COLLEGE STUDENTS' MOTIVATION FOR PHYSICAL ACTIVITY

A Dissertation

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Lori Lynn DeLong
B.A., Louisiana College, 1995
M.Ed., University of Louisiana at Monroe, 1997
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ABSTRACT

The purpose of this study was to examine college students' motivations to be physically active by merging the perspectives of self-determination theory and the transtheoretical model. The secondary purpose was to examine the effects of a required physical activity course on college students' levels of physical activity. The premise is that both the theory and model can be used to help predict physical activity outcomes. Participants were 277 male and female students at a small private college. Motivation, self-determination, stage of change, self-efficacy, decisional balance, and leisure time activity levels were assessed using an online survey. Results revealed that activity levels did vary across stages of change and that the participants became more self-determined as they moved across the stages of change. Intrinsic motives were predictors of self-determination and motives were found to differ across the stages of change. Decisional balance scores were higher in the later stages of change (maintenance, action, and preparation) while the self-efficacy scores were lower in the early stages (contemplation and precontemplation) than all other stages. No significant group differences were found between students who had or had not completed the physical activity course for RAI, decisional balance, and self-efficacy. However, group differences in motives revealed that interest/enjoyment, competence, and social motives were rated as more important by those who had taken the course than those who had not. There were no differences on self-reported levels of physical activity. Results suggest that currently used approaches in required courses may not be effective in increasing physical activity levels of college students. The incorporation of the transtheoretical model with self-determination theory provides a framework to investigate the motivational levels of college students and could be incorporated in attempts to improve the effectiveness of required courses designed to facilitate their pursuit of a lifetime of physical activity.

CHAPTER 1: INTRODUCTION

According to *Physical Activity Among Adults: United States, 2000* one in five adults engage in high levels of activity, but one in four are largely inactive (United States Department of Health and Human Services, [USDHHS], 2003). This report, along with many others including the Surgeon General's Report (USDHHS, 1996) that identified physical inactivity as a major health risk factor, document the magnitude of health problems that are compounded by the lack of physical activity. Daily physical activity on a moderate basis is recommended for people of all ages. The National Center for Chronic Disease Prevention and Health Promotion (USDHHS, 1996) reports that nearly half of American youths aged 12-21 years are not vigorously active on a regular basis, with 14% of young people reporting no recent physical activity.

Morrow, Krzewinski-Malone, Jackson, Bungum, and Fitzgerald (2004) found that adults have knowledge of traditional physical activities but have little understanding of lifestyle physical activities. They concluded that there is a need for more education about the latest physical activity and exercise recommendations. To reach the United States' goals for Healthy People 2010 (USDHHS, 2000), programs to promote the adoption of healthful physical activity are essential. There is a gap in the research concerning how to maximize the effectiveness of programs to foster individual exercise adherence.

Several public health initiatives have begun to address this issue. For example, the American College Health Association sponsored a task force on the National Health Objectives that developed a campaign in conjunction with Healthy People 2010 (USDHHS, 2000) called Healthy Campus 2010: Making It Happen (American College Health Association, 2000). The stated mission is to encourage institutions of higher education to make health objectives a

priority by recommending strategies, providing information, and promoting health programs. Ten major objectives were identified, with physical activity designated as the number one health issue in colleges.

Increasing physical activity in the college-aged population is a priority. Only 13 out of 125 state institutions of higher learning surveyed by Kittleson and Ragon (1984) required a health-related course for graduation. According to Pearman et al. (1997), a required lifetime health and physical education course had positive effects on alumni's physical activity levels. More research is needed to investigate how required health and physical education courses can increase students' physical activity levels as compared to those students who have not taken the course. The purpose of this study was to examine motivational constructs in a college population where students are required to take a physical fitness course for graduation. The findings will guide efforts to identify and develop effective strategies that can be used to facilitate adoption of active lifestyles for the college aged population that will carry over into adulthood. Students' levels of physical activity and exercise motivation were explored using Self-Determination theory (Deci & Ryan, 1985) as an organizing framework. The Transtheoretical Model (Prochaska & Velicer, 1997) was integrated with Self-Determination Theory to examine how motivation changes as individuals become physically active.

Self-Determination Theory

Self-Determination Theory (SDT) provides a framework for the study of motives for physical activity. Deci and Ryan (1985) developed SDT to examine how different types of motivation lead to varying degrees of self-determination. Intrinsic and extrinsic motivation make up the continuum that distinguishes individual self-determination (Carron, Hausenblas, & Estabrooks, 2003; Vallerand & Losier, 1999). Along this continuum, amotivation - the absence

of motivation for an activity - is at one extreme, and intrinsic motivation - the motivation to do an activity for its own sake or for the pleasure it provides - is at the other extreme, and levels of extrinsic motivation fall between these extremes.

Intrinsic motivation is the highest level of self-determination. To be intrinsically motivated one must deem the activity as being enjoyable or interesting (Deci & Ryan, 1985; Ryan & Deci, 2000; Vallerand & Losier, 1999). Individuals who exercise for the enjoyment of the activity are those who are intrinsically motivated. They enjoy pushing themselves to the limits of physical activity. Individuals who are intrinsically motivated to exercise do not do so to achieve an outcome. Rather they engage in physical activity as an end in itself.

Many individuals who exercise, however, do so for extrinsic reasons. Those who are extrinsically motivated perform the activity for some benefit they will receive or to avoid negative consequences (Deci & Ryan, 1985; Ryan & Deci, 2000; Vlachopoulos, Karageorghis, & Terry, 2000). At varying levels of extrinsic motivation, the degree of internalization increases as one moves along the continuum toward intrinsic motivation (Landry & Solmon, 2002).

Extrinsic motivation is multidimensional in nature, as it has been categorized into four types or levels of regulation: external regulation, introjected regulation, identified regulation, and integrated regulation. External regulation is at the lower end of the continuum closest to amotivation. At this level of regulation, motivation is spurred solely by rewards or avoidance of punishment. At the next level, introjected motivation, the action is more internalized, but is still linked to external reasons. The activity is beginning to take on value, but individuals engage out of guilt or obligation rather than choice (Deci & Ryan, 1985).

Identified regulation occurs when individuals freely choose to participate in an activity because they begin to value it and feel that it is important. Individuals who fall in this category exercise because they value the benefits of exercise. At this level, the individual is moving closer to becoming more self-determined and is approaching an autonomous level (Biddle, 1999; Ryan & Deci, 2000). The highest form of extrinsic motivation, closest to intrinsic motivation, is integrated regulation. The two are very similar, but individuals who are motivated at a level of integrated regulation do not exercise for the sake of the activity itself, but instead, regulate their behavior to achieve some outcome, such as to improve or maintain fitness.

Extrinsic motivation helps to explain the reasons people participate voluntarily in exercise without ever seeming to enjoy the activity (Wilson & Rodgers, 2002). This continuum demonstrates how an individual can feel quite self-determined in his/her regulation of exercise but yet be extrinsically motivated to perform the exercise for reasons such as improving appearance, maintaining fitness, or losing weight (Mullan & Markland, 1997).

As individuals move along the continuum toward higher levels of self-determination and intrinsic motivation, Deci and Ryan (1985) identified three important psychological needs that facilitate more internalized forms of self-determination (Biddle, 1999; Carron, Hausenblas, & Estabrooks, 2003; Ryan & Deci, 2000). These needs are autonomy, competence, and relatedness. An individual's motivational state, wherever it lies along the continuum between amotivation and intrinsic motivation, can be described by the extent to which these needs are met (Kilpatrick, Hebert, & Jacobsen, 2002).

Autonomy is the independence to choose for oneself what behavior or activity in which to engage (Levesque, Stanek, Zuehlke, & Ryan, 2004). Autonomous exercise motives are the reasons that individuals engage in higher levels of physical activity (Mullan & Markland, 1997;

Ingledew, Markland, & Medley, 1998; Wilson, Rodgers, Fraser, & Murray, 2004). Individuals need to feel as if they are in control and not being controlled. Autonomous actions are more flexible and allow individuals to be more creative in their exercise programs than do controlled actions.

Competence is the belief that one is capable of producing a desired outcome (Ferrer-Caja & Weiss, 2000). Individuals must perceive their activities from a self-determined (i.e. autonomous) point of view for perceived competence to be influenced and motivation to be internalized. Relatedness refers to how close one feels to others. Characterized as a bi-directional construct, it encompasses not only being cared for, but also caring for others. Ryan and Deci (2000) describe the components of relatedness as the quality of relationships with others, feeling understood, participating in meaningful dialogue, and having fun with others. Markland (1999) argues that it is important to create self-determining conditions for exercise classes that include autonomy, relatedness, and competence.

Motives For Physical Activity. Self-determination theory can be utilized to help understand why students engage in physical activity and if they intend to exercise in the future. To understand, one must identify the type of motivation the student possesses that will influence the activities selected, the effort and adherence portrayed, and the effects of the experience (Carron et al., 2003). However, a person's motives for physical activity are also important. The most common motives identified are to improve or maintain health, improve physical appearance, experience enjoyment, enjoy a social experience, and obtain psychological benefits (Ryan, Fredrick, Lepes, Rubio, & Sheldon, 1997). Adherence to motives that are extrinsically motivated (i.e. improving physical appearance) may not be as enduring as those that are intrinsic (i.e. enjoyment, social, and psychological) (Ryan, et al., 1997). The individual's perception of

autonomy is a determining factor. If the individual perceives that he/she lacks control and free choice, then the likelihood of adherence decreases.

Several studies have used self-determination theory as a framework to investigate the physical activity behaviors of college students. In a cross-cultural study, Levesque et al. (2004) investigated the role of autonomy and competence in university students from Germany and the U.S. The measures of autonomy and competence, as well as motivational causes were found to be applicable across cultures. Positive informational feedback and lower perceived pressure were positively related to perceived autonomy and competence. Wilson et al. (2004) found that exercise regulations discriminated between motivational consequences among college men and women, with women having stronger introjected regulations than men. However, identified regulation was found to be the most important predictor of exercise in both sexes. This study is consistent with previous studies that have provided evidence that exercise regulations can differentiate in predicting motivational consequences for both men and women (Fredrick & Ryan, 1993; Ingledew et al., 1998).

College aged women, specifically, have been targeted as an interest group in exercise research. Wilson and Rodgers (2002) studied the relationship between autonomous exercise motives and physical self-esteem in collegiate female exercise participants. Females who were higher in identified regulation and/or intrinsically motivated reported higher levels of self-esteem, whereas those females who exercised for extrinsic reasons reported lower levels of self-esteem. There was also a positive relationship between autonomous exercise motives and self-esteem. Women who valued the important health outcomes of exercise or those who found exercising to be self-rewarding and fun were likely to have higher self-esteem.

Similar findings were reported by Maltby and Day (2001) when they surveyed male and female undergraduate students. They found that extrinsic exercise motives were significantly related to poorer psychological well-being, where as, intrinsic motives were accompanied by higher levels of psychological well-being. The difference lies in their beliefs about how exercise is internalized. Individuals internalize exercise motivation over time. Maltby and Day (2001) suggest that the change is causal and a more integrative relationship occurs. They argue that exercise motives and psychological well-being interact, leading to a reinforcement of positive feelings that causes exercise to become more rewarding, thus more internalized.

The goal is for individuals to progress through the continuum of motivation until their motives become internalized, which is crucial for adherence. Individuals' motives for exercise do change over time from extrinsic to more intrinsic motives (Maltby & Day, 2001). The stages of change in the Transtheoretical model is one framework that has been used to examine the shift from extrinsic to intrinsic motives (Mullen & Markland, 1997).

Transtheoretical Model

The transtheoretical model is a psychological framework that evaluates an individual's readiness to change a behavior (Glanz et al., 1994). It focuses on the decision making of the individual and is a model of intentional change (Velicer, Prochaska, Fava, Norman, & Redding, 1998). This model is composed of four main dimensions: stages of change, processes of change, self-efficacy, and decisional balance (Cardinal & Kosma, 2004; Cardinal, Tuominen, & Rintala, 2004; Kosma, Cardinal, & Rintala, 2002) with the central organizing framework being the stages of change (Dannecker, Hausenblas, Connaughton, & Lovins, 2003; Marcus, Eaton, Rossi, & Harlow, 1994; Prochaska & Velicer, 1997). The processes of change are an influential variable in the transtheoretical model but were not a focus of this study.

Stages Of Change. The stages of change approach has frequently been applied in the health field because it uses stages to track changes in behavior over time. This approach recognizes that behavior change requires both time and motivation because individuals vary in their readiness to make a change. The stages of change model is used as an effective tool in developing interventions that are specific to individual needs (Velicer et al., 1998). The assumption is that there are five stages through which individuals progress in order to change behavior (Cardinal & Kosma, 2004; Carron et al., 2003; Dannecker, etal., 2003; Dishman, 1994; Mullan & Markland, 1997).

The five stages range from the individual having no thoughts to changing a behavior (precontemplation) to the final stage where an individual actively engages in the new behavior (maintenance). The first stage is precontemplation where there is no indication that a change will be made. In contemplation, the second stage, individuals intend to make changes within the next six months. The third stage is the preparation stage, where the individual plans to change the behavior within the next month. In the action stage, an individual is actively engaged in the new behavior. When the person has sustained the behavior for a period exceeding six months, she or he progresses to the maintenance stage. These stages of change are seen as cyclic, meaning that an individual may regress through the stages many times before the change is achieved and sustained (DiClemente, 1993; Mullan & Markland, 1997).

Researchers have begun to use the stage of change framework in studies that target universities and college aged students. Cardinal et al. (2002) conducted an evaluation of a university course designed to promote exercise behavior. Students currently enrolled in a 10-week lifetime fitness for health (LFH) course were compared with students who had previously

completed the LFH course and students with no prior experience with the LFH course. Regardless of the group, there were no significant improvements in exercise activity from pre- to post-intervention. The results were discouraging, as the change in stages of change or exercise behavior over the ten week course was minimal. However, an implication was that the participants' stages of change for exercise may be an important moderating variable associated with exercise behavior change. Cardinal et al. (2002) suggested that behavioral skill development be taught in the course to encourage lifelong fitness.

Other studies have involved ethnically diverse college students (Suminski & Petosa, 2002), sedentary college students (Rosen, 2000), and African-American college women (Juniper, Oman, Hamm, & Kerby, 2004). Suminski and Petosa (2002) reported that there were higher percentages of minorities in the precontemplation and contemplation stages than White students. Sedentary students who reported positive intentions to begin exercising were more likely to act on the intent leading to regular exercise which is consistent with the model's stages of change. Intention to exercise is predictive of being physically active later when the subject has prior experience with exercise (Rosen, 2000). African-American women's levels of physical activity varied among the stages of change in the study by Juniper et al. (2004). In the precontemplation stage, perceived barriers were significantly higher; where as, perceived severity, cues to action, and self-efficacy were significantly lower.

Decisional Balance. Decisional Balance (Janis & Mann, 1977) reflects an individual's struggle to weigh the pros and cons of an activity or changing of an activity (Velicer, DiClemente, Prochaska, & Brandenberg, 1985). Specifically to exercise, it can be thought of as a balance between the benefits and costs of exercising. This balance changes as an individual

makes his or her way through the stages of change. It has been hypothesized that decisional balance (pros minus the cons) increases from precontemplation to maintenance, with a shift occurring between the preparation and action stages where the pros eventually outweigh the cons (Prochaska & Velicer, 1997).

The changing of stages does not occur in a linear fashion, rather individuals may progress and regress through the stages. As individuals attempt to adopt change, they either succeed or fail in those efforts, affecting their cognitive and behavioral processes of change, which also causes the decisional balance to shift. For most behavioral changes, it is difficult to adhere because the sacrifices (cons) are immediate and the benefits (pros) are not. During precontemplation, an individual may be easily persuaded by the cons of not exercising. They may feel that exercise is too hard and not worth the effort. As one begins to exercise and progresses from preparation to action, the pros for exercising begin to outweigh the cons on the decisional balance scale. Finally, as one moves toward maintenance, one has to concentrate on the pros of exercising to keep the scale tipped in favor of the activity or one might increase their risk of relapse (Plotnikoff, Blanchard, Hotz, & Rhodes, 2001).

Self-Efficacy. Self-efficacy is the belief or perception an individual has of his or her own ability to complete a given task (Bandura, 1982). In the constructs of the transtheoretical model and exercise, self-efficacy is the belief or confidence that one can overcome obstacles to participate in exercise (Leenders, Silver, White, Buckworth, & Sherman, 2002; Marcus et al., 1992). Bandura (1982) proposed that motivation to perform a certain behavior was based on two factors: expectations of outcome and cognitions about self-efficacy. Research has consistently shown self-efficacy to be the strongest predictor of exercise behavior (Buckworth, Granello, & Belmore, 2002; Marcus & Owen, 1992; Sullum et al., 2000).

Self-efficacy increases significantly from the precontemplation stage of change to the maintenance stage. Those individuals with low perceived confidence in their ability to exercise are more likely to be inactive compared to those with high levels of perceived confidence (Leenders etal., 2002; Silver, Buckworth, Kirby, & Sherman, 2000). Recent research has shown that self-efficacy accounts for the majority of variance between the stages of change and exercise (Cardinal, etal., 2004; Marshal & Biddle, 2001; Wallace & Buckworth, 2001). Self-efficacy has consistently been positively associated with being physically active, stage of change for physical activity, and adherence to physical activity programs (USDHHS, 1996). Research findings have supported the premise that self-efficacy is predictive of exercise adherence in college students with a low self-efficacy resulting in a greater likelihood of relapse (Sullum et al., 2000).

Self-Determination Theory Across Stages Of Change

Four studies to date have examined the relationship between self-determination theory and stages of change. Ingledew, Markland, and Medley (1998) examined the relationship between exercise motivation and stages of change and found that extrinsic motivation was the highest in the action stage, and it tended to be low in the maintenance stage. In a sample of adult men and women, individuals who were in the first three stages of change were less self-determined than those who were in the action and maintenance stages (Mullan & Markland, 1997). Landry and Solmon (2004) found similar results among older African-American women as did Matsumoto and Takenaka (2004) in a Japanese sample. In Japan, less than 30% of the total population exercised for 30 minutes a day, more than twice a week. This study focused on motivational profiles and stages of change in exercise behavior. Those who were more self-determined were in the maintenance stage as they were more internally motivated to exercise, which led to maintaining behavior for long-term regular exercise (Matsumoto & Takenaka,

2004). These findings support the notion that self-determination increases across the stages of change in exercise.

College-aged years are a critical time when young adults make decisions about how active they will be in their everyday lives. There is evidence that more self-determined individuals are more likely to be active on a regular basis, in that levels of self-determination are higher in later stages of change. There has been only limited investigation of the motivation of college students to be physically active, and given that this is a critical period, more study is needed at this age level. Required college courses that teach the benefits of physical activity and encourage students to be active through interventions based on theoretical perspectives could be a way to increase self-determination that should foster long-term motivation. Investigations examining the efficacy of these required courses have not supported the notion that the classes are effective. It is important to begin a line of investigation to examine not only predictors of college students' levels of physical activity, but also to develop strategies about how course content can be structured to maximize the effectiveness of those required courses.

The purpose of this study was to examine college students' motivations to be physically active by merging the perspectives of the self-determination theory and transtheoretical model. A secondary purpose was to examine the effects of a required physical activity course on college students' levels of physical activity. It was hypothesized that:

1. Self-reported physical activity would vary as a function of stage of change.
2. Higher levels of self-regulation would discriminate between the stages of change.
3. Decisional balance and self-efficacy would be positive predictors of self-determination.
4. Intrinsic motives for physical activity would be positive predictors of self-determination.

5. Motives, decisional balance, and self-efficacy would vary as a function of stages of change.
6. A required college physical activity class would positively influence college students' motivation and engagement in physical activity.

CHAPTER 2: METHODOLOGY

Participants

Eight hundred and seventy-two students from a small private college were invited to participate in the study. Three hundred and six students initiated the survey but only 277 (115 male and 162 female) students completed all sections. This was a 32% return rate of the total enrollment for the spring semester. The mean age of the students was 20.63 years old. There was a good distribution of current student classifications with 56 Freshmen, 74 Sophomore, 69 Juniors, and 78 Seniors.

Setting

The small, private college where data were collected is located in a small city in the Southeastern United States. It is a liberal arts college that has a religious affiliation. The enrollment is typically around 1,000 students, although there were fewer students enrolled during the semester data were collected. A majority of students live on campus and are female. The largest majors on campus are biology and health and physical education. All full-time students have a membership to an athletic health club that is located on campus and is open from 5 am to 10pm. The fitness/health facility is owned and run through a partnership with a local hospital and contains a basketball court, two racquetball courts, a lap swimming pool, weight room, aerobic rooms, spin room, massage room, saunas, hot tubs, an indoor walking/running track, cardio-equipment, doctor offices, physical therapy offices and a child care center.

At this institution, a personal fitness class is required of all students to graduate. This class focuses primarily on cardiovascular fitness while incorporating all components of physical fitness. These classes meet twice a week for the duration of the semester for approximately 50 minutes, and are taught by a qualified health and physical education professor. The grades for

the class are determined by aerobic fitness category (scores on 1 ½ mile run test), a written test, attainment of five personal health goals, and completion of all items in the physical fitness appraisal (pre and post scores for body composition, grip strength, sit and reach, 30 second sit-up, blood pressure, weight, and 1 ½ mile run test). Students also log cardiovascular aerobic points everyday as a part of their physical fitness appraisal and they are encouraged to get their blood chemistry tested for bonus points. Students are encouraged to attend the different aerobic and cycling classes available to them at the fitness facility to obtain their aerobic points.

Two hundred and nine participants completed the class while sixty-eight had not. Permission was obtained through the Institutional Review Board and participants were provided informed consent via the web-based survey.

Instrumentation

Six instruments used in this study assessed self-reported levels of self-determination, motivation, stage of change, self-efficacy, decisional balance, and leisure-time exercise levels. In addition to these surveys, informational data were gathered to assess student's involvement and perceptions of the required personal fitness class.

Behavioral Regulation In Exercise Questionnaire (BREQ). The BREQ was used to assess levels of self-determination to be physically active. The BREQ is a fifteen item questionnaire that measures extrinsic and intrinsic motivation to exercise (Mullan & Markland, 1997; Mullan, Markland, & Ingledew, 1997). It coincides with the self-determination continuum to include questions that measure external regulation ("I exercise because other people say I should"), introjected regulation ("I feel guilty when I don't exercise"), identified regulation ("I value the benefits of exercise"), and intrinsic motivation ("I exercise because it's fun."). It is scored on a five point Likert scale ranging from one (not true for me) to five (very true for me).

Previous research has supported the validity and reliability of the BREQ predicting motives of exercise behavior (Mullan & Markland, 1997; Wilson & Rodgers, 2002; Wilson, Rodgers, & Fraser, 2002). The subscales can be analyzed separately, and may also be combined in to a single measure, called the Relative Autonomy Index (RAI) using the following formula: 2(intrinsic motivation) + identified regulation -introjected regulation - 2(external regulation).

Motives For Physical Activity Measure - Revised (MPAM-R). The MPAM-R is a 30-item questionnaire that assesses five motives for participating in physical activity. These motives are interest/enjoyment ("Because it's fun"), competence ("Because I like engaging in activities which physically challenge me"), appearance ("Because I want to look or maintain weight so I look better"), fitness ("Because I want to be physically fit"), and social ("Because I want to be with my friends"). Scores are assessed on a seven-point Likert scale ranging from one (not at all true for me) to seven (very true for me). This scale is a revision of an earlier measure (Fredrick & Ryan, 1993). The revisions have been validated by Ryan, Fredrick, Lepes, Rubio, and Sheldon (1997).

Physical Activity Stages of Change Questionnaire (PASCQ). The PASCQ (Marcus & Simkin, 1993) consists of four items representing the five stages of change in the transtheoretical model. The student was asked to answer four questions which reflected their current exercise behaviors. For example, physical activity was defined and then the student was asked to reply yes or no to "I am currently physically active" and "I intend to become more physically active in the next 6 months." Regular physical activity was then defined and the student was asked to answer yes or no to "I currently engage in regular physical activity" and "I have been regularly physically active for the past 6 months." The answers were assessed by a scoring algorithm. For example, a student would be in the precontemplation stage if they

answered no to the first two questions. For a student to be in the maintenance stage, they had to answer yes to questions one, three, and four. The scoring algorithm determined the students' particular stage at the time they completed the questionnaire , however, this questionnaire has been shown to be stable over a 2-week period (Marcus & Forsyth, 2003).

The Decisional Balance Scale (DBS). The Decisional Balance Scale (DBS; Marcus, Rakowski, & Rossi, 1992) assesses one's attitudes (pros and cons) towards exercise. The pros represent the advantages of exercise while the cons represent the disadvantages. Participants are asked to indicate how important each question is in their decision to exercise by using a five-point Likert scale (1 = not at all important, 5 = extremely important). An example of a pro question is "Regular exercise would help me relieve tension or stress" and a con question is "I would have less time for my family and friends if I exercised regularly." The scale is scored by adding the responses to the pro questions, the responses to the con questions, and then by subtracting the con total from the pro total to create a decisional balance difference score. Plotnikoff et al. (2001) conducted a longitudinal study across populations to test the validity and reliability of the decisional balance scales in exercise. Content, factorial, concurrent, and construct validity along with internal consistency were established for the scale.

Physical Exercise Self-Efficacy Scale (PESES). The Physical Exercise Self-efficacy scale (PESES, Schwarzer & Renner, 2004; Brown, 2005) has been used in recent research as a measure used to assess self-efficacy and exercise. The PESES is a five item scale that is measured on a four point Likert scale (1 = very uncertain, 4 = very certain). The scale is set up with a question at the beginning that asks "How certain are you that you could overcome the following barriers?" The opening question is followed by the statement, "I can manage to carry out my exercise intentions,.....", which is followed by five phrases that conclude the

statement: "1. even when I have worries and problems. 2. even if I feel depressed. 3. ...tense. 4. ...tired. 5. ...busy." Brown (2005) found that item-total correlations were good (r = .4 to .76) and internal consistency was excellent (Cronbach's alpha = .88). Validity was supported by a moderate correlation with exercise intention (r = .33) and physical activity behavior (r = .39) at a 6 month follow-up.

Weekly Leisure Time Exercise Questionnaire. This is a self-report measure that the students reported how many times during a 7-day period they participated in strenuous (running, jogging, heart beat rapidly), moderate (fast walking, tennis, not exhausting), and mild (yoga, golf, minimal effort) physical activity for more than 15 minutes (Godin & Shephard, 1985). An exercise index score is calculated by multiplying each reported exercise session by its metabolic equivalent tasks (METS) and summing the results. The formula is as follows: Weekly leisure activity score = (9 x Strenuous) + (5 x Moderate) + (3 x Light). The second part of this measure asks how often one engages in regular activity that works up a sweat and makes heart beat rapidly. Godin and Shephard (1985) reported a 2-week test-retest reliability of .74 for the measure. Cardinal, Jacques, and Levy (2002) also reported modest reliability coefficients at pre- and post-test with a Cronbach's alpha coefficients of .47 and .44, respectively.

Procedures

Data was collected during the months of April and May via a web–based survey. Participants were informed of the purpose of the study via a mass email sent to all students registered for the spring semester. The researcher provided an email address and phone number for participants to ask any questions concerning the nature of the study. Students were assured that participation in the study was completely voluntary.

Questionnaires were set up via a web-based design for students to be able to access at their leisure. Individuals were informed that the questionnaires examine reasons for exercising and their motivation to exercise. Personal data information was also collected to determine if and when they completed the required physical fitness class. The students were able to complete the survey in fifteen minutes or less. The responses were confidential and anonymous.

Four emails were sent to the students to encourage their participation. The first mass email was sent to all students who were enrolled for the Spring semester. Ten days later, a bright orange flier was placed in the students' post office boxes in the student union reminding the students to participate in the study. Three weeks after the first email, a second email was sent to all students who had not replied to the first email. Reminder notices were posted in all the computer labs on campus, in the student union on doors, at the post office, in classrooms, and on doors leading into administrative and educational buildings. The third email was sent during the last week of classes as finals were about to begin. The final email was sent the week after finals to all students who had not completed the survey as a last plea to complete the survey.

Data Analysis

Several approaches were used to analyze the data. Each hypothesis was analyzed separately. The first hypothesis was tested using an Analysis of Variance (ANOVA) with the independent variable being stages of change and the dependent variable being the students' report of physical activity. The second hypothesis was tested using a discriminant function of the stages of change and self-determination levels of regulation (subscales from the BREQ). The third hypothesis was analyzed using a multiple regression with self-efficacy and decisional balance as the predictors and the RAI as the criterion variable representing self-determination.

The fourth hypothesis was also analyzed using a multiple regression where the motives for physical activity were the predictors and the RAI was the criterion.

Multivariate analyses of variances (MANOVAs) with the stages of change as the independent variable were used to examine the variations in motives, decisional balance and self-efficacy in relation to the function of stages of change in the fifth hypothesis. The first MANOVA analyzed the dependent variables of decisional balance and self-efficacy. A second MANOVA used the five motives as the dependent variables. A step-wise discriminant analysis was used to follow-up significant effects. The last hypothesis was analyzed using a chi-square as a test of independent proportions to determine if individuals who have taken the physical activity class were more likely to be in the higher stages of change than those who had not. Additionally, analyses of variance were used to test for group differences between participants who had or had not completed the course. RAI, decisional balance, self-efficacy, and the five motives were the dependent variables in the MANOVAs. An independent t-test was used to test for differences between the groups on self-reported levels of physical activity.

CHAPTER 3: RESULTS

Descriptive statistics and Cronbach alpha reliability coefficients for the variables in the study, where appropriate, are reported in Table 1. The presentation of the results is organized around the six hypotheses of the study.

Table 1 Descriptive Statistics (N=277)

	Mean	Standard Deviation	Cronbach's	
BREQ				
1.External	1.79	.74	.796	
2.Introjected	2.88	1.07	.831	
3.Identified	3.76	.85	.820	
4.Intrinsic	3.67	.94	.931	
RAI	2.60	.86		
MPAM				
1.Interest/Enjoyment	4.91	1.45	.927	
2.Competence	4.96	1.56	.950	
3.Appearance	5.23	1.39	.901	
4.Fitness	5.78	1.22	.904	
5.Social	3.38	1.51	.867	
			pros	**cons**
Decisional Balance	10.30	5.76	.799	.745
Self-Efficacy	2.73	.706	.853	
Physical Activity (Mets/Week)	51.55	27.58		

Physical Activity and Stage of Change

The initial hypothesis was that self-reported levels of physical activity would vary as a function of stage of change. A frequency count for the stages of change is reported in Table 2 and METS by stage of change is reported in Table 3. The first and second stages were analyzed as a combined group due to the small number of students in stage one. An one-way ANOVA revealed that activity levels did vary across stages of change [$F(3,276) = 39.76$, $p < .01$]. Student-Newman-Keuls procedure was used as the post hoc test. Students in the precontemplation/ contemplation stages reported lower METS than all other stages. Those in preparation and action did not differ from one another, but both groups were less active than those in the maintenance stage.

Table 2 Stage of Change Frequency Counts (N=277)

Stages of Change	n
Pre-contemplation	5
Contemplation	46
Preparation	36
Action	44
Maintenance	146

Table 3 METS by Stage of Change (N=277)

Stages of Change	n	Mean	SD
Pre-contemplation/ Contemplation	51	26.12[a]	21.03
Preparation	36	39.17[b]	19.13
Action	44	47.93[b]	21.93
Maintenance	146	64.58[c]	24.99
Total	277	51.55	27.58

Note: Column means with differing superscripts are significantly different than one another.

Self-Determination and Stage of Change

The hypothesis that higher levels of self-regulation would discriminate between the stages of change was also supported. The discriminant function analysis indicated that a significant portion of the variance in the stages of change was accounted for by the subscales of the BREQ. One discriminant function was significant (canonical r = .58, Wilks' lambda = .642, $F(12,714) = 10.83$, $p<.0001$), accounting for 94.9% of variance in the model. Means and standard deviations are presented in Table 4, and the structure coefficients and group centroids are presented in Table 5. Variables with structure coefficients higher than .3 are considered to make a significant contribution to the function (Pedhazur, 1982).

Table 4 Means and Standard Deviations of Self-Determination and Stages of Change

Stage	External		Introjected		Identified		Intrinsic	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Pre-contemplation /Contemplation (n=51)	1.75	.67	2.38	.93	2.84	.73	2.76	.99
Preparation (n=36)	1.72	.60	2.65	.98	3.59	.66	3.51	.90
Action (n=44)	1.79	.75	2.61	.97	3.75	.73	3.66	.87
Maintenance (n=146)	1.81	.79	3.18	1.07	4.12	.69	4.04	.70
Total (N=277)	1.78	.74	2.88	1.07	3.76	.85	3.67	.94

According to the structure coefficients, external regulation did not make a meaningful contribution, but introjected, identified, and intrinsic did make significant positive contributions. The centroid values indicate that the precontemplation/contemplation and preparation groups were negative on the function, the action group was relatively neutral, while the maintenance group was positive on the discriminant function.

Table 5 Discriminant Function Analysis Using Self-Regulation to Differentiate Stages of Change

Discriminating Variable	Structure Coefficient
External	.05
Introjected	.49
Identified	.97
Intrinsic	.87
Group	**Centroid Value**
Pre-Contemplation/Contemplation	-1.38
Preparation	-0.23
Action	.04
Maintenance	.53

Decisional Balance, Self-Efficacy, and Self-Determination

Decisional balance and self-efficacy were hypothesized to be positive predictors of self-determination. Simple correlations between decisional balance, self-efficacy and the RAI are reported in Table 6. Decisional balance and self-efficacy were also entered as predictors in a step-wise regression with the RAI as the criterion measure of self-determination. Results are reported in Table 7.

The hypothesis was supported as both self-efficacy (F (1, 275) = 69.60, p<.001) and decisional balance (F (1, 274) = 50.91, p<.001) were positive predictors of the RAI. It is no surprise that self-efficacy entered the model first since self-efficacy is one of the strongest predictors of exercise behavior (Buckworth, Granello, & Belmore, 2002).

Table 6 Simple Correlations for Decisional Balance, Self-Efficacy, and RAI (N=277)

	Decisional Balance	**Self-Efficacy**
Decisional Balance		
Self-Efficacy	.340**	
RAI	.400**	.449**

** $\underline{p}$<.01 (two-tailed)

Table 7 Multiple Regression to Predict RAI

Step	**Variable**	**β**	**R^2**	**Adjusted R^2**	**$\underline{t}$**	**$\underline{p}$**
1	Self-Efficacy	.35	.202	.199	6.46	.001
2	Decisional Balance	.28	.271	.266	5.09	.001

Motives and Self-Determination

It was hypothesized that intrinsic motives would predict self-determination. Simple correlations between the five motives and the RAI are reported in Table 8. The five subscales of the MPAM were also entered as predictors in a step-wise regression with the RAI as the criterion measure of self-determination. Results are reported in Table 9.

The hypothesis was supported as interest and enjoyment was the first predictor to enter the model ($\underline{F}(1,275)=180.99$, $\underline{p}<.001$). Social motives entered in the next step ($\underline{F}(2,274)=125.71$, $\underline{p}<.001$), but entered as a negative predictor. Fitness was the final predictor to enter the model ($\underline{F}(3,273)=99.90$, $\underline{p}<.001$). Competence and appearance were not significant predictors. If competence had entered the model, the support for the hypothesis would have been stronger.

Table 8 Simple Correlations for the Motives and RAI (N=277)

Motives	Interest/ Enjoyment	Competence	Appearance	Fitness	Social
Interest/ Enjoyment					
Competence	.85**				
Appearance	.32**	.33**			
Fitness	.57**	.57**	.65**		
Social	.65**	.60**	.26**	.29**	
RAI	.63**	.57**	.35**	.56**	.19**

** $\underline{p}$<.01 (two-tailed)

Table 9 Step-wise Regression to Predict RAI

Step	Variable	β	R^2	Adjusted R^2	$\underline{t}$	$\underline{p}$
1	interest/ enjoyment	.70	.397	.395	10.91	.001
2	social	-.34	.479	.475	-6.17	.001
3	fitness	.26	.523	.518	5.06	.001

Motives, Decisional Balance, Self-Efficacy and Stages of Change

Motives, decisional balance, and self-efficacy were hypothesized to vary as a function of stages of change. Means and standard deviations are reported in Tables 10 and 11. Multivariate analyses of variances (MANOVAs) were used to examine variations of the dependent variables in relation to the independent variable, stages of change.

The MANOVA with decisional balance and self-efficacy as the dependent variables indicated those constructs varied by stage of change [Wilks' Lambda .74, $\underline{F}$ (3,276)=14.89, $\underline{p}$< .01]. The univariate follow-ups yielded significant effects for decisional balance [$\underline{F}$(3,276) =

19.87, p< .01] and self-efficacy [F(3,276) = 18.50, p<. 01]. Individuals in maintenance, action, and preparation had higher scores on decisional balance than those in contemplation and precontemplation. With regard to self-efficacy, those in contemplation and precontemplation were lower than all other stages. Students in the preparation stage were less efficacious then those in maintenance, but those in the action stage did not differ from either group.

Table 10 Group Means and Standard Deviations for Decisional Balance and Self-efficacy

Stages	Decisional Balance		Self-efficacy	
	Mean	**SD**	**Mean**	**SD**
Pre-contemplation /Contemplation (n=51)	5.33[a]	6.45	2.18[a]	.57
Preparation (n=36)	10.97[b]	4.41	2.61[b]	.72
Action (n=44)	10.23[b]	4.32	2.72[bc]	.61
Maintenance (n=146)	11.88[b]	5.22	2.95[c]	.66
Total (N=277)	10.30	5.76	2.73	.71

Note: Column means with differing superscripts are significantly different than one another.

A repeated measures ANOVA using the overall sample means for the five motives as the dependent variables was conducted to determine if the ratings of motives differed from one another. The analysis revealed a significant main effect (F = 5278.95 (1,276), p < .01). Repeated contrasts indicated that the fitness motive was higher than all other motives. Appearance was ranked next, and was rated higher than competence, interest/enjoyment, and social. Competence and interest/enjoyment did not differ from one another. Social was lower than all other motives.

Table 11 Group Means and Standard Deviations for Motives

Stages	Interest/ Enjoyment		Competence		Appearance		Fitness		Social	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Pre-contemplation /Contemplation (n=51)	3.68[a]	1.75	3.48[a]	1.72	4.36[a]	1.65	4.67[a]	1.57	2.79[a]	1.51
Preparation (n=36)	4.43[b]	1.32	4.46[b]	1.31	4.88[b]	1.30	5.77[b]	1.06	2.63[a]	1.16
Action (n=44)	4.76[b]	1.20	4.46[b]	1.35	5.29[bc]	1.35	5.68[b]	1.19	3.16[a]	1.35
Maintenance (n=146)	5.51[c]	1.07	5.76[c]	1.05	5.60[c]	1.15	6.20[c]	.82	3.83[b]	1.48
Total (N=277)	4.91	1.45	4.96	1.56	5.23	1.39	5.78	1.23	3.38	1.51

Note: Column means with differing superscripts are significantly different than one another.

The MANOVA to test for group difference in motives revealed significant effects [Wilk's Lambda .59, $F(3,276)= 10.62$, $p < .01$]. Follow-up univariate tests indicate that there were differences between groups evident on all five motives: interest/enjoyment ($F(3,277)= 28.65$, $p <.01$), competence ($F(3,277)= 45.77$, $p<.01$), appearance ($F(3,277)= 12.4$, $p<.01$), fitness ($F(3,277)= 25.36$, $p<.01$), and social ($F(3,277)= 11.45$, $p<.01$).

Student-Newman Keuls follow-ups reveal for interest/enjoyment, competence, appearance and fitness that the precontemplation and contemplation group rated those motives as less important than all other stages. Preparation and action groups did not differ from each other, but rated motives as less important than the maintenance group with the exception of the appearance motive that showed no difference between the action and maintenance groups. With regard to social motives, the maintenance group rated those significantly higher than all other groups.

Physical Activity Course

The final hypothesis was that a required physical activity class would positively influence college students' motivation and engagement in physical activity. A chi-square was used to determine if individuals who had taken the physical activity class were more likely to be in the higher stages of change than those who had not. There were 209 students who had taken the class and only 68 who had not. The observed and expectant frequencies are reported in Table 12. The expected frequencies are generated in the chi square analysis $\{x^2 = 3 (O-E)2/E\}$ based on the proportion of individuals that would be expected to be in a group if the groups were equally represented in the sample (Portney & Watkins, 2000). The Pearson chi-square was not significant (p=.283).

Table 12 Observed and Expected (in parentheses) Frequency Counts of Completion of Physical Activity Course by Stages of Change

Comp. Course	Contemplation	Preparation	Action	Maintenance
YES	35 (38.5)	26 (27.2)	31 (33.2)	117 (110.2)
NO	16 (12.5)	10 (8.8)	13 (10.8)	29 (35.8)

No significant group differences [Wilks' Lambda .987, $F(1,276) = 1.22$, $p = .304$] were found between students who had or had not completed the physical activity course for RAI, decisional balance, and self-efficacy. There was a trend evident in the MANOVA to test for group differences in motives [Wilks' Lambda .964, $F(1,276)= 2.05$, $p= .072$]. Univariate tests for interest/enjoyment ($F(1,276)= 6.71$, $p= .01$), competence ($F(1,276)= 9.04$, $p= .003$), and social ($F(1,276)= 4.66$, $p= .032$) revealed that those who had taken the course rated those

motives as more important than those who had not. The groups were not different with regard to appearance and fitness motives. The groups did not differ on self-reported levels of physical activity [t(275)= 1.50, p= .135]. Group means and standard deviations are reported in Table 13.

Table 13 Completion of Physical Activity Course Group Means and Standard Deviations

	Yes (n=209)		No (n=68)	
	Means	**SD**	**Means**	**SD**
RAI	2.66	.85	2.43	.87
Decisional Balance	10.51	5.67	9.63	6.03
Self - efficacy	2.75	.70	2.66	.74
MPAM				
1.Interest/Enjoyment	5.04	1.42	4.52	1.47
2.Competence	5.12	1.51	4.48	1.62
3.Appearance	5.24	1.41	5.19	1.31
4. Fitness	5.85	1.24	5.57	1.14
5.Social	3.49	1.52	3.04	1.44
Physical Activity	52.96	26.79	47.21	29.68

CHAPTER 4: DISCUSSION

The purpose of this study was to investigate college students' motivations to be physically active by merging the perspectives of the self-determination theory and transtheoretical model. Other studies have examined various aspects of the theory and model proposed, but not as in-depth with both together. The secondary purpose was to examine the effects of a required physical activity course on college students' levels of physical activity.

Physical Activity and Stages of Change

The initial hypothesis, that self-reported physical activity would vary as a function of stage of change, was supported**.** The METS reported for a typical week increased across each stage with students in the maintenance stage being the most active while those in the precontemplation/contemplation stages were the least active. Students in the precontemplation/ contemplation stages are just considering becoming active while those in the maintenance have been active for at least 6 months. This finding is not unique, and is in agreement with previous studies (Cardinal et al., 2002, Cardinal et al., 2004).

Self-Determination and Stages of Change

The hypothesis that self-regulation would discriminate between the stages of change was also supported. Consistent with Mullan and Markland (1997), there was evidence that the participants became more self-determined as they moved across the stages of change. Those who were in action and maintenance were more self-determined than those who were in the precontemplation/contemplation and action stages.

Introjected, identified, and intrinsic motivation measures made significant contributions to the linear function discriminating between stages of change. Consistently, external regulation

has proven to be a non-significant variable in differentiating stages of change (Mullan & Markland, 1997, Landry & Solmon, 2004). This indicates that decisions about physical activity of college students, like other populations studied, are not affected by extrinsic controls.

Introjected regulation, or exercising out of a sense of guilt or obligation, made a contribution to the linear discriminant function. This coincides with Mullan and Markland (1997) who found that introjected regulation had a positive, minimal significant influence for men and women. However, Landry and Solmon (2004) reported that introjected regulation had a significant negative influence among older African American women in discriminating between those who exercised and those who did not. They suggested that for their sample, the use of guilt or coercion rather than encouraging individuals to be active, could actually serve to be a negative influence. Either age or ethnicity could be the explanation for the contrast between the results of this study and the Landry and Solmon (2004) study, but it does appear that self-determination may function in different ways in different segments of the population.

Identified regulation made the most powerful contribution to the discriminant function. This suggests that these college students engaged in physical activity because they recognized the positive health benefits associated with exercise, such as improving fitness or losing weight. The same was found for older African American women (Landry & Solmon, 2004). Whitehead (1993) refers to this level of self-determination as the "threshold of autonomy." Consistent with theoretical predictions from self-determination theory (Deci & Ryan, 1985), when individuals report that they are engaging in a behavior out of their own volition rather than because they feel controlled, they are more likely to maintain the behavior and in this case, engage in regular exercise.

Participating in physical activity for enjoyment and for the activity itself in the form of intrinsic motivation was also a positive contributor to the discriminant function, but it was not as strong an influence as identified regulation. The contributions of intrinsic and identified regulations are comparable to those reported by Mullan and Markland (1997) and Landry and Solmon (2004).

Decisional Balance, Self-Efficacy and Self-Determination

Based on the self-determination theory, it was hypothesized that decisional balance and self-efficacy would be positive predictors of self-determination. Self-efficacy was the first to enter the linear regression model. Self-efficacy, the belief that one can overcome obstacles to exercise, has consistently been shown to be a strong predictor of physical activity (Buckworth et al., 2002; Marcus & Owen, 1992; Sullum et al., 2000). In order to become more self-determined, self-regulatory efficacy, the strength of the belief that one can make oneself exercise regularly in the face of obstacles, is believed to have the greatest affect on physical activity adherence (Berry & Howe, 2005).

Decisional balance was also a significant positive predictor of self-determination. In order to be intrinsically motivated, the benefits of an activity should outweigh the cost or the sacrifices associated with the activity. Similar findings were reported by Sullum et al. (2000) who concluded that in order to increase college students' motivational levels, the cons must be reduced and the pros of physical activity must be emphasized and increased.

Motives and Self-Determination

Intrinsic motives were hypothesized to be positive predictors of self-determination. Of the five motives of the MPAM, interest and enjoyment was the first predictor to enter the step-

wise linear regression model. Interest and enjoyment are self-determined motives and have been identified as predictors of adherence to physical activity (Ryan et al., 1997). Competence, the other intrinsic motive, did not enter the model as a significant predictor. The high correlation between competence and interest and enjoyment may account for the failure of competence to emerge as a significant predictor. It is possible that this is a measurement issue, interest and enjoyment was strongly related to competence (Fredrick & Ryan, 1993). In this sample, the competence motive may not have been a distinct motive from interest and enjoyment. Given such a strong relationship, the shared variance between them was attributed to interest and enjoyment rather than competence (Peterson, 1994).

However, the fact that competence did not enter the model is consistent with findings reported by Markland (1999) who suggested that perceived competence might not be an influential motive for individuals with a high level of self-determination. Goudas, Biddle, and Underwood (1995) also present evidence that autonomy is a more powerful influence on motivation than perceived competence, in that when individuals do not feel that they are autonomous, even when they have high levels of perceived competence, they are unlikely to be intrinsically motivated. Taken together, these findings suggest that perceived competence may be a necessary, but not sufficient, condition for self-determined motivation.

Social was the second type of motive to enter the regression to predict self-determination, but it did so as a negative predictor. One possible explanation for this is a biased sample from a small, private college. They may not place as much value on social interactions as a more diverse population (Schuman, 2005). The results here are comparable to previous work where social motives are among the lowest categories of motivation for physical activity and adherence (Ryan et al., 1997).

Fitness was the final predictor to enter the regression and had the weakest simple correlation to the RAI. Fitness is categorized as an extrinsic motive (Ryan et al., 1997) but the argument could be made that it could become a positive predictor of physical activity as the individual becomes more physically active. The determining factor is the individual's perceptions of what "fitness" means to them.

Motives, Decisional Balance, Self-Efficacy and Stages of Change

Motives, decisional balance, and self-efficacy were hypothesized to vary as a function of stages of change, and those hypotheses were supported. Participants in the maintenance, action, and preparation stages had higher scores on decisional balance than those in precontemplation/contemplation, meaning they had more pros than cons. Prochaska and Velicer (1997) hypothesized that decisional balance increases (more pros than cons) as an individual journeys from precontemplation to maintenance stages and evidence from this study is consistent with that hypothesis.

Several studies provide evidence that self-efficacious individuals are in the higher stages of change while those with a lower perception of confidence are inactive and in the early stages of change (Leenders et al., 2002; Silver et al., 2000). The results of this study are consistent with earlier work, with precontemplation/contemplation having the lowest levels of self-efficacy and maintenance having the highest levels.

All five motives were found to differ across the stages of change. Specifically, those students in the precontemplation/contemplation stages rated all motives except social as less important than the other stages. The ratings of all motives increased across the stages from precontemplation/contemplation to the maintenance stage. As Ingledew et al. (1998) found,

active individuals rate exercise motives differently than inactive individuals. Results suggest that extrinsic motives dominate the early stages of physical activity adoption, while the intrinsic motives are important for progression and maintenance of activity.

Physical Activity Course

A secondary purpose of this study was to examine the effect of a required physical activity class on students' motivation and activity levels. There were no significant differences between students who had taken the course and those who had not on the stages of change, self-reported physical activity, self-determination, decisional balance, or self-efficacy.

There was, however, a trend to suggest group differences for the motives might vary based on course participation. Univariate follow-ups revealed that the students who had taken the course rated interest/enjoyment, competence, and social motives higher than those who had not. This could be a positive result of the course, in that the students felt more confident to participate in physical activity and enjoyed it.

There were also no differences in the self-reported physical activity levels. There is a fitness center that all students have access to on campus that encourages their participation, so it is easy for students to exercise and that may have affected the results of this study. Cardinal et al. (2002) also found similar non-significant results in their study of a required fitness course. They reported their course did little to change the students' exercise levels outside of class and did not significantly influence the students' stage of change for exercise behavior.

One explanation for the failure to detect group differences in this study could be a biased sample. Although every effort was made to recruit all students on campus, the return rate was 32%, and a majority of those students had already taken the course. It is possible that students

who had not taken the course were less likely to volunteer to complete the survey than those who had done so. It also seems plausible that among students who had not taken the course, inactive students might be less likely than active ones to voluntarily participate. Although the sample bias is a limiting factor, consistent with previous research, this study does not provide evidence that current approaches taken in required fitness courses have an impact that is measurable in a college sample.

Limitations

Several limitations are inherent in the study design and must be acknowledged. First, the survey consisted of self-report measures that could have lead to potential problems with interpretation and reporting. If feasible, more objective measures of physical activity can produce more reliable and valid results, but they could not be incorporated in this study. Second, the unequal sample size between groups who had or had not taken the course suggests the sample may be biased. Within this college population, it is a challenge to recruit equal groups since most students are encouraged to take the required course in their freshman year. Third, the health and physical education department had the largest number of majors on campus during the spring semester which may have further biased the sample toward a more active population. Fourth, this population could also have been biased due to other seasonal effects. Cardinal et al. (2002) also noted this in their study. Early to late spring may not have been the best time to collect data as college students are more prone to outdoor activities as the weather improves. The low return rate and incomplete data sets could also be a result of the spring semester. Fifth, there are many other uncontrollable factors that affect students' decisions to be active such as outside influences, intramurals, and the availability of recreation and health clubs.

Finally, this study was not a longitudinal study but a cross-sectional collection of data. A long-term study would be useful to follow students who have taken the course as a freshman as they progress through their collegiate years and beyond graduation.

Conclusions and Implications

The findings of this study support the notion that merging the two perspectives of the self-determination theory and transtheoretical model was successful. The two frameworks complement one another in the study of physical activity. Course content in required courses and interventions to increase physical activity of college students could be developed from these two perspectives. However, evidence that the required course made a difference in the physical activity patterns of students did not emerge. The goal of the required class has been to improve fitness levels and health awareness while meeting a performance standard that is mandatory for graduation. Based on the results, several implications are supported for the teaching of college students to be physically active and for future research.

Implications for Practice. Although more research is needed in this population, several implications for practitioners are supported by the results of this study. Self-determination appears to function in different ways in different segments of the population, especially with regard to introjected regulation. The data supports the notion that rewards and threats are not significant motivational influences for exercise related behavior change. Strategies reinforcing higher levels of self-determination, rather than those focusing on a sense of guilt or obligation, are more likely to foster long-term physical activity.

Consistent with Markland (1999), demonstrating competence was not a strong predictor of self-determination. While perceived competence is important for self-determination, it alone is

not a powerful enough influence to predict self-determination (Goudas et al., 1995). It seems that perceived competence may be a necessary, but not sufficient, condition for self-determined motivation. In addition to structuring the learning environment so that individuals believe they can be successful if they exert effort, it is important to focus on other intrinsic motives, such as interest and enjoyment, and a value of fitness, to foster levels of adherence in physical activity and exercise settings (Ryan et al., 1997).

Another implication for practitioners is supported with regard to social motives. Consistent with Ryan et al. (1997), social motives were not key factors in determining levels of self-determination, and were ranked lower than all other motives for participation in physical activities. According to the self-determination theory, relatedness is a basic psychological need that must be met if individuals are to move along the motivational continuum toward higher levels of self-regulation and self-determination. The nutriment of relatedness has not been closely investigated in any domain, and studies in physical activity settings have not provided evidence of the importance of that nutriment. These results suggest that a focus on motives related to interest and enjoyment, fitness, and maintaining health has more potential to foster adherence than an emphasis on exercise as a way to interact with others.

Individuals who were active rated all motives to be more influential reasons to engage in activity than those who were not active. It seems that individuals who choose to exercise see more value in all of the motives that were assessed, which suggests that when individuals attach some form of value to physical activity, they are more likely to be more self-determined and to exercise regularly. Motives for physical activity need to be fostered in instructional settings where students are taught the value of exercise. Both the extrinsic and the intrinsic motives of

physical activity need to be emphasized during the initial stages of an exercise program (Ingledew et al., 1998). An individual may have to rely more on extrinsic body motives until the intrinsic benefits of interest/enjoyment can evolve with time, especially those who are in the preparation and action stages.

The last implication evident in this study is that simply requiring students to enroll in a course will not necessarily insure that they become more self-determined in their exercise behavior, or more active. Although there are limitations associated with the design of the study that have been acknowledged, consistent with Cardinal et al. (2002) there was no strong evidence that the required course made any difference in physical activity levels. These results suggest that it may be necessary to incorporate strategies that are specifically designed to promote self-regulation and more autonomous levels of motivation that are tailored to the needs of the individual. A required class could be effective with the right interventions and course content. Interventions need to teach behavioral skills that are designed around the self-determination theory that target the elements of self-regulation and address the psychological aspects of the transtheoretical model. By increasing and nurturing feelings of autonomy and competence in the exercise domain, it enhances the likelihood that a college student will adopt physical activity into their lifestyle.

Directions for Future Research. The results of this study extend the knowledge base concerning how levels of self-determination, motives to be active, self-efficacy, and decisional balance vary across the stage of change in a sample of college students. Examination of these findings, within the context of the limitations of the study, however, provide a basis for recommendations for future study.

When compared to the findings of previous research, there is some incongruity with regard to the role that introjected regulation plays in predicting the stage of change. Depending on the population studied, it has been either a non-significant influence for females (Mullan & Markland, 1997), a minimally significant positive predictor for adult males (Mullan & Markland, 1997) and in this study for college students, and a significant negative predictor for older African American women (Landry & Solmon, 2004). It is unclear whether the variation in the role of introjected regulation varies by age, race, or gender, and it seems that is an important question to answer. It is clear that, for some segments of the population, the use of coercion or guilt as a strategy to improve adherence may in fact decrease the likelihood that individuals will be active. It is important to determine which segments of the population respond unfavorably to those approaches in order to tailor interventions effectively.

It is also clear that further investigation of the effectiveness of college courses to facilitate the adoption of healthy active life styles that will be maintained across the life span is needed. At present there is not sufficient evidence to support the argument that current approaches have any effect at all. If courses are to be required, we need to determine how those courses can be structured so that they are most effective. To do that, we need to conduct research to identify strategies that can be used to foster higher levels of self-determination that are associated with the action and maintenance stages of change. To help determine those strategies, research needs to be conducted that incorporates data regarding the students' performance in the class, as well as, objective measures that supplement the self-report data in order to have a more valuable contribution to the literature.

Ultimately, the goal is to develop interventions and strategies that provide a greater understanding of how physical activity is essential in leading a healthy life. More longitudinal

data are needed that track students through college and post-graduation into their respective lives in order to have a clear understanding of ways to foster the adoption and maintenance of a physically active lifestyle. This information is needed to determine if strategies are effective for lifetime physical activity and what effect age and race have on levels of activity. It is important to determine whether or not courses and interventions that promote physical activity are comparable across samples of males, females, and ethnically diverse groups. The incorporation of the transtheoretical model with self-determination theory has proven that it can provide a framework to investigate the motivational levels of college students in their pursuit of a lifetime of physical activity.

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APPENDIX A: EXTENDED REVIEW OF LITERATURE

Self-Determination Theory and the Transtheoretical Model as an Organizing Framework to Investigate College Students' Physical Activity Behavior

According to Physical Activity Among Adults: United States, 2000, released in May 2003, one in five adults engage in high levels of activity, but one in four are largely inactive (United States Department of Health and Human Services, [USDHHS], 2003). This report, along with many others including the Surgeon General's Report (USDHHS, 1996) that identified physical inactivity as a major health risk factor, document the magnitude of health problems that are compounded by the lack of physical activity. Daily physical activity on a moderate basis is recommended for people of all ages (Morrow, Krzewinski-Malone, Jackson, Bungum, & Fitzgerald, 2004). The National Center for Chronic Disease Prevention and Health Promotion (USDHHS, 1996) reports that nearly half of American youths aged 12-21 years are not vigorously active on a regular basis, with 14% of young people reporting no recent physical activity. Only 42% of twenty-one year old men and 30% of twenty-one year old women reported participating in vigorous physical activity. This decrease in physical activity has been a key contributor in the 50% increase in obesity prevalence among U.S. adults during the past decade (Buckworth & Dishman, 2002; Clement, Schmidt, Bernaix, Covington, & Carr, 2004; Dallow & Anderson, 2003).

Despite these documented benefits of physical activity and the decline of health in young adults, many college students are not physically active on a regular basis. According to the 1995 National College Health Risk Behavior Survey, only 38% of the college undergraduate students studied participated in moderate physical activity during the week prior to the survey (Douglas et

al., 1997). Rosen (2000) and Suminski and Petosa (2002) found similar results. Rosen (2000) reported that 74% of his sample of college students did not participate in vigorous physical activity the week prior to the study, while Suminski and Petosa (2002) reported that 47% of their total sample of collegiate students did not participate in vigorous physical activity during the month preceding their study. These studies along with others that have been conducted with college alumni (Brynteson & Adams, 1993; Pearman, Valois, Sargent, Saunders, Drane, & Macera, 1997) demonstrate the importance of educational programs in the university curriculum that focus on the benefits of physical activity (Kittleson & Ragon, 1984).

Historically, physical activity courses were a part of the college curriculum. Recent data at the turn of the century reported that sixty-three percent of colleges and universities in the United States require some form of physical activity course to graduate (Hensley, 2000). Other studies have shown that although universities may require students to take and pass such courses, the efficacy of these courses has not been investigated (Adams & Brynteson, 1992; Pearman et al., 1997; Sallis et al., 1999). In light of the concerns about young adults' physical inactivity and their decline in health, it is important to explore ways to encourage them to adopt and maintain physically active lifestyles. Inclusion, or reinstatement, of a physical activity course as a degree requirement in colleges is one approach that has the potential to address this concern to some degree. It is important, however, to investigate ways to maximize the effects of those courses using theoretically based approaches if they are to have a positive impact on college students (Cardinal, Jacques, & Levy, 2002).

The purpose of this literature review is to synthesize the research specifically related to college students and physical activity, with the goal of identifying strategies that have the

potential to increase engagement in physical activity. Self-determination theory is used as an organizing framework to study students' motivations. The transtheoretical model is examined to integrate stages of change, processes of change, decisional balance, self-efficacy, and temptation with self-determination to investigate students' physical activity behaviors. Within each of these theoretical perspectives, research studies that have used these approaches are reviewed and synthesized to provide insight into how classes can be structured to facilitate engagement in physical activity. Measurement issues with regard to these theoretical approaches are also addressed. The paper concludes with a summary of the implications that are supported by the research literature, and identification of issues for extending research.

Self-Determination Theory

Self-Determination Theory (SDT) provides a framework through which one's motives for physical activity can be studied. Deci and Ryan (1985) developed SDT to examine how different types of motivation lead to varying degrees of self-determination. Intrinsic and extrinsic motivation make up the continuum that distinguishes one's self-determination (Deci & Ryan, 1985; Li, 1999; Vallerand & Losier, 1999). Along this continuum, amotivation - the absence of motivation toward an activity - is at one extreme, intrinsic motivation - the motivation to do an activity for its own sake or for the pleasure it provides - is at the other extreme, and levels of extrinsic motivation fall between these extremes.

Intrinsic motivation is the highest level of self-determination. To be intrinsically motivated one must deem the activity as being enjoyable or interesting (Deci & Ryan, 1985; Ryan & Deci, 2000; Vallerand & Losier, 1999). Intrinsic motivation is further delineated into three forms: intrinsic motivation toward knowledge, toward accomplishment, and toward

experiencing stimulation (Carron et al., 2003; Vallerand & Losier, 1999). Knowledge reflects the desire to learn something new about the situation or activity, accomplishment involves the satisfaction of completing the activity, and experiencing stimulation is characterized by the good feelings or sensations that are gained from the activity. Those individuals who exercise for the enjoyment of the activity are intrinsically motivated. They enjoy pushing themselves to the limits of physical activity. Individuals who are intrinsically motivated to exercise do not do so to achieve an outcome. Rather they engage in physical activity as an end in itself.

However, many individuals who exercise do so for extrinsic reasons. Those who are extrinsically motivated perform the activity for some benefit they will receive or to avoid negative consequences (Deci & Ryan, 1985; Ryan & Deci, 2000; Vlachopoulos, Karageorghis, & Terry, 2000). At varying levels of extrinsic motivation, the degree of internalization increases as one moves along the continuum toward intrinsic motivation (Landry & Solmon, 2002). Extrinsic motivation helps to explain the reasons people participate voluntarily in exercise without ever seeming to enjoy the activity (Wilson & Rodgers, 2002). It is acknowledged in the continuum that an individual can feel quite self-determined in his/her regulation of exercise but yet be extrinsically motivated to perform the exercise for reasons such as improving appearance, maintaining fitness, or losing weight (Mullan & Markland, 1997).

Extrinsic motivation is multidimensional in nature, as it has been categorized into four types or levels of regulation: external regulation, introjected regulation, identified regulation, and integrated regulation. External regulation is at the lower end of the continuum, closest to amotivation. At this level of regulation, motivation is spurred solely by rewards or avoidance of punishment. External regulators exercise because other people say they have to. At the next

level, introjected motivation, the action is more internalized, but is still linked to external reasons. The activity is beginning to take on value, but individuals engage out of guilt or obligation rather than choice. Introjected regulators feel guilty if they do not exercise (Biddle, 1999; Ryan & Deci, 2000).

Identified regulation is when an individual freely chooses to participate in an activity because they feel that it is important. Individuals who fall in the identified regulation category exercise because they value the benefits of exercise. Participation in exercise is motivated by the outcome of the participation whether it be to look better or for improved fitness and health. At this level the individual is moving closer to becoming more self-determined and is approaching an autonomous level (Biddle, 1999; Ryan & Deci, 2000).

The highest form of extrinsic motivation, closest to intrinsic motivation, is integrated regulation. The two are very similar, but individuals who are motivated at a level of integrated regulation do not exercise for the sake of the activity itself, but instead, regulate their behavior to achieve some outcome, such as to improve or maintain fitness. Integrated exercisers exercise because it is important to their personal goals. Integrators have not reached intrinsic motivation levels because they do not engage in exercise for the pure enjoyment of the activity. Table 1 illustrates the continuum of self-determination as one would progress from amotivation through extrinsic motivation to intrinsic motivation (Biddle, 1999; Ryan & Deci, 2000).

Psychological Needs

As individuals move along the continuum toward higher levels of self-determination and intrinsic motivation, Deci and Ryan (1985) identified three important psychological needs that are related to intrinsic motivation (Biddle, 1999; Carron et al., 2003; Ryan & Deci, 2000). These

are autonomy, competence, and relatedness. An individual's motivational state, wherever it lies along the continuum between amotivation and intrinsic motivation, can be described by the extent to which these needs are met (Kilpatrick, Hebert, & Jacobsen, 2002).

Table 1 Self-Determination Continuum

Regulation of Behavior in Exercise					
Amotivation	**Extrinsic Motivation**				**Intrinsic Motivation**
	External Regulation	Introjected Regulation	Identified Regulation	Integrated Regulation	
Little or no motivation to attempt behavior	Controlled by reward and threats	Avoidance of guilt or to please others	Motivated by appreciation of outcomes - acted out by choice	Values activity in relation to one's goals	Participates for fun and activity itself

Autonomy is the independence to choose for oneself what behavior or activity in which to engage (Levesque, Stanek, Zuehlke, & Ryan, 2004). Research indicates that autonomous exercise motives are the reason that individuals shift from inactive to active stages of exercise (Mullan & Markland, 1997; Ingledew, Markland, & Medley, 1998; Wilson, Rodgers, Fraser, & Murray, 2004). Individuals need to feel as if they are in control and not being controlled. Autonomous actions are more flexible and allow the individual to be more creative in their exercise programs than do controlled actions.

Competence is the belief that one is capable of producing a desired outcome (Ferrer-Caja & Weiss, 2000). Individuals must perceive their activities from a self-determined (i.e. autonomous) point of view for perceived competence to be influenced and motivation to be internalized. Relatedness refers to how close one feels to others. It refers to both directions of

the relationship. Ryan and Deci (2000) describe the components of relatedness as the quality of relationships with others, feeling understood, participating in meaningful dialogue, and having fun with others. Markland (1999) argues that it is important to create self-determining conditions for exercise classes that include autonomy, relatedness, and competence.

Self-determination theory can be utilized as a predictor of personal fitness and one's intention to exercise in the future. The predictions are made by identifying the type of motivation the individual possesses that will influence the activities selected, the effort and adherence portrayed, and the effects of the experience (Carron et al., 2003). However, a person's motives for physical activity are important, too. The most common motives given are to improve or maintain health, improve physical appearance, experience enjoyment, enjoy a social experience, and obtain psychological benefits (Ryan, Fredrick, Lepes, Rubio, & Sheldon, 1997). Adherence to motives that are extrinsically motivated (i.e. improving health and physical appearance) may not be as enduring as those that are intrinsic (i.e. enjoyment, social, and psychological) (Ryan, et al., 1997). The determining factor will be the individual's perceptions. If the individual perceives that he/she lacks control and free choice, then the likelihood of adherence decreases.

Research Applications

The intention and goal from a self-determination theory perspective is that the individuals will progress through the continuum of motivation until their motives become internalized, which is crucial for adherence. Individuals' motives for exercise can change over time from extrinsic to more intrinsic motives (Maltby & Day, 2001). By applying self-determination theory to physical activity research, investigators have been able to predict participants' levels of

exercise adherence by determining their initial levels of motivation. A large number of studies have been conducted in various settings using self-determination theory. The findings are presented by organizing the studies according to three broad contexts: adults, school physical education, and university populations.

Adult Exercisers. Participants who enter into an exercise program with high levels of intrinsic motivation and a sense of relatedness are more apt to attend exercise sessions than those with a lower level of intrinsic motivation (Oman & McAuley,1993). Specifically, investigations have shown that intrinsic motives such as competence and enjoyment relate more to exercise and physical activity program adherence than those of extrinsic motives such as body-related reasons for participation (Ryan et al., 1997).

Markland (1999) studied the effects of perceived competence on intrinsic motivation in an aerobic dance class and found that perceived competence had no effect on those with a high level of self-determination. For those with a low self-determination, however, perceived competence had a positive relationship with intrinsic motivation. This suggests that perceived competence is not an issue for those who are participating because they so choose. It is those who feel compelled to participate in an activity that need a sense of competence in the activity to increase their intrinsic motivation.

Other researchers have looked at not only the motives but the type of activity that could influence exercise participation. Fredrick and Ryan (1993) examined differences in motivation by the type of activity, specifically the differences between sport and fitness activities. They found that those who engage in individual sports were more intrinsically motivated because they focused more on the task itself, portraying higher levels of interest/enjoyment and competence

motivation than those in the fitness group. Meanwhile, the fitness group was characterized by extrinsic motivation, focusing more on body related motives such as physical attractiveness and fitness.

A more recent study looked at the difference in competition and intrinsic motivation between a competitive cycling group and a fitness group (Frederick-Recascino & Schuster-Smith, 2003). The cyclist group's competitiveness positively correlated with levels of interest/enjoyment motivation and days per week of exercise. The exercise group's competitiveness positively correlated with interest/enjoyment, competence, and appearance motives, but was unrelated to days per week of exercise. For both groups competitiveness was positively related to higher levels of intrinsic motivation.

School Physical Education. Self-determination research has been used as a framework to study motivational constructs in school physical education classes. Standage, Duda, and Ntoumanis (2003) combined self-determination theory and achievement goal theory to investigate students' motivational processes for physical activity and how these processes predict students' intention to be physically active in their leisure time. Perceived competence and relatedness were more predictive of self-determination than autonomy. However, autonomy did emerge as a weak predictor of self-determined motivation. Ferrer-Caja and Weiss (2000) reported similar findings, in that autonomy was a weak predictor in their study of high school physical education classes.

Perceived competence has emerged as a key determinant of self-determination in these studies (Ferrar-Caja & Weiss, 2000; Standage et al., 2003). Importantly, not only was perceived competence a positive predictor of self-determination, there was a negative relationship between

perceived competence and amotivation. This means that perceived competence could predict positive and negative engagement of students in physical education. In addition to these findings, self-determination toward physical education predicted students' intentions to be physically active during their leisure time.

Researchers around the world are concerned about the lack of physical activity in young people today. Recent studies have been conducted in Estonia (Hein, Muur, & Koka, 2004) and Germany (Levesque et al., 2004). In Estonia, researchers studied the intention to be physically active after high school graduation and its relationship to intrinsic motivation. They found that high school students' intentions to be active, motivation to experience stimulation, and motivation to accomplish were the strongest predictors for physical activity. Physical education teachers need to realize that for students to incorporate physical activity into their lifestyles, they need not only to experience the stimulation but also feel an accomplishment associated with the activity. This information could help physical activity practitioners structure their classes to foster students' autonomous motivation for lifelong physical activity (Hein et al., 2004).

University Populations. Several studies have used self-determination theory as a framework to investigate the physical activity behaviors of college students. Researchers from Germany teamed up with researchers from the United States to investigate autonomy and competence in university students from both countries. The measures of autonomy and competence, as well as motivational causes were found to be applicable across cultures. Positive informational feedback and lower perceived pressure were positively related to perceived autonomy and competence in both settings (Levesque et al., 2004).

One strength of this study is that four different universities were used in collecting data, two German and two American. Also, a variety of students from different academic domains were surveyed, suggesting the findings are generalizable to diverse populations. A possible weakness of this study is that there was no way to determine if the differences that emerged were related to German versus American approaches to university education. German students felt more autonomous overall; but American students reported higher levels of perceived competence. The question of why Americans feel they have less control and increased feelings of pressure is unresolved. No matter the differences in culture or institutions, the need for autonomy and competence in university systems appears to be crucial to the students' well-being (Levesque et al., 2004).

In their study of relationships between exercise regulations and motivational consequences of college students, Wilson, Rodgers, Fraser, and Murray (2004) found that exercise regulations discriminated between motivational consequences among men and women, with women having stronger introjected regulations than men. However, identified regulation was found to be the most important predictor of exercise in both sexes. This study reinforced previous research that exercise regulations can differentiate in predicting motivational consequences for both men and women (Fredrick & Ryan, 1993; Ingledew et al., 1998). A weakness of this study is that it is impossible to conclude that regulations cause motivational consequences based on the fact that this was not a longitudinal study and the causal implications were not tested in the regression analysis.

College aged women, specifically, have been targeted as an interest group in exercise research. Wilson and Rodgers (2002) studied the relationship between autonomous exercise

motives and physical self-esteem in collegiate female exercise participants. Females who were in the identified regulation or intrinsically motivated categories reported higher levels of self-esteem, whereas those females who exercised for extrinsic reasons reported lower levels of self-esteem. There was also a positive relationship between autonomous exercise motives and self-esteem. Women who valued the important health outcomes of exercise or those who found exercising to be self-rewarding and fun were likely to have higher self-esteem.

While this information sounds promising, there are some drawbacks to this study. The sample used in this study was young females in a supervised university exercise class. This does not allow for generalization to be made across populations. Also, only over-all physical self-esteem was measured, not the type or level (Wilson & Rodgers, 2002). This does not allow one to draw any conclusion about self-esteem within the context of the self-determination theory.

However, similar findings were reported by Maltby and Day (2001) when they studied 556 male and female undergraduate students who responded to a survey. They found that extrinsic exercise motives were significantly related to poorer psychological well-being, where as, intrinsic motives were accompanied by better psychological well-being. The difference lies in their beliefs about how exercise is internalized. Individuals internalize exercise motivation over time. Maltby and Day (2001) suggest that the change is causal and a more integrative relationship occurs. Their argument is that exercise motives and psychological well-being interact, leading to a reinforcement of positive feelings that causes exercise to become more rewarding, thus internalized.

Measurement

Several questionnaires have been validated and used in the self-determination literature to assess motivation in physical activity. The psychometric properties of the instrumentation that

has been developed for use within self-determination theory is a strength. For example, the Motivation for Physical Activity Measure (MPAM-R: Ryan, Frederick, Lepes, Rubio, & Sheldon, 1997) is a survey that measures motivation to participate in sport and exercise activities. It measures five motivational factors: interest/enjoyment, competence, appearance, fitness, and social motivations. Interest/enjoyment and competence are motives that reflect intrinsic motivation while appearance, fitness and social motivations represent extrinsic motivation. Evidence of reliability and validity for these motives was provided by Frederick and Ryan (1993), showing internal consistency (alphas above .87) and differential relations with both choice of sport/exercise activities and associated outcomes.

The Exercise Motivations Inventory - 2 (EMI-2, Markland & Ingledew, 1997) measures an individual's motives or reasons for exercising. The inventory is comprised of fourteen subscales and can be used for exercisers and non-exercisers. It has also been found to discriminate between individuals at different stages of change for exercise and to predict change in stage (Ingledew et al., 1998). The factorial validity and invariance of the factor structure was tested using factor analytic procedures by Markland and Ingledew (1997). Maltby and Day (2001) reported good internal reliability, ranging from .60 to .95.

The MPAM-R and the EMI-2 are both designed to measure individuals' motives for exercise. The EMI-2 is a longer instrument with 51 items measuring 14 motives for exercise (Maltby & Day, 2001), while the MPAM-R is a 30 item questionnaire that measures five general motives for activity participation (Ryan et al., 1997). The EMI-2 focuses on both the fitness related reasons for exercising as well as the health related reasons and is applicable to both non-exercisers and exercisers. The MPAM-2 focuses on five specific motives that range from

intrinsic motives such as enjoyment to extrinsic motives such as appearance. The MPAM-2 represents a broader scope of intrinsic and extrinsic motives while the EMI-2 is more specific in breaking down the health and fitness aspects of intrinsic and extrinsic motives.

The Behavioral Regulation in Exercise Questionnaire (BREQ) is another tool that has been used extensively. It is a self-report measure developed to assess exercise regulations consistent with the self-determination theory (Wilson et al., 2004; Wilson et al., 2002; Mullan, Markland, & Ingledew, 1997; Mullan & Markland, 1997). The BREQ consists of four subscales that measure the four regulations of exercise behavior: external, introjected, identified, and intrinsic. The subscale, amotivation, has been included in a revised measure, BREQ-2. Neither measure includes integrated regulation. Wilson, Rodgers, and Fraser (2002) examined the BREQ's psychometric properties and found support for the psychometric properties in terms of factorial validity and the relations with theoretically relevant constructs, exercise behavior and motivational constructs.

Rose, Markland, and Parfitt (2001) developed the Exercise Causality Orientations Scale (ECOS) based upon Deci and Ryan's (1985) causality orientation theory. The ECOS assesses the strength of individual's causality orientations to exercise. The format of the questionnaire is a series of scenarios describing the exercising environment that include preferences for new exercise programs, reasons for exercising, and monitoring progress. Each scenario is followed by three responses that are characteristic of each causality orientation: autonomy, control, and impersonal (Rose et al., 2001). Participants are asked to indicate the response that best characterizes them, producing a score for each orientation. The ECOS shows promise in the research, as it has good psychometric properties providing support for its concurrent validity, but more research is warranted using other samples to confirm its validation.

The Locus of Causality for Exercise Scale (LCE, Markland & Hardy, 1997) was developed to assess the extent to which an individual feels that they choose to exercise rather than feeling that they have to exercise. One of the main premises of self-determination is the perception of choice. This scale assess one's beliefs about who is control. If the individual feels as if their behavior is being controlled by someone else, then they have an external perceived locus of causality. An internal perceived locus of causality is when individuals feel as if they are in control of their own behavior and are acting of their own free will. Therefore, individuals feel more self-determined when they have an internal perceived locus of causality and less when they perceive an external locus of causality (Markland, 1999). The LCE has been shown to be a strong predictor of intrinsic motivation, and has proven to be reliable with alpha coefficients of .83 and .82 in two studies conducted by Markland and Hardy (1997). Markland (1999) found the LCE to measure self-determination as a moderator of the effects of perceived competence on intrinsic motivation.

Through measuring an individual's degree of self-determination to exercise, researchers are able to discern their motives for exercising. As individuals, hopefully, increase in their self-determination and motivation, they move through different phases or stages of exercise participation. As participation increases, an individual is likely to become less extrinsically motivated and more intrinsically motivated. The stages of change in the Transtheoretical model is one framework that has been used to examine the shift from extrinsic to intrinsic motives (Mullan & Markland, 1997).

Transtheoretical Model

The transtheoretical model is a psychological framework that evaluates an individual's readiness to change a behavior (Glanz et al., 1994). It focuses on the decision making of the

individual and is a model of intentional change (Velicer, Prochaska, Fava, Norman, & Redding, 1998). This model is composed of four main dimensions: stages of change, processes of change, self-efficacy, and decisional balance (Cardinal & Kosma, 2004; Cardinal, Tuominen, & Rintala, 2004; Kosma, Cardinal, & Rintala, 2002). The transtheoretical model has been used extensively in adherence research (DiClemente, Bellino, & Neavins, 1999; Glanz et al, 1994; Prochaska & DiClemente, 1983; Prochaska, Redding, Harlow, Rossi & Velicer, 1994); however, it is beyond the scope of this paper to provide a thorough review. Therefore, the focus in this paper is limited to exercise and college students. With that stated, the central organizing framework of the transtheoretical model is the stages of change (Dannecker, Hausenblas, Connaughton, & Lovins, 2003; Marcus, Eaton, Rossi, & Harlow, 1994; Prochaska & Velicer, 1997).

Stages of Change

The stages of change approach is widely used in the health field because it uses stages to track changes in behavior over time. This approach recognizes that behavior change requires both time and motivation because individuals vary in their readiness to make a change. The stages of change model is an effective tool in developing interventions that are specific to individual needs (Velicer et al., 1998). The assumption is that there are five stages through which individuals progress in order to change behavior (Cardinal & Kosma, 2004; Carron et al., 2003; Dannecker, etal., 2003; Dishman, 1994; Mullan & Markland, 1997).

The five stages, presented in Table 2, range from the individual having no thoughts to changing a behavior (precontemplation) to the final stage where an individual actively engages and sustains the new behavior (maintenance). These stages of change are seen as cyclic, meaning that an individual may regress through the stages many times before the change is

achieved and sustained (DiClemente, 1993; Mullan & Markland, 1997). It has been reported that for exercise and smoking cessation only about fifteen percent of those studied regress all the way back to the precontemplation stage (Velicer et al., 1998).

Table 2. Stages of Change

Stage	Stage Description
Precontemplation	Not intending to take action in foreseeable future (next six months)
Contemplation	Intending to change in the next six months
Preparation	Intending to take action in immediate future (within next month)
Action	Made specific overt modifications within past six months
Maintenance	Working to prevent relapse and are less tempted to relapse

Research Application. One of the earliest studies conducted on stages of change, exercise, and college students was done by Pinto (1995), who recognized the need for a "dynamic theoretical model to encourage programs to change behavior" (p. 27). A sedentary lifestyle was portrayed by an astoundingly large number of young adults in this private college with forty-six percent of the students exercising irregularly or not at all. These data were obtained retrospectively from a seven-page questionnaire that was mailed to a random sample of students. The questionnaire assessed a variety of health topics with physical activity being one of them. The data about physical activity yielded information about the type of exercise and frequency of participation.

Restrictions from the data allowed only three stages of change to be identified: contemplation, preparation, and action stages. Due to the absence of data on intention to exercise and measures of duration and intensity, this study represents a preliminary application to the stages of change approach. Also since this research was a post hoc examination of data,

results should be interpreted with caution. Findings were that 18% of the students sampled were in the precontemplation/contemplation stages, 28% were in the preparation stage, and 54% were in the action stage. No significant differences were found between men and women across stages. There also were no significant differences between year in school and stages of change. Based on the findings Pinto (1995) concluded that in order to make a difference and reach these students for life long activity, a tailored stages of change intervention must be developed as they transition from high school and from college.

Cardinal, Engels, and Zhu (1998) used stages of change to investigate preadolescents' physical activity and exercise behavior. The majority (87.3%) of the five to eleven year-old children were classified in the action or maintenance stages of change. However, beginning around nine years of age, the number of children in the maintenance stage began to decline with an increase in the number of children in the action stage. The children in the action phase may be equally active but they have not been active as long or consistently as those in the maintenance stage. This could point to the early beginnings of a decrease in regular physical activity that could carry over into the cycle of physical inactivity in their adult lives.

In line with this research, Rodgers, Courneya, and Bayduza (2001) studied three different populations in relation to the stages of change. These three populations were high school students, undergraduate university students, and employed adults. As with previous research (Prochaska &Velicer, 1997), there was no stage-by-population interaction supporting the notion that the model does apply to diverse populations. The pattern of change across the stages was the same regardless of the population studied. However, the main discriminating factor in this study was age. There were disproportionately more adults in the early stages of change and

fewer in the later stages of change as compared to the high school and university students. Limitations to this study include the cross-sectional design, small sample sizes (168 high school, 215 university, and 77 adults), and the self-report nature of the data.

Specifically, the stage of change research has begun to target universities and college aged students. A study of interest was conducted as an evaluation of a university course designed to promote exercise behavior (Cardinal et al., 2002). The students were enrolled in a lifetime fitness for health (LFH) course that lasted ten weeks. There were three groups in this study: (1) an experimental group, comprised of students enrolled in the LFH course; (2) a group with students who were previously enrolled in the LFH course; and (3) students with no prior experience with the LFH course.

Regardless of the group, there were no significant improvements in exercise activity from pre- to post-intervention. The results were discouraging with the minimal change in stages of change or exercise behavior over the ten week course. However, an implication was that the participants' stages of change for exercise may be an important moderating variable associated with exercise behavior change. Cardinal et al. (2002) suggested that behavioral skill development be taught in the course to encourage lifelong fitness.

Other studies have involved ethnically diverse college students (Suminski & Petosa, 2002), sedentary college students (Rosen, 2000), and African-American college women (Juniper, Oman, Hamm, & Kerby, 2004). Suminski and Petosa (2002) reported that there were higher percentages of minorities in the precontemplation and contemplation stages than were White students. Sedentary students who reported positive intentions to begin exercising were more likely to act on the intent leading to regular exercise which is consistent with the model's stages

of change. Intention to exercise is predictive of being physically active later when the subject has prior experience with exercise (Rosen, 2000). African-American women's levels of physical activity varied among the stages of change in the study by Juniper et al. (2004). Findings were that in the precontemplation stage, perceived barriers were significantly higher; whereas, perceived severity, cues to action, and self-efficacy were significantly lower.

Four studies to date have examined the relationship between self-determination theory and stages of change. Ingledew, Markland, and Medley (1998) examined the relationship between exercise motivation and stages of change and found that extrinsic motivation was the highest in the action stage, and it tended to be low in the maintenance stage. In a sample of 314 men and women, individuals who were in the first three stages of change were less self-determined than those who were in the action and maintenance stages (Mullan & Markland, 1997). Landry and Solmon (2004) found similar results among older African-American women as did Matsumoto and Takenaka (2004) in a Japanese sample. In Japan, less than 30% of the total population exercised for 30 minutes a day, more than twice a week. This study focused on motivational profiles and stages of change in exercise behavior. Those who were more self-determined were in the maintenance stage as they were more internally motivated to exercise, which led to maintaining behavior for long-term regular exercise (Matsumoto & Takenaka, 2004). These findings support the notion that self-determination increases across the stages of change in exercise.

Measurement. The stages of change for exercise behavior have been measured in two ways: stage of exercise change questionnaire (SECQ - Reed, Velicer, Prochaska, Rossi, & Marcus, 1997) and stage of change for exercise ladder (Beiner & Abrams, 1991; Mullan &

Markland, 1997; Callaghan, Eves, Norman, Chang & Lung, 2002). The SECQ consists of five items representing the five stages of change in the transtheoretical model. The participant is to indicate which stage reflects their current exercise behavior. For example if a participant is planning to begin an exercise behavior within the next month, then they would be classified as being in the preparation phase of exercise change. Much research has been conducted using the SECQ (Cardinal et al., 2002; Fallon & Hausenblas, 2004; Suminski & Petosa, 2002; Wyse, Mercer, Ashford, Buxton, & Gleeson, 1995) with a recent study conducted to validate the questionnaire (Dannecker et al., 2003).

The study was conducted with 152 university students who completed questionnaires as well as a maximal treadmill test (Dannecker et al., 2003). The findings partially supported the validity of the SECQ. There were significant differences among the stages of change for self-reported strenuous and moderate exercise behavior. Participants in the action and maintenance stages had the highest strenuous and moderate exercise behavior. However, the hypothesized pattern of stage differences were only partially supported; leading the researchers to point out methodological limitations and inherent difficulties in detecting validity of stages of change.

The contemplation ladder was originally designed by Biener and Abrams (1991) as a tool to measure the readiness to consider smoking cessation. It was designed to look like a ladder with the rungs representing the different stages of change. The stages of change were reworded to represent the stage of change for exercise ladder. The precontemplation stage is represented by the bottom rung and the maintenance stage is at the top of the ladder. The labels on the rungs represent the minimal requirements of a participant in each stage with each stage including the above two or three rungs until the next label. Validity for physical activity and

the ladder was reported by Marcus and Simkin (1993) by comparing the scores to the ratings on the Seven-Day Physical Activity Recall questionnaire. There were significant differences between the reported levels of physical activity and stages of change.

Processes of Change

To understand how individuals move from one stage to the next, ten processes of change have been identified. These processes of change are actions in which individuals engage to move from one stage to the next; therefore, they provide important guides for intervention programs (Velicer et al, 1998). The processes of change have been refined from a larger pool of concepts to 10 focal areas. These 10 processes have received the most empirical support in the transtheoretical research (Prochaska et al., 1994; Prochaska & DiClemente, 1983; Prochaska, Velicer, DiClemente, & Fava, 1988). The processes of change are presented in Table 3 (Callaghan, Eves, Norman, Chang, & Lung, 2002).

The processes are both cognitive-experiential and behavioral. The cognitive-experiential processes involve gathering new information that increases one's awareness of how exercise is beneficial, encouraging a change of attitude and feelings about exercise. These processes occur more often in the lower stages such as the precontemplation, contemplation, and preparation stages. However, the behavioral processes involve activities that change behaviors such as rewarding one self for exercising, having a friend encourage one to exercise, or placing reminders around to exercise. These behavioral processes occur in the higher stages such as the action and maintenance stages (Callaghan etal., 2002; Culos-Reed, Gyurcsik, & Brawley, 2001; Guillot, Kilpatrick, Hebert, & Hollander, 2004).

Table 3. Processes of Change for Exercise

Process of Change	Definition	Type of Process
Consciousness raising	Increasing knowledge about the benefits of exercise.	Experiential
Dramatic relief	Reacting to warnings about the risks of not exercising.	Experiential
Environmental reevaluation	Caring about consequences to others of not exercising.	Experiential
Self- reevaluation	Comprehending the benefits of exercising.	Experiential
Social liberation	Increasing healthy opportunities to exercise.	Experiential
Self-liberation	Committing yourself to exercise.	Behavioral
Counter-conditioning	Substituting alternatives: exercising as an alternative to not exercising.	Behavioral
Helping relationships	Enlisting social support to help you exercise more.	Behavioral
Reinforcement Management	Rewarding yourself when you exercise.	Behavioral
Stimulus Control	Reminding yourself to exercise.	Behavioral

The stages of change show the point at which behavioral change takes place, whereas the processes of change describe how the behavior changes are happening (Sullum, Clark, & King, 2000). Table 4 presents a graphic display of where in the stages of change the processes have the most emphasis.

Research has been limited on the processes of change and exercise, even though Prochaska and DiClemente (1992) emphasized the processes of change as the crux of the transtheoretical model (Marshal & Biddle, 2001; Rhodes, Berry, Naylor, & Higgins, 2004; Rosen, 2000). For example, in a meta-analysis of 71 studies across transtheoretical model domains Marshal and Biddle (2001) found that only 7 of the 71 studies addressed processes of change. This seems to be very limited in the light that there were 71 studies conducted applying the transtheoretical model to physical activity.

Table 4. Processes of Change as they progress through the Stages of Change

Precontemplation	Contemplation	Preparation	Action	Maintenance
Consciousness raising----------				
Dramatic relief----------				
Environmental reevaluation----------				
----------Self-reevaluation----------				
--------Social liberation----------				
----------Self-liberation----------				
----------Counter-conditioning------				
----------Helping relationships----------				
-----Reinforcement management--------				
Stimulus control				

There has been debate over the use of the two item aggregated processes (behavior and experiential) or the ten item-aggregated processes (all 10 processes); as well as, their importance across the stages of change. After their meta-analysis, Marshal and Biddle (2001) were still unclear of the role of processes of change for physical activity. They concluded that the stage of change by processes interaction, as well as evidence of higher order constructs in exercise applications was not well documented.

Using a sample that included three separate populations (high school students, undergraduate students, and employed adults), Rodgers et al. (2001) found that there was a distinct increase in the use of processes as participants advanced through the stages. The undergraduate students reported using all the processes more than the high school students and adults. The researchers hypothesized that this result could be because the students have fewer constraints and a more flexible daily schedule. College students also have a greater chance of being exposed to exercise-related information that could affect their processes of change. The behavioral processes seem to be more sensitive to exercise-behavior change than the cognitive processes.

Measurement. Processes of change are measured using the Processes of Change Questionnaire (PCQ) developed by Marcus, Selby, Niaura, and Rossi (1992). The instrument contains forty questions that measure the ten processes of change. The measure was validated in a study of a worksite health promotion project. Over one thousand employees were administered the stages of change and processes of change questionnaires. The workers used all ten processes of change in such a manner that the experiential and behavioral constructs were ranked (Dallow & Anderson, 2003).

Validation of this instrument in an adolescent population did not fare as well (Rhodes et al., 2004). Only four of the processes were found to be applicable for adolescents with Social Liberation not being supported at all. Findings of this study were that the simple correlated processes (10 processes) fit the data better than the higher order behavioral or experiential constructs. The data for the processes across the stages of change showed counter conditioning to be the critical process for exercise behavior change, while the experiential processes were not supported across the stages of change in adolescents.

Decisional Balance

Decisional Balance (Janis & Mann, 1977) reflects an individual's struggle to weigh the pros and cons of an activity or changing of an activity (Velicer, DiClemente, Prochaska, & Brandenberg, 1985). Specifically to exercise, it can be thought of as a balance between the benefits and costs of exercising. This balance changes as an individual make his/her way through the stages of change. It has been hypothesized that decisional balance (pros minus the cons) increases from precontemplation to maintenance (Prochaska & Velicer, 1997).

The changing of stages does not occur in a linear fashion, rather individuals may progress and regress through the stages. As an individual attempts progression, they either

succeed or fail in those efforts, affecting their cognitive and behavioral processes of change which also causes the decisional balance to shift. For most behavioral changes, it is difficult to adhere because the sacrifices (cons) are immediate and the benefits (pros) are not. During precontemplation, an individual may be easily persuaded by the cons of exercising. They may feel that exercise is too hard and not worth the effort. As one begins to exercise and progresses from preparation to action, the pros for exercising begin to outweigh the cons on the decisional balance scale. Finally, as one moves toward maintenance, one has to concentrate on the pros of exercising to keep the scale tipped in favor of the activity or one might increase their risk of relapse (Plotnikoff, Blanchard, Hotz, & Rhodes, 2001).

Sullum, Clark, and King (2000) demonstrated this need to tip the scale toward the pros in their research for predictors of exercise relapse in a college population. Fifty students volunteered to participate in the study. The criterion for inclusion was that the students exercised at least three times per week for at least 20 minutes per session. Baseline data were collected in October with a follow-up in December. Other aspects of the transtheoretical model were also assessed; but in relation to decisional balance, the con statements differed by stage of change at baseline, whereas the pro statements increased. These findings suggest that in order to reduce the risk of relapse, practitioners must initially focus on interventions that will reduce the cons. Once the reduction of cons occurs, the focus should be shifted to highlight the pros of exercise, thereby increasing and maintaining students' motivational levels.

Plotnikoff et al. (2001) conducted a large longitudinal study with Canadian adult exercisers to test the validity and reliability of the decisional balance scale. They concluded that it is of outmost importance for practitioners to provide strategies in the pre-action stages to decrease the cons and in the action and maintenance stages to reinforce the pros. Nigg (2001)

supports this notion but she also adds that as exercise becomes "ingrained," the pros may not be as important in determining exercise adherence, as the decision making process seems to be where the weighing of the pros and cons is most important. In addition, Nigg also calls for further research to determine if the pros of continuing regular exercise are the same as the pros for adopting an exercise regimen.

Measurement. The Decisional Balance Scale (DBS; Marcus, Rakowski, & Rossi, 1992) assesses one's attitudes (pros and cons) towards exercise. The pros represent the advantages of exercise while the cons represent the disadvantages. Participants are asked to indicate how important each question is in their decision to exercise by using a five-point Likert scale (1 = not at all important, 5 = extremely important). An example of a pro question is "Regular exercise would help me relieve tension or stress" and a con question is "I would have less time for my family and friends if I exercised regularly." The scale is scored by adding the responses to the pro questions, the responses to the con questions, and then by subtracting the con total from the pro total to create a decisional balance difference score.

Validity and reliability were tested in a large longitudinal study of 1602 Canadian adults through three different telephone interviews over a period of a year (Plotnikoff et al., 2001). Internal consistency coefficients were acceptable for the pros and cons over the three time periods. Concurrent validity was established with the exercise self-efficacy and intention measures, with pros and cons positively and negatively correlating respectively to these constructs. The strength of the scale was also measured over the period of a year with differences in seasons being assessed. This study helped establish content, factorial, concurrent and construct validity along with internal consistency and test-retest reliablity.

Self-Efficacy

Self-efficacy is the belief or perception regarding one's ability to complete a given task (Bandura, 1986). In the constructs of the transtheoretical model and exercise, self-efficacy is the belief or confidence that one can overcome obstacles to participate in exercise (Leenders, Silver, White, Buckworth, & Sherman, 2002; Marcus et al., 1992). Bandura (1982) proposed that motivation to perform a certain behavior was based on two factors: expectations of outcome and cognitions about self-efficacy. Research has consistently shown self-efficacy to be the strongest predictor of exercise behavior (Buckworth, Granello, & Belmore, 2002; Marcus & Owen, 1992; Sullum et al., 2000). The scope of this paper does not allow for a thorough review of self-efficacy; the focus of this section is on self-efficacy in respect to college students and physical activity.

Self-efficacy increases significantly from the precontemplation stage of change to the maintenance stage. Those individuals with low perceived confidence in their ability to exercise are more likely to be inactive compared to those with high levels of perceived confidence (Leenders etal., 2002; Silver, Buckworth, Kirby, & Sherman, 2000). Recent research has shown that self-efficacy accounts for the majority of variance between the stages of change and exercise (Cardinal, etal., 2004; Marshal & Biddle, 2001; Wallace & Buckworth, 2001). Self-efficacy has consistently been positively associated with being physically active, stage of change for physical activity, and adherence to physical activity programs (USDHHS, 1996). Research findings have supported the premise that self-efficacy is predictive of exercise adherence in college students with a low self-efficacy resulting in a greater likelihood of relapse (Sullum et al., 2000).

Barrier self-efficacy relates to a person's situation specific self-confidence in the face of barriers (Cardinal et al., 2004; Cardinal & Kosma, 2004). This concept has been targeted as a guiding force to produce change in exercise habits and exercise adherence by identifying young adults' barrier self-efficacy for exercise. Cardinal et al. (2004) conducted a cross-cultural comparison study of American and Finnish college students' exercise behaviors. The only cultural difference observed was that American students rated themselves higher on barrier self-efficacy than did the Finnish students. For example, American students reported that they were more confident that they would exercise when it was raining compared to the Finnish students. Barrier self-efficacy was found to have a 35% unique variance out of the ten variables studied. A weakness of this study is that the Finnish students were older which could imply that the barriers on the self-efficacy scale were more substantial to the Finnish students' responsibilities.

Measurement. The Self-efficacy questionnaire (Marcus et al., 1992) was developed to measure individuals' confidence in their ability to sustain exercise in various situations. The five item questionnaire is scored based on a five point Likert scale with one equaling not at all confident and five equaling very confident. An example question is " I am confident I can participate in regular exercise when I am tired." Different researchers have developed variations of this scale to meet their population needs (Callaghan et al., 2002; Gorely & Gordon, 1995). Marcus and Owen (1992) found the internal consistency scores to range from .80 to .85 in two different studies while Marcus et al. (1992) reported a test-retest reliability of .90.

The Physical Exercise Self-efficacy scale (PESES, Schwarzer & Renner, 2004; Brown, 2005) has been used in recent research as a measure used to assess self-efficacy and exercise. The PESES is a five item scale that is measured on a four point Likert scale (1 = very uncertain,

4 = very certain). The scale is set up with a question at the beginning that asks "How certain are you that you could overcome the following barriers?" The opening question is followed by the statement, " I can manage to carry out my exercise intentions,.....", which is followed by five phrases that conclude the statement: "1. even when I have worries and problems. 2. even if I feel depressed. 3. ...tense. 4. ...tired. 5. ...busy." Brown (2005) found that item-total correlations were good (r=.4 to .76) and internal consistency was excellent (Cronbach's alpha = .88). Validity was supported by a moderate correlation with exercise intention (r=.33) and physical activity behavior (r=.39) at a 6 month follow-up.

Self-efficacy can also be measured by the Barriers-efficacy scale (McAuley & Mihalko, 1998). This scale assesses participants' ability to exercise in the face of barriers. Examples of barriers are bad weather, boredom, lack/loss of interest, pain, discomfort, and exercising alone. Individuals rate their degree of confidence that they would exercise in the event that a barrier were to occur. The rating is done on a 0% - 100% scale (0% = not tempted at all, 50% = somewhat tempted, and 100% = extremely tempted). Marcus, Eaton, Rossi, and Harlow (1994) found the instrument to be internally reliable (α=.82) and stable (test-retest reliability = .90). The internal consistencies of the English and Finnish versions were .81 and .90, respectively (Cardinal et al, 2004). This scale appears to have the most promise in the college research. It could help college students identify the barriers; so that, they could recognize them and work to overcome them. The Cardinal et al. (2004) research has demonstrated that it is applicable to the college population.

Temptation

Another dimension of TM that has recently been studied is temptation. Temptation has been hypothesized to be the missing piece of the TM puzzle within the physical activity domain

(Cardinal et al., 2004; Dannecker et al., 2000). Temptation is defined as the intensity of urges to engage in a specific behavior when in the midst of a difficult situation (Fallon & Hausenblas, 2004; Velicer et al., 1998). The temptation not to exercise is being studied as a unique form of self-efficacy (Cardinal et al., 2004). Temptation not to exercise is experienced more by those in the precontemplation stages of change, while those in the maintenance stages experience the least amount of temptation. Therefore, temptation should vary inversely with self-efficacy with equal amounts of both temptation and self-efficacy occurring in the action stage (Fallon & Hausenblas, 2004).

Change is hard and it is easy to relapse to old habits. The three most common types of tempting situations are negative affect or emotional distress, positive social situations, and cravings (Velicer et al., 1998). While these may be the most common in addiction research, the positive and negative effects do not differentiate in relation to exercise (Hausenblas et al., 2001). Two factors that did differentiate in the exercise research were affect and competing demands. The affect factor represents the elements of temptation such as anger, stress, and satisfaction. The competing demands factor includes items that represent laziness, lack of time, and being too busy. These factors emerged from the data collected from college students to specifically represent the college aged population and encompassed the most frequently cited reasons for ceasing to exercise or for leading a sedentary lifestyle.

As interventions are employed on college campuses, temptation will become an important construct for maintenance of exercise (Hausenblas et al., 2001). It could help target where relapse from exercise could occur to help develop more appropriate exercise prescriptions for individuals. Using the maintenance stage for example, temptation is one of the

best predictors of relapse from a behavior even though the individual has successfully been performing that behavior for at least six months (Redding & Rossi, 1999). The temptation to not exercise has been found to decrease with the increase of exercise as the stage of change increases, but it does not "disappear completely" (Hausenblas et al., 2001).

Measurement. The Temptation to Not Exercise Questionnaire (Hausenblas et al., 2001) measures the intensity of temptations to not exercise. It contains two subscales: Competing Demands and Affect. Examples of competing demands are lack of time and too busy. Affect examples are anger, stress, and satisfaction. Participants rate their temptation not to exercise to a variety of situations on a scale of 0% (not tempted at all) to 100% (extremely tempted). The higher score indicates a greater amount of temptation to not exercise. Hausenblas et al. (2001) developed and validated the Temptation to Not Exercise Questionnaire. They found in their second study that the internal consistency values were .81 and .86 for Affect and Competing Demands, respectively. The Affect and Competing Demands scales were inversely related to self-efficacy (r's = -.54 and -.51, respectively).

Transtheoretical Model Measurements

Marshal and Biddle (2001) voiced their concerns and questions about measurement issues as they conducted their meta-analysis on the transtheoretical model of behavior change and its application to physical activity and exercise. They found an increasing need for standardization to improve the reliability of measurement. They concede that having multiple measures of the same variable provides construct validity but it has the potential to present problems with regard to reliability. Their recommendation is for researchers to use a consistent response format for participants to answer. This would aid in reliability and decrease measurement error.

Interventions

The Transtheoretical Model suggests that for successful behavioral change to occur, interventions must be tailored to an individual's current stage of change and make use of the appropriate processes of change. Traditional interventions to increase physical activity have had some short term success but there has been minimal success in achievement of long term exercise adherence (Dishman, 1991).

Adams and White (2003) reviewed 26 studies to determine if activity promotion interventions based on the transtheoretical model were effective. They found 73% (11 of 15) of the short term studies reported positive effects of interventions over control conditions while only 29% (2 of 7) of the long term (more than 6 months) studies did. A number of the studies reviewed reported an effect on the stage of change without a coinciding effect on activity levels. While effects on the stage of change are good, one would hope to see increases in activity levels that lead toward exercise adoption and adherence. There was also a significant increase in activity or stage of activity change in a number of studies reviewed that was attributed to the brief transtheoretical model based intervention. The overall conclusion was that the transtheoretical model based interventions are effective in increasing physical activity for a short term but more research needs to be conducted on the long term effects. None of the 26 studies were conducted with college students.

Dallow and Anderson (2003) targeted 58 sedentary, obese women in their study, using self-efficacy and the transtheoretical model to develop a physical activity intervention. The design consisted of a 48 week trial. Subjects were randomly assigned to one of two intervention groups: a treatment group (lifestyle group) and a control group (usual care group). The

lifestyle group met once a week for 16 weeks and then every other week to discuss curriculum content that included the processes of change and self-efficacy. The usual care group received a free membership to a health club for 24 weeks with four educational group classes on how to start their exercise programs. The treatment group had significant and positive changes in processes of change, self-efficacy, physical activity levels, and cardiorespiratory endurance. The control group only had significant changes in two of the processes of change with no other reported significant changes. The researchers concluded that a theory based intervention is more likely produce positive results than a traditional exercise program.

Although no intervention studies were found with college students using the transtheoretical model, there have been recommendations as to how to get college students to be more physically active. Recently, researchers have advocated using personality assessments in helping college students adopt and maintain exercise behaviors (Buckworth, Granello, & Belmore, 2002). They conducted a study with 168 undergraduate students who completed a demographics questionnaire and three self-report instruments: the stages of change, exercise self-efficacy, and Myers-Briggs Type Indicator questionnaire. According to Buckworth et al. (2002), findings were that individuals who are extraverts are more successful in their exercise programs, have more confidence (self-efficacy) when faced with barriers, and are able to overcome them more often. This is important in the implementation of intervention in that the intervention should be tailored to the individual and to the individual's stage of adherence. Students in the early stages need to focus on improving exercise self-efficacy in their intervention while those in the contemplation stage need to concentrate on cognitive and behavioral interventions to overcome barriers to exercise. The action stage participants are at

risk to relapse so their interventions should be geared toward overcoming specific barriers that put them at risk. Regardless, all students could benefit from tracking their exercise adherence and successes to help increase their exercise adherence.

Gyurcsik, Bray, and Brittain (2004) targeted students as they made the transition from high school to college, specifically 132 female freshman university students between the ages of 17 and 19 years. A semi-structured, open-ended questionnaire was used to assess the barriers to physical activity. Participants were to list up to five barriers to vigorous physical activity. The majority of these students were not active, and researchers argued that it is important to target barriers that are keeping them from exercising. The barriers identified by students were categorized into a composite of intrapersonal, interpersonal, institutional, community, and physical environmental factors. Some examples of cited barriers to exercise within these categories were: social invitations during one's exercise time, school work, jobs, and lack of sleep. Implications for interventions in this study focused not only on negotiating the barriers but also on increasing coping self-efficacy. These researchers contend that it is important to equip freshmen students with coping skills to handle all the transitions they are experiencing to increase their self-efficacy and thus, hopefully, increase their physical activity. This study did not implement any specific strategies.

The temptations not to exercise are another viable avenue for interventions. Specifically for college students, it was found that the Competing Demands component is the most pronounced temptation for not exercising (Hausenblas et al., 2001). Interventions for this population have to determine where prevention of relapse can be targeted so that students can successfully maintain an exercise regimen. The ability to assess temptation could contribute to

the development of more appropriate exercise prescription guidelines and aid in attaining the national physical activity recommendations (USDHHS, 1996).

Issues for Extending Research

A recent study conducted on "American adults' knowledge of exercise recommendations" (Morrow et al., 2004) found that adults have knowledge of traditional physical activities but have little understanding of lifestyle physical activities. These researchers suggested that there is a need for more education about the latest physical activity and exercise recommendations. To reach the United States' goals for Healthy People 2010, knowledge through education and adoption of healthful physical activity is essential. There is a gap in the research where this knowledge through education is occurring and how it affects individual adherence to exercise.

In an effort to encourage the distribution of this knowledge, the American College Health Association sponsored a task force on the National Health Objectives that developed a campaign in conjunction with Health People 2010 called Healthy Campus 2010: Making It Happen (American College Health Association, 2000). The mission statement clearly states it is to help institutions of high education make health objectives a priority by recommending strategies, providing information, and promoting health programs. Ten health objectives have been identified of which physical activity is the number one leading health issue in colleges.

It is clear increasing physical activity in this population is a priority. Only 13 out of 125 state institutions of higher learning surveyed by Kittleson and Ragon (1984) required a health-related course for graduation. According to Pearman et al. (1997), a required lifetime health and physical education course had positive effects on alumni's physical activity levels. More

research is needed to determine if a required health and physical education course increases students' physical activity levels as compared to those students who have not taken the course. There is a need to design and test theoretically based interventions in these courses to document their effectiveness.

Many questions need to be answered with regard to physical activity and the college population. Recently, research investigating college students has been on the rise; but unfortunately, much of the early research conducted was to validate instruments (Dannecker et al., 2003), to determine exercise regulations and motivations (Wilson et al., 2004), or to determine differences in exercise adherence that exist between groups such as ethnic diverse groups (Suminski & Petosa, 2004), gender (Clement et al., 2004), and cross cultural comparisons (Cardinal et al., 2004).

Recently, however, researchers have begun to examine why college students are or are not exercising using the transtheoretical model and exploring what interventions can be employed to increase the activity. The majority of studies conducted have staged participants or have been of a cross-sectional nature which in turn provide weak evidence of stage theories (Marshal & Biddle, 2001). The transtheoretical model based interventions are effective in increasing physical activity for a short term but more longitudinal studies need to be conducted to provide evidence to validate the transtheoretical model. In providing this evidence, research needs to include all five of the transtheoretical model constructs simultaneously to help quiet criticism that they are not being used together (Buckworth, 2001; Culos-Reed et al., 2001).

Mullan and Markland's (1997) findings, that as an individual increases in self-determination they become intrinsically motivated which leads to an increase in physical

activity, could lead to implications for practice in college settings. Given that individuals at higher stages of change are more self-determined, interventions need to be designed to facilitate self-determination which leads to the progression across stages of change. There is little research based evidence to guide these interventions.

Implications for Practice

Although there continues to be a need for research-based evidence concerning the efficacy of intervention strategies, there are several implications for practitioners that can be supported by the existing evidence. The first key is to develop an autonomous environment using the self-determination theory to increase young adults' stages of change and physical activity levels. An autonomy supportive environment provides a good reason for asking someone to participate, gives some choices to the person, acknowledges the person's feelings toward the activity, and encourages the person to take initiative and to be confident in their ability to participate (Williams,Gagne, Ryan & Deci, 2002). Gagne (2003) in her research of autonomy support and autonomy engagement of college students reports that autonomy support helps prevent negative outcomes such as dropout or turnover. Specific strategies that have been identified include:

1. Implement classroom settings for physical activity that are autonomy supportive rather than controlling. Allow students to make their own choices as to the activities they choose to be physically active (Cardinal et al., 2002).

2. Set attainable standards of physical activity in their courses to nurture competence (Ferrer-Caja & Weiss, 2000).

3. Tailor interventions according to individuals' stages of change l(Pinto, 1995).

4. Support the need for relatedness in college students by providing a social support that would encourage their participation in physical activity (Ryan & Deci, 2001).

5. Identify determinants of physical activity in first-year college students to develop interventions to maintain or increase physical activity (Bray & Born, 2004).

Summary and Discussion

The status of young American adults' health and physical activity seems to be on the decline. The teenage years and young adult stage have been targeted as a critical time in adoption and maintenance of exercise behaviors that will influence an individual's life long level of physical activity (Sullum et al., 2000). Unfortunