation were: Positive Health, Strength and Endurance, and Affiliation. Positive Health and Strength and Endurance were positively correlated to the autonomous orientation, while Affiliation was negatively correlated. The control orientation had also three significant predictor variables which were: Social Recognition, Weight Management, and Affiliation. All three predictors were positively correlated with the control orientation. The four significant predictor variables of impersonal orientation were: Social Recognition, Affiliation, Health Pressures, and Competition. Only Competition was negatively correlated with impersonal orientation.

The students from the School of Health Professions were found to be significantly different from students from the other schools when examining exercise motives and exercise causality orientation. The students from the School of Health Professions scored significantly higher in intrinsic and extrinsic exercise motives than the students from other schools. They were significantly higher in two out of three exercise causality orientations: the autonomous and control orientations. There was no significant difference found for the impersonal orientation.
CHAPTER V

SUMMARY, DISCUSSION, AND
RECOMMENDATIONS

This chapter summarizes the problem and purpose of the study, the literature review, the research methodology used, and the results of this study. In addition, implications of the findings are discussed and recommendations are provided for further research in the areas of exercise motivation and exercise causality.

Summary of the Problem

High-school students are not in the fit category upon entering Andrews University. While being at Andrews University their physical fitness further declines as measured by 10 years of Microfit aggregated data (Pribis et al., 2010).

Purpose of the Study

The purpose of this study was to identify the most important exercise motivators that influence Andrews University undergraduate students’ choices and behaviors toward acquiring a more physically active lifestyle. It also sought to investigate whether the exercise causality orientation profile strength of Andrews University students was autonomous, controlled, or impersonal in the regulation of their behavior toward exercise. In addition, differences in study variables were assessed for the students from the School of Health Professions and other schools.
The results of this study have a strong potential to increase more knowledge for physical educators in order to initiate, influence, and modify students’ behavior toward enjoying physical activity.

Summary of the Literature Review

An extensive review of literature provides wide evidence that various exercise motives are pursued by individuals as a result of underlying motivation type – extrinsic or intrinsic – in regulating their exercise behavior (Deci & Ryan, 2000; Deci & Ryan, 2008; Ingledew & Markland, 2009; Ingledew & Sullivan, 2002; Markland, 1999; Markland & Hardy, 1992; Ryan et al., 1997; Kuroda et al., 2012).

Studies show that individual adherence to exercise depends on the functional significance of exercise motives from the perspective of self-determination theory (Deci & Ryan, 1985a). Exercise motives are differentiated according to the extent to which their realization will satisfy autonomy, competence, and relatedness. Highly autonomous motivational regulations yield intrinsic motivation toward exercise. For instance, exercise motives such as enjoyment, challenge, revitalization, affiliation, and competition are examples of internally informational, highly autonomous regulations and positively predict long-term exercise adherence (Teixeira et al., 2012).

In contrast, the less autonomous motivational regulations yield extrinsic motivation toward exercise. Extrinsic motivation varies with four regulations where the least self-determined is external (reward or coercion) and introjected (feeling of guilt), which are weak constructs for persistence at exercise. The subsequent motivational levels of identified regulation (subject originates the activity because it is important) and of
integrated regulation (where several identifications are assimilated and organized hierarchically) positively predict exercise participation (Teixeira et al., 2012).

Several studies showed that the lower level extrinsic motives, contrary to intrinsic, will not sustain long-term adherence to exercise or physical activity (Buckworth et al., 2007; Ingledew et al., 1998; Maltby & Day, 2001; Markland & Hardy, 1992; Ryan et al., 1997; Silva et al., 2011). However, it is possible that individuals who are experiencing intrinsic motives such as feeling of enjoyment, challenge, and affiliation may also value extrinsic motives such as improving their physical appearance (Markland & Hardy, 1992). Ingledew et al. (1998) observed that in the beginning of adopting exercise behavior, individuals may value improvement of physical appearance. While this extrinsic goal of improving the bodily appearance is important in the beginning stage of exercise, experiencing intrinsic benefits such as enjoyment is essential to maintaining exercise behavior long-term (Ingledew et al., 1998).

Based on Self-Determination Theory, the individuals’ desire to initiate and maintain exercise behavior will be subjective to their individual exercise causality orientation profile (Ryan & Deci, 1985a, 1985b). Lived personal experiences often will affect positively or negatively their sense of autonomy, competence, and relatedness underlying the motivation toward physical activity (Mouratidis, Vansteenkiste, Lens, & Sideridis, 2008). For example, a study done by Chatzisarantis and Hagger (2009) with 215 British students showed that students’ autonomous regulation toward exercise can be enhanced. Only students in the autonomy-supportive condition, by receiving choice in exercise and encouragement, demonstrated increased participation in exercise. There was
no change in exercise behavior regulation among the students who were in the neutral condition (Chatzisarantis & Hagger, 2009).

Several other studies suggested that controlled motivation (i.e., external and introjected) and amotivation have been associated with students’ boredom and unhappiness (Mouratidis et al., 2008; Ntoumanis, 2001; Standage et al., 2005, as cited in Chatzisarantis & Hagger, 2009). The degree to which individuals internalize their reasons for engaging and adhering to exercise may depend on the level of fulfillment of their psychological needs (Deci & Ryan, 1985a, 1991; Ryan & Deci, 2000, 2002). Deci and Ryan (1985b) stated that it is not realistic to classify people on the basis of one of the causality profile orientations. They suggested that people may have different orientations in different life contexts, where each person may have a predominant causality orientation. They may be predominantly autonomous, controlled, or impersonal within different life domains (Deci & Ryan, 1985b).

Exercise studies showed that the level of fulfillment of the three basic psychological needs of autonomy, competence and relatedness among secondary students, college students, and adults will affect their exercise causality orientation profile (Aaltonen et al., 2013; Collins et al., 2010; Dupont et al., 2009; Kwan et al., 2011; Thøgersen-Ntoumani & Ntoumanis, 2006). It will either foster intrinsic and higher levels of extrinsic motivation or increase external pressures to avoid consequences (reward or coercion).

Exercise programs which encourage choice, offer task-mastering climate, and peer support will promote self-determination to exercise. As a result there will be an increase in enjoyment among its participants. The feeling of enjoyment will boost their intrinsic and
higher levels of extrinsic regulation toward exercise (Edmunds et al., 2008). Researchers agree that promoting high levels of self-determination in exercise will foster long-term exercise participation (Ames, 1992; Kimball et al., 2009; Moreno Murcia et al., 2008; Standage et al., 2005).

A lack of competence and autonomous regulation is characteristic of inactive individuals. A recent cross-sectional and longitudinal designs study (2,308 participants) conducted by Aaltoen et al. (2013) compared motivation of physically active and inactive individuals. Only participants who were less active scored low on the self-determined motives related to mastery, enjoyment, relatedness, better fitness, and appearance. The study revealed that the less active group regulated externally their behavior toward physical activity by following and trying to please others.

Summary of Methodology

A quantitative correlational research design was utilized for this study. A total of 23 variables were studied. These variables were measured using validated and established instruments. The first instrument, named the Exercise Motivation Inventory-2, was used to study the 14 exercise motivators, while the second instrument studied three exercise causality orientation variables using the Exercise Causality Orientations Scale. The four remaining variables measured the demographics of the sample.

The data for this study were obtained from 316 undergraduate students registered for the Spring 2013 semester at Andrews University. After IRB (Institutional Review Board) approval, hard-copy surveys were administered and collected in the classrooms during the last week of March and the first week of April 2013. The sample was composed of 94 (29.7%) respondents from the School of Health Professions and 219 (69.3%)
respondents from other schools. The studied sample consisted of 316 undergraduate students with ages ranging from 17 to 48 years (\(M=21.10, \ SD=4.59\)). The students were comprised of 182 males (57.8%) and 134 females (42.2%). The sample ethnic groups were composed of 112 (35.4%) White not Hispanic, 71 (22.5%) Black or African American, 55 (17.4%) Hispanic, 45 (14.2%) Asian, 22 (7%) Multi-racial, and 10 (3.2%) in the Other category. One respondent did not mark his or her ethnicity; therefore a total of 315 students reported their ethnicity. There were three (.9%) missing responses of students who did not identify whether they were from the School of Health Professions or the other schools.

The data analysis employed Multiple Linear Regression Analysis to examine the correlation between exercise motivation predictors and exercise causality orientation profiles among Andrews University (AU) undergraduate students. The \(t\) test for Independent Sample revealed significant differences in the exercise motives and exercise causality orientation between the students from the School of Health Professions and the students from other schools.

**Summary and Discussion of the Results**

**Research Hypothesis 1**

Research hypothesis 1 proposed: *All 14 exercise motivators—enjoyment, challenge, revitalization, affiliation, competition, social recognition, positive health, stress management, strength and endurance, nimbleness, weight management, appearance, health pressure, and ill-health avoidance—are significant predictors of the autonomy construct of exercise causality orientation among Andrews University undergraduate students during the Spring 2013 semester.*
This study revealed a linear relationship between the 14 exercise motivators and the autonomy construct of exercise causality orientation among AU undergraduate students \((F=7.27, p<.000)\). The 14-predictor model was found to be significant and it explained 25.3% of the variance of autonomous orientation toward exercise among AU students. The three significant predictor variables of autonomous orientation in the 14-predictor model were Positive Health \((\beta=.216)\), Strength and Endurance \((\beta=.170)\), and Affiliation \((\beta= -.154)\). The first two predictors were positively correlated, while the third of Affiliation was negatively correlated to the autonomous construct. Positive Health and Strength and Endurance represent higher levels of extrinsic motivation according to existing research and are considered of autonomous regulation. Further, these motivators foster exercise adoption and maintenance (Buckworth et al., 2007; Deci & Ryan, 2000; Ingledew & Markland, 2008; Markland & Hardy, 1992; Ryan et al., 1997).

Contrary to the existing research where affiliation is an example of highly autonomous regulation (Teixeira et al., 2012), the affiliation predictor in this study was negatively correlated with the autonomous orientation. This may suggest that forming a community with people to enjoy the social aspect of exercise did not appeal to AU students with autonomous orientation. Limited availability due to time schedules may be the involved factor.

Research Hypothesis 2

Research hypothesis 2 proposed: All 14 exercise motivators—enjoyment, challenge, revitalization, affiliation, competition, social recognition, positive health, stress management, strength and endurance, nimbleness, weight management, appearance, health pressure, and ill-health avoidance—are significant predictors of the control
This study found a linear relationship between the 14 exercise motivators and the autonomy construct of exercise causality orientation among AU undergraduate students \((F=5.92, p<.000)\). The 14-predictor model was found to be significant and it explained 21.6\% of the variance of control orientation toward exercise among AU students. The three significant predictor variables of control orientation in the 14-predictor model were Social Recognition \((\beta=.265)\), Weight Management \((\beta=.218)\), and Affiliation \((\beta=.154)\). All three predictors were positively correlated to the control orientation construct.

These findings are coherent with the existing evidence relating Social Recognition and Weight Management participatory motives to exercise as being associated with control regulation of exercise (Ingledew et al., 2009). Ingledew and Markland (2008) found that Weight Management motive reflected external regulation, which had a negative impact on long-term exercise participation. Also, Social Recognition predicted more positively external regulation and showed no impact on long-term exercise participation (Ingledew et al., 2009; Ingledew & Markland, 2008).

The Affiliation variable was the third significant predictor of control orientation. Another study proposed that the Affiliation motive is important to individuals who appear to value the social aspect of support and encouragement to engage in exercise behavior (Woolford et al., 2012). This may suggest the importance of providing exercise programs which emphasize support and encouragement for students within weight management. Offering exercise programs with appropriate support and encouragement to enable them to experience social recognition may induce students’ exercise behavior and perhaps allow
them to move toward autonomous orientation as they experience enjoyment in exercise participation.

Research Hypothesis 3

Research hypothesis 3 proposed: All 14 exercise motivators—enjoyment, challenge, revitalization, affiliation, competition, social recognition, positive health, stress management, strength and endurance, nimbleness, weight management, appearance, health pressure, and ill-health avoidance—are significant predictors of the impersonal construct of exercise causality orientation among Andrews University undergraduate students during the Spring 2013 semester.

This study also revealed a linear relationship between the 14 exercise motivators and autonomy construct of exercise causality orientation among AU undergraduate students ($F=5.95$, $p<.000$). The 14-predictor model was found to be significant and it explained 21.7% of the variance of impersonal orientation toward exercise among AU students. The four significant predictor variables of impersonal orientation in the 14-predictor model were Social Recognition ($\beta=.256$), Affiliation ($\beta=.250$), Health Pressures ($\beta=.244$), and Competition ($\beta=-.165$). These findings presented mixed results, where the first two predictors of impersonal exercise causality are contrary to the existing research. Thus, Social Recognition and Affiliation were associated with control or autonomous orientation but not impersonal (Standage et al., 2005). A recent cross-sectional and longitudinal designs study, conducted by Aaltonen et al. (2013), compared motivation of physically active and inactive individuals. Only participants who were less active scored low on the self-determined motives including relatedness. The study revealed that the less
active group regulated externally their behavior toward physical activity by following and trying to please others.

The third predictor of the Health Pressure motive in research has been indicative of control orientation toward exercise. Markland and Ingledew (1997) found that individuals can adopt exercise under the pressure to improve their health but it does not predict long-term exercise adherence. The fourth significant predictor was Competition and it had a negative relationship to the impersonal orientation. This finding seems to be consistent with previous results which indicate that the competition motive is highly informational and characteristic of autonomous orientation to exercise. It has a negative relationship toward impersonal orientation to exercise (Deci & Ryan, 1985a, Markland & Hardy, 1992; Teixeira et al., 2012). This may suggest that this particular group prefers to be with individuals having similar exercise orientation in non-competitive situations.

Research Hypothesis 4

Research hypothesis 4 proposed: There are significant differences in the type of exercise motives and exercise causality orientation among the undergraduate students from the School of Health Professions and other schools.

There were significant differences between the students from the School of Health Professions and other schools in 8 out of 14 exercise motives and in two out of three exercise causality orientation profiles. The significant exercise motivation predictors were: enjoyment, revitalization, affiliation, positive health, strength and endurance, nimbleness, appearance, and ill-health avoidance. The significant exercise causality orientation criterions were autonomous and control. Students from the School of Health Professions
were found to value exercise participatory motives characteristic of intrinsic and higher levels of extrinsic regulations.

Enjoyment, revitalization, and affiliation motives are examples of intrinsic motivation for individuals who are autonomously orientated toward exercise (Ingledew & Markland, 2009). The exercise participatory motives of positive health, strength and endurance, nimbleness, and ill-health avoidance, according to Ingledew and Markland (2009), are distinctive of identified regulation toward exercise. Intrinsic and higher extrinsic regulations are found in research to be indicators of self-determination toward exercise (Deci & Ryan, 2000; Ingledew & Markland, 2009; Ingledew & Sullivan, 2002; Kuroda et al., 2012; Markland, 1999; Markland & Hardy, 1992; Ryan et al., 1997). Deci and Ryan (1985a) explained that individuals who participate in exercise because it is important and valued behavior display a higher level of extrinsic motivation than do individuals who participate for external reward or who are coerced to exercise. Obviously, students who pursue health majors are driven by interest and importance to engage in exercise behavior which is not valued the same by students from other schools.

The results of this study allowed extending the limited knowledge about the valued exercise motives among Andrews University undergraduate students. Further, it examined how these motives predict students’ level of motivation toward exercise as measured by the Exercise Causality Orientations Scale. The differences in exercise motives and exercise causality among students from the School of Health Professions and other schools were assessed.

Students in the autonomous orientation profile valued significantly two exercise motives of Positive Health and Strength and Endurance. The third significant exercise
motive of Affiliation had an inverse relationship to their autonomous orientation toward exercise. Positive Health and Strength and Endurance motives are referred to as higher levels of extrinsic motivation. These motives yield autonomous regulation toward exercise. Wide research evidence showed that these motivators foster exercise adoption and maintenance (Buckworth et al., 2007; Deci & Ryan, 2000; Ingledew & Markland, 2008; Markland & Hardy, 1992; Ryan et al., 1997).

Contrary to the existing research where affiliation is an example of highly autonomous regulation (Teixeira et al., 2012), the affiliation predictor in this study was negatively correlated with the autonomous orientation. This may suggest that forming a relationship with people to enjoy the social aspect of exercise did not appeal to AU students with autonomous orientation. Limited availability due to time schedules may be the involved factor.

For the control exercise causality orientation the significant predictors were Social Recognition, Weight Management, and Affiliation. All three predictors were positively correlated to the control orientation construct. These findings are coherent with the existing evidence relating Social Recognition and Weight Management participatory motives to exercise as being associated with control regulation of exercise (Ingledew et al., 2009). According to research, individuals motivated toward exercise by motives of social recognition and weight management are seeking external results (Ingledew & Markland, 2008). Lack of being recognized for fitness achievements or unsuccessful efforts to lose weight to maintain a desired body weight can lead to amotivation and relapses and therefore does not offer long-term exercise participation.
The Affiliation variable, the third significant predictor of control orientation group, suggests that these particular students appear to value the social aspect of support and encouragement to engage in exercise behavior. Research confirms that experiencing friendly associations within the exercise context promotes successful exercise adherence (Woolford et al., 2012). This may propose the importance of providing exercise programs which emphasize support and encouragement for students who want to lose weight. Offering result-driven weight management exercise courses for college credit with a personalized approach, appropriate support, and social recognition may enhance students’ exercise behavior. The final suggestion is to help this group personally experience improvement and enjoyment in exercise participation.

The findings revealed four significant exercise motives to be predictors of impersonal exercise causality orientation. The impersonal orientation group was positively predicted by Social Recognition, Affiliation, and Health Pressures, and inversely by Competition. These findings presented mixed results according to existing research, where Social Recognition and Affiliation were associated with control or autonomous orientation but not impersonal (Standage et al., 2005). However, a recent cross-sectional and longitudinal designs study, conducted by Aaltoen et al. (2013), revealed that the less active individuals regulated externally their behavior toward physical activity by following and trying to please others. The finding of the Health Pressure motive as being a significant predictor of impersonal orientation is consistent with existing research. Markland and Ingledew (1997) found that individuals can adopt exercise under the pressure to improve their health but it does not predict long-term exercise adherence.
The fourth significant predictor of the competition motive was inversely related to the impersonal orientation. This finding seems to be consistent with previous results which indicate that trying to win a reward or seek a rivalry in exercise is characteristic of autonomous and not an impersonal orientation to exercise (Deci & Ryan, 1985a; Markland & Hardy, 1992; Teixeira et al., 2012). This may suggest that this particular group prefers to be with individuals having a similar exercise orientation in non-competitive situations. Creating a cooperating class climate that avoids social comparison and emphasizes effort and gradual and measurable personal improvement may help participants get more involved in exercise behavior.

In order to motivate this particular group, smaller and personalized exercise programs utilizing participants’ dispositional motives should be considered. Providing encouragement through group social support with incentives to be recognized for exercise behavior is worthy to be explored. Giving volition in undertaking physical activities based on students’ needs and interest may help them step up from impersonal to a more motivated behavior toward exercise. This approach may consider finding practical ways to increase their perceived value of exercise and ultimately their commitment to be active.

It may be essential to offer opportunity in exercise classes to experience measured physiological and psychological improvements. Implementation of strategies and instructional methods based on meeting students’ basic psychological needs for autonomy, competence, and relatedness is recommended to create a motivational climate toward physical activity (Deci & Ryan, 1985a, 1985b; Merklin, 2010; Markland & Hardy, 1992; Moreno Murcia et al., 2008; Ntoumanis & Standage, 2009; Ntoumanis & Biddle, 1999).
Finally, students from the School of Health Professions were found to value exercise participatory motives characteristic of intrinsic and higher levels of extrinsic regulations when compared with students from other schools. The significant exercise causality predictors’ characteristic of intrinsic and higher extrinsic motives were: enjoyment, revitalization, affiliation, positive health, strength and endurance, nimbleness, and ill-health avoidance (Ingledew & Markland, 2009).

Intrinsic and higher extrinsic regulations are found in research to be indicators of self-determination or autonomous orientation toward exercise (Deci & Ryan, 2000; Ingledew & Markland, 2009; Ingledew & Sullivan, 2002; Kuroda et al., 2012; Markland, 1999; Markland & Hardy, 1992; Ryan et al., 1997). Deci and Ryan (1985a) explained that individuals who participate in exercise because it is important and a valued behavior display a higher level of extrinsic motivation. Obviously, students who pursue health majors are driven by interest and importance to engage in exercise behavior which is not valued the same by students from other schools. These findings suggest that students from other schools should be provided with activities that facilitate the adoption of behaviors and exercise activities to increase their interest in health and physical activities.

**Recommendations for Practice**

The findings from this study suggest the importance of increasing AU students’ self-determined motivation toward exercise. This can be achieved by promoting active healthy lifestyles by offering physical education courses which utilize the Self-Determination Theory. The premise of this theory is that humans have a need to be autonomous, competent, and build relations with other people. Depending on the level that these needs have been met in students during elementary and secondary schools, different
exercise motives will be valued and pursued by students as they enter college. Thus, the findings of this study suggest that there is a need to:

1. Promote motives of positive health, and strength and endurance to students in all your classes.

2. Offer affiliation and social recognition within weight management exercise courses.

3. Create a non-competitive class climate and offer incentives to increase commitment to be active.

4. Implement strategies and instructional methods based on meeting students’ basic psychological needs of having choice, and experiencing improvement and support.

5. Offer fitness courses or physical activities which require social interactions and collaboration. For example, pair more fit persons with less fit persons to increase accountability.

6. Provide a wide choice of fitness courses that focus on decreasing boredom and increasing enjoyment in exercise participation.

7. Provide students outside of the School of Health Professions with activities that facilitate the adoption of behaviors and exercise activities to increase their interest in health and physical activities.

8. Encourage teachers of fitness classes to be an authoritative model in what they teach.

There is a great need to assess the students’ exercise motivators and exercise causality orientation profiles in the beginning and at the end of each fitness course to find out whether the exercise motivators and exercise behaviors have been enhanced. This
would allow assessing whether the course instruction added more enjoyment to students’ motivational experience by promoting the three basic psychological needs for choice, improvement, and support.

In closing, effective health promotion or physical activity courses should include motivations that promote exercise participation and adherence throughout life. It would be desirable to see enjoyment, challenge, revitalization, and affiliation to be the significant exercise motive predictors of autonomous exercise orientation among AU undergraduate students.

**Recommendations for Research**

This study of exercise participatory motives and exercise causality orientation profiles appears to be the first study addressing the motivational regulations to exercise among Andrews University students. Clearly, more research will need to be conducted to address these important motivations and exercise adherence issues.

Specifically, it would be valuable to check the generalizability of these findings and compare with a similar research at universities which do not emphasize the importance of healthy lifestyle. In addition, gender differences should be studied since appearance is an important motive for exercise behavior among women.

The motivational exercise behavior changes also could be compared to fitness changes made during the fitness course, such as increases in strength, flexibility, balance, and spatial orientation. Adding a qualitative research study to obtain more in-depth information from personal interviews with students should be considered.
APPENDIX A

IRB APPROVAL
March 22, 2013

Anna Piskozub
Tel: 269-471-3019
Email: Piskozub@andrews.edu

RE: APPLICATION FOR APPROVAL OF RESEARCH INVOLVING HUMAN SUBJECTS
IRB Protocol #: 13-049  Application Type: Original  Dept.: Nutrition and Wellness
Review Category: Exempt  Action Taken: Approved  Advisor: Tevni Grajaes
Title: Exercise Motivators and Exercise Causality among Andrews University Students: A Correlational Study

Your IRB application for approval of research involving human subjects entitled: “Exercise Motivators and Exercise Causality among Andrews University Students: A Correlational Study” IRB protocol # 13-049 has been evaluated and determined Exempt from IRB review. You may now proceed with your research.

Please note that any future changes made to the study design and/or informed consent form require prior approval from the IRB before such changes can be implemented. Incase you need to make changes please use the attached report form.

While there appears to be no more than minimum risks with your study, should an incidence occur that results in a research-related adverse reaction and/or physical injury, this must be reported immediately in writing to the IRB. Any research-related physical injury must also be reported immediately to the University Physician, Dr. Hamel, by calling (269) 473-2222.

We ask that you reference the protocol number in any future correspondence regarding this study for easy retrieval of information.

Best wishes in your research.

Sincerely,

Sarah Kimakwa
Research Integrity & Compliance Officer
IRB Office
APPENDIX B

TABLE OF OPERATIONALIZATION OF VARIABLES
Table of Operationalization of Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Conceptual Definition</th>
<th>Instrumental Definition</th>
<th>Operational Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enjoyment</td>
<td>A state of positive or pleasant emotions which result in feelings of satisfaction, self-actualization, fun and exhilaration resulted by participation in exercise. This state includes thoughts, feelings and exercise behavior.</td>
<td>This variable will be measured using the Exercise Motivations Inventory – 2 (EMI – 2) (Markland &amp; Ingledew, 1997). EMI – 2 has 14 variables that measures individual motives for exercise behavior through 51 items. Each variable has its own subscale with assigned items. The enjoyment subscale has 4 items: 1. Because I enjoy the feeling of exerting myself. (9) 2. Because I find exercising satisfying in and of itself. (23) 3. For enjoyment of the experience of exercising. (37) 4. Because I feel at my best when exercising. (48)</td>
<td>This variable will be measured by subscale composed of 4 items on a 6-point Likert-type scale. The value in items have the following meaning: 0 = Not at all true for me 1 2 3 4 5 = Very true for me Scoring strategies: To obtain mean score, the subscale will be summed up and the total will divided by the number of items.</td>
</tr>
<tr>
<td>Challenge</td>
<td>A state of emotions imbued with a sense of difficulty and contest in order to experience improvement by</td>
<td>This variable will be measured using the Exercise Motivations Inventory – 2 (EMI – 2) (Markland &amp; Ingledew, 1997). The challenge subscale has 4 items: 1. To give me goals to work towards. (14)</td>
<td>This variable will be measured by subscale composed of 4 items on a 6-point Likert-type scale. The value in items have the</td>
</tr>
</tbody>
</table>
reaching a goal, mastering a skill and measuring up to a personally set standard. This state includes thoughts, feelings, actions and exercise behavior.

2. To give me personal challenges to face. (28) 3. To develop personal skills (42) 4. To measure myself against personal standards. (51)

Following meaning:

0 = Not at all true for me
1
2
3
4
5 = Very true for me

Scoring strategies:

To obtain mean scores, each subscale will be summed up and the total will divided by the number of items.

Revitalization

A physical and mental condition of vitality or vigor. This condition includes thoughts, feelings, actions, and exercise behavior.

This variable will be measured using the Exercise Motivations Inventory – 2 (EMI – 2) (Markland & Ingledew, 1997). The revitalization subscale has 3 items:

1. Because it makes me feel good. (3) 2. Because I find exercising invigorating. (17) 3. To recharge my batteries. (31)

Affiliation

To form a community with people in order to experience friendly associations within exercise context. This state includes thoughts, feelings, and an effort to relate to others and

This variable will be measured using the Exercise Motivations Inventory – 2 (EMI – 2) (Markland & Ingledew, 1997). The revitalization subscale has 3 items:

1. To spend time with friends. (10) 2. To enjoy the social aspects of exercising. (24) 3. To have fun being active with other people. (38) 4. To make new friends. (49)

This variable will be measured by subscale composed of 4 items on a 6-point Likert-type scale.

Same as above.
<table>
<thead>
<tr>
<th>Category</th>
<th>Definition</th>
<th>Measurement</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competition</td>
<td>A state of emotions imbibed by the act of competing for dominion or a reward. This state includes thoughts, feelings, actions, exercise behavior to stand out.</td>
<td>This variable will be measured using the Exercise Motivations Inventory – 2 (EMI – 2) (Markland &amp; Ingledew, 1997). The competition subscale has 4 items: 1. Because I like trying to win in physical activities. (12) 2. Because I enjoy competing. (26) 3. Because I enjoy physical competition. (40) 4. Because I find physical activities fun, especially when competition is involved. (50)</td>
<td>Same as above.</td>
</tr>
<tr>
<td>Social Recognition</td>
<td>The acknowledgement of setting personally higher level of fitness achievement than others. This state includes thoughts, feelings, actions, and exercise behavior.</td>
<td>This variable will be measured using the Exercise Motivations Inventory – 2 (EMI – 2) (Markland &amp; Ingledew, 1997). The social regulation subscale has 4 items: 1. To show my worth to others. (5) 2. To compare my abilities with other peoples’. (19) 3. To gain recognition for my accomplishments. (33) 4. To accomplish things that others are incapable of. (45)</td>
<td>Same as above.</td>
</tr>
<tr>
<td>Positive Health</td>
<td>A state of physical and mental vitality and freedom from disease or ailment. This state includes thoughts, feelings, actions, exercise behavior.</td>
<td>This variable will be measured using the Exercise Motivations Inventory – 2 (EMI – 2) (Markland &amp; Ingledew, 1997). The positive health subscale has 3 items: 1. To have a healthy body. (7) 2. Because I want to maintain good health. (21) 3. To feel more healthy. (35)</td>
<td>This variable will be measured by subscale composed of 3 items on a 6-point Likert-type scale.</td>
</tr>
<tr>
<td>Stress Management</td>
<td>A predetermined strategy for coping</td>
<td>This variable will be measured using the Exercise Motivations Inventory – 2 (EMI – 2) (Markland &amp; Ingledew, 1997). The stress management subscale has 3 items: 1. To reduce stress. (10) 2. Because I want to be less stressed. (24) 3. To feel less anxious. (38)</td>
<td>Same as above.</td>
</tr>
</tbody>
</table>
with psychological or emotional worries. This state includes thoughts, feelings, actions, and exercise behavior. Ingledew, 1997). The stress management subscale has 4 items:

1. To give me space to think. (6)
2. Because it helps to reduce tension. (20)
3. To help manage stress. (34)
4. To release tension. (46)

Strength & Endurance

A state of feeling and being physically strong with capability for exertion or endurance in exercise. This state includes thoughts, feelings, actions, and exercise behavior. This variable will be measured using the Exercise Motivations Inventory – 2 (EMI – 2) (Markland & Ingledew, 1997). The strength and endurance subscale has 4 items:

1. To build my strength. (8)
2. To increase my endurance. (22)
3. To get stronger. (36)
4. To develop my muscles. (47)

Nimbleness

A state of physical functionality characterized by being swift and flexible. This state includes thoughts, feelings, actions, and exercise behavior. This variable will be measured using the Exercise Motivations Inventory – 2 (EMI – 2) (Markland & Ingledew, 1997). The nimbleness subscale has 3 items:

1. To stay become more agile. (13)
2. To maintain flexibility. (27)
3. To stay/become flexible. (41)

Appearance

The outward or visible aspect of a person. Individuals who seek enhancement of their physical appearance. This variable will be measured using the Exercise Motivations Inventory – 2 (EMI – 2) (Markland & Ingledew, 1997). The appearance subscale has 4 items:

1. To help me look younger. (4)
will seek bodily improvements through exercise. This state includes thoughts, feelings, actions, and exercise behavior.

Weight Management
Is a state of an individual effort made to lose weight or to maintain the desired body weight. This state includes thoughts, feelings, actions, and exercise behavior.

This variable will be measured using the Exercise Motivations Inventory – 2 (EMI – 2) (Markland & Ingledew, 1997). The weight management subscale has 4 items:
1. To stay slim. (1)
2. To lose weight. (15)
3. To help control my weight. (29)
4. Because exercise helps me burn calories. (43)

Health Pressures
Individual who is informed that lack of exercise puts him/her into a health risk feels pressured to improve their health through exercise. This state includes thoughts, feelings, actions and exercise behavior.

This variable will be measured using the Exercise Motivations Inventory – 2 (EMI – 2) (Markland & Ingledew, 1997). The health pressures subscale has 3 items:
1. Because my doctor advised me to exercise. (11)
2. To help prevent an illness that runs in my family. (25)
3. To help recover from illness/injury. (39)

Ill-health Avoidance
It is individual action to improve their health and prevent diseases and sickness. This state includes thoughts, feelings, actions and exercise behavior.

This variable will be measured using the Exercise Motivations Inventory – 2 (EMI – 2) (Markland & Ingledew, 1997). The ill-health avoidance subscale has 3 items:
1. To avoid ill-health. (2)
Autonomous Orientation

Individuals seek out opportunities to be self-determining, regard the characteristics of events as sources of information to regulate their chosen behavior, and regulate their actions on the basis of personal goals and interests (Rose, Markland & Parfitt, 2001). Self-determined goals and interests regulate behavior and actions that seek growth and improvement through exercise adherence.

This variable will be measured using the Exercise Causality Orientations Scale (ECOS) (Rose, Markland & Parfitt, 2001). The instrument comprises 7 scenarios/scales with 3 responses/items under each scenario. There are a total of 21 items. The autonomy orientation has a total of 7 items, where one item derives from each scenario/scale. Causality orientations theory adopts a multidimensional view of personality. That is why individuals are not going to be categorized according to types (e.g. autonomy oriented versus control oriented) only will be profiled according to the strength of the orientation they exhibit. Scores will be obtained for each orientation. The strength of each orientation is calculated by summing scores on each orientation item response. The autonomy profile is comprised of the following items under each scenario:

1. Decide for yourself which type of exercise you would like to complete. (Scenario 1; Item 2)
2. As a way to measure your progress and to feel proud of your achievements. (Scenario 2; Item 2)
3. Evaluate your own performance and provide yourself with positive feedback. (Scenario 3; Item 2)
4. Employ your own strategies to motivate yourself. (Scenario 4, Item 3)
5. Set your own realistic but challenging goals. (Scenario 5, Item 1)
6. What do I think is the best option for me. (Scenario 6, Item 2)

This variable will be measured by one of three items listed under each of the seven scenarios/scales. The items in this scale are scored on a 7-point Likert-type scale.

1 = Very unlikely
2
3
4 = Moderately likely
5
6
7 = Very likely

Scoring strategies:

Scores will be obtained for autonomy orientation by summing scores.
How you are feeling whilst exercising at the intensity you choose. (Scenario 7, Item 3)

This variable will be measured using the Exercise Causality Orientations Scale (ECOS) (Rose, Markland & Parfitt, 2001). The instrument comprises 7 scenarios/scales with 3 responses/items under each scenario. The control orientation profile is comprised of the following items under each scenario:

1. Attend a structured exercise class where an exercise leader is telling you what to do. (Scenario 1, Item 1)
2. As a way a way of pressurizing yourself to exercise. (Scenario 2, Item 3)
3. Be given a lot of praise and encouragement from others. (Scenario 3, Item 1)
4. Approach someone to help motivate you. (Scenario 4, Item 1)
5. Make someone important to you set goals for you to aim for. (Scenario 5, Item 2)
6. What do you (the exercise leader) think I should do? (Scenario 6, Item 1)
7. The intensity you have been told to exercise at (Scenario 7, Item 1)

This variable will be measured by one of three items listed under each of the seven scenarios/scales. The items in this scale are scored on a 7-point Likert-type scale.

Scoring strategies:
Scores will be obtained for control orientation by summing scores.

Impersonal Orientation
Individuals feel that they are unable to regulate their behavior to achieve desired outcomes, leading to a sense of incompetence

This variable will be measured using the Exercise Causality Orientations Scale (ECOS) (Rose, Markland & Parfitt, 2001). The instrument comprises 7 scenarios/scales with 3 responses/items under each scenario. The impersonal orientation profile is comprised of the following items under each scenario:
and helplessness (Rose, Markland & Parfitt, 2001). The feeling of inadequacy in exercise leads to amotivation.

1. Tag along with your friends and do what they do. (Scenario 1, Item 3)  
2. As a reminder of how incapable you are at fulfilling the task. (Scenario 2, Item 1)  
3. Just hope that what you are doing is correct. (Scenario 3, Item 3)  
4. Ignore the problem, nothing can be done to improve your motivation (Scenario 4, Item 2)  
5. Not set goals because you may not be able to live up to them. (Scenario 5, Item 3)  
6. What has everyone else done in the past? (Scenario 6, Item 3)  
7. What everyone around you is doing. (Scenario 7, Item 2)

Scores will be obtained for impersonal orientation by summing scores.

Gender: The gender of the individual completing the survey.

What is your sex? Male, Female

Values are:
Male = 1
Female = 2

Nominal variable

Participant’s Age: The age of the individual completing the survey.

How old are you? (18-100)

Values are:
18-100

Interval scale variable

Ethnicity: Groups identified by the United States Bureau of the Census on the base of race or ethnic background.

My ethnicity is:
1. Asian
2. Black or African American, not Hispanic
3. Hispanic or Latino

Participants will be identified according to their chosen ethnicity.

Values are:
1 = Asian
2 = Black or African American

Participant will be identified according to their chosen ethnicity.
4. White not Hispanic
5. Multi-racial
6. Other

This variable is included in the ECOS instrument. Participants will be asked to indicate if their major is from the School of Health Professions or Other School.

My major is offered by:
1. School of Health Professions
2. Other School

Participants will be identified according to the school. Values are:
1 = School of Health Professions
2 = Other School

Nominal variable
APPENDIX C

INFORMATION TO BE READ TO THE STUDENTS
Dear Students,

I am conducting research on exercise motives and exercise causality orientation profiles among Andrews University undergraduate students. In order to participate in this study you must be 18-years of age or older. You must also complete two short questionnaires. Your voluntary participation is requested so I may learn more about the attitudes and behaviors toward exercise. The insight gained from this study may help in creating programs which will enhance the fitness participation at Andrews University and promote well-being through all life stages.

Completing 2 questionnaires will take approximately 15-20 minutes. In order to ensure anonymity I ask that you do not include your name anywhere on the questionnaires. However, as a token of appreciation there will be a drawing where six students will receive a gift visa card of $50.00 each. If you choose to participate in the drawing write your name and e-mail address on the card attached to the top of the survey packet. When you bring the completed surveys to the next class period, remove the card from the completed survey and drop it in a designated box placed next to the box for collecting the completed surveys.

Again, your participation is voluntary and you may choose to not answer all of the questions on the questionnaire or stop the survey. There is no harm or risk involved in completing this survey. If decide to participate by completing the survey, you will give informed consent.

If you have any questions pertaining to this study, please contact Anna Piskozub at piskozub@andrews.edu. You can also contact my adviser, Dr. Winston Craig at 269-471-3351 or e-mail him at wcraig@andrews.edu. This research is carried out under the oversight of the Andrews University’s Institutional Review Board (IRB). Any inquiries about research participant’s rights may be addressed to IRB by calling 269-471-6361.

Thank you for taking time to participate in this research.
APPENDIX D

RESEARCH INSTRUMENTS
The Exercise Motivations Inventory - 2

Below are a number of statements concerning the reasons people often give when asked why they exercise. Whether you currently exercise regularly or not, please read each statement carefully and indicate, by blackening in the appropriate circle, whether or not each statement is true for you personally, or would be true for you personally if you did exercise. If you do not consider a statement to be true for you at all, blacken the ‘0’ circle. If you think that a statement is very true for you indeed, blacken the ‘5’. If you think that a statement is partly true for you, then blacken the ‘1’, ‘2’, ‘3’, or ‘4’ circles, according to how strongly you feel that it reflects why you exercise or might exercise.

Remember, we want to know why you personally choose to exercise or might choose to exercise, not whether you think the statements are good reasons for anybody to exercise.

<table>
<thead>
<tr>
<th>Personally, I exercise (or might exercise) . . .</th>
<th>Not at all true for me</th>
<th>Very true for me</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. To stay slim</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. To avoid illness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Because it makes me feel good</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. To help me look younger</td>
<td></td>
<td></td>
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<tr>
<td>5. To show my worth to others</td>
<td></td>
<td></td>
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<tr>
<td>6. To give me space to think</td>
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<td></td>
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<tr>
<td>7. To have a healthy body</td>
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<td></td>
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<tr>
<td>8. To build up my strength</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Because I enjoy the feeling of exerting myself</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. To spend time with friends</td>
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<td></td>
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<tr>
<td>11. Because my doctor advises me to exercise</td>
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<td></td>
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<tr>
<td>12. Because I like trying to win in physical activities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. To stay/become more agile</td>
<td></td>
<td></td>
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<tr>
<td>14. To give me goals to work towards</td>
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<tr>
<td>15. To lose weight</td>
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<tr>
<td>16. To prevent health problems</td>
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<td>17. Because I find exercise invigorating</td>
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<td>18. To have a good body</td>
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<td>19. To compare my abilities with other peoples’</td>
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<tr>
<td>20. Because it helps to reduce tension</td>
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<td>21. Because I want to maintain good health</td>
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<td>22. To increase my endurance</td>
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<tr>
<td>23. Because I find exercising satisfying in and of itself</td>
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<td>24. To enjoy the social aspects of exercising</td>
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<td>25. To help prevent an illness that runs in my family</td>
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<tr>
<td>26. Because I enjoy competing</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Personally, I exercise (or might exercise) . . .</th>
<th>Not at all true for me</th>
<th>Very true for me</th>
</tr>
</thead>
<tbody>
<tr>
<td>27. To maintain flexibility</td>
<td></td>
<td></td>
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<tr>
<td>28. To give me personal challenges to face</td>
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<td>29. To help control my weight</td>
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<td>30. To avoid heart disease</td>
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<td>31. To recharge my batteries</td>
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<td>32. To improve my appearance</td>
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<td>33. To gain recognition for my accomplishments</td>
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<tr>
<td>34. To help manage stress</td>
<td></td>
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<tr>
<td>35. To feel more healthy</td>
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<tr>
<td>36. To get stronger</td>
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<tr>
<td>37. For enjoyment of the experience of exercising</td>
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<tr>
<td>38. To have fun being active with other people</td>
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<tr>
<td>39. To help recover from an illness/injury</td>
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<tr>
<td>40. Because I enjoy physical competition</td>
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<tr>
<td>41. To stay/become flexible</td>
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<tr>
<td>42. To develop personal skills</td>
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<tr>
<td>43. Because exercise helps me to burn calories</td>
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<tr>
<td>44. To look more attractive</td>
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<tr>
<td>45. To accomplish things that others are incapable of doing</td>
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<tr>
<td>46. To release tension</td>
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<tr>
<td>47. To develop my muscles</td>
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<tr>
<td>48. Because I feel at my best when exercising</td>
<td></td>
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<tr>
<td>49. To make new friends</td>
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<tr>
<td>50. Because I find physical activities fun, especially when competition is involved</td>
<td></td>
<td></td>
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<tr>
<td>51. To measure myself against personal standards</td>
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Please complete the back side of this sheet.
The Exercise Causality Orientation Scale

Below are a series of situations that people can find themselves in with regard to exercising. Each situation is followed by three responses (a, b, and c) that represent different ways in which people could react. Please imagine yourself in each situation and block the circle by the number on the scale below EACH response (a, b, and c) to indicate the extent to which EACH response would be characteristic of you in that situation. There are no right or wrong answers and no trick questions. We simply want to know the extent to which you think you would react in these different ways to each situation.

1. You are beginning a new exercise program. You are likely to:
   a) Attend a structured exercise class where an exercise leader is telling you what to do.
   b) Decide for yourself which types of exercise you would like to complete.
   c) Tag along with your friends and do what they do.

2. You are asked to keep a record of all the weekly exercise you have completed in an exercise diary. You are likely to view the diary:
   a) As a reminder of how incapable you are at fulfilling the task.
   b) As a way to measure your progress and to feel proud of your achievements.
   c) As a way of pressuring yourself to exercise.

3. In order to monitor how well you are doing in an exercise program you are likely to want to:
   a) Be given a lot of praise and encouragement from others.
   b) Evaluate your own performance and provide yourself with positive feedback.
   c) Just hope that what you are doing is correct.

4. You have been exercising regularly for 6 months but recently you have been missing sessions and are finding it hard to get motivated to exercise. You are likely to:
   a) Approach someone to help motivate you.
   b) Ignore the problem, nothing can be done to improve your motivation.
   c) Employ your own strategies to motivate yourself.

5. You have been told that setting goals is a good way to motivate yourself to exercise. You would likely:
   a) Set your own realistic but challenging goals.
   b) Make someone important to you set goals for you to aim for.
   c) Not set goals because you may not be able to live up to them.

6. During a discussion with an exercise consultant he/she presents many options on the best way for you to exercise to achieve fitness and health benefits. It is likely that your first thought would be:
   a) What do you (the exercise leader) think I should do?
   b) What do I think is the best option for me?
   c) What has everyone else done in the past?

7. During an exercise session how hard you are working out is likely to be governed by:
   a) The intensity you have been told to exercise at.
   b) What everyone around you is doing.
   c) How you are feeling while exercising at the intensity you choose.

---

It helps us to have basic personal information about those who complete this questionnaire. We would be grateful for the following information:

1. Your age
   [ ] 0
   [ ] 1
   [ ] 2
   [ ] 3
   [ ] 4
   [ ] 5
   [ ] 6
   [ ] 7
   [ ] 8
   [ ] 9

2. Your gender
   [ ] Female
   [ ] Male

3. Your ethnicity
   [ ] Asian
   [ ] Black or African-American, not Hispanic
   [ ] Hispanic or Latino
   [ ] White, not Hispanic
   [ ] Multiracial
   [ ] Other

4. Your school
   [ ] School of Health Professions
   [ ] Other School
Dear Anna,

We have not explicitly defined the EMI-2 constructs as we think that they are self-evident from the scale names and items.

Best regards,
David Markland

On 20/02/2013 18:13, Anna Piskozub wrote:
> Dr. Markland,
> I really need your help in finding out where I can find the conceptual definitions of the variables used in EMI-2.
> Are the definitions of these variables listed in your research article published in Personality and Individual Differences:
> *The exercise motivations inventory: Preliminary development and validity of a measure of individuals' reasons for participation in regular physical exercise*?
> Please reply to my e-mail.
> Thank you very much!
> Anna
> Anna T. Piskozub
> Graduate Service Coordinator
> School of Education
> Andrews University
> Seek Knowledge, Affirm Faith, Change the World

David Markland, PhD, C.Psychol
Director of Postgraduate Research
REFERENCE LIST


CURRICULUM VITA

Anna T. Piskozub

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EDUCATION

M.S. in Nutrition and Wellness, 2013
School of Health Professions, Andrews University, Berrien Springs, MI

B.A. in Business Administration, 2008
Atlantic Union College, South Lancaster, MA

PROFESSIONAL CERTIFICATION

Personal Trainer, American Council on Exercise
Mat Pilates Instructor, Balanced Body University
Aerobics Instructor, ZUMBA

WORK EXPERIENCE

Coordinator for Graduate Programs Services, School of Education, Andrews University, Berrien Springs, MI (1995—Present)

Change Your Body, Owner, Berrien Springs, MI (2003—Present)


Billing Specialist, Sidley & Austin, Chicago, IL (1987—1995)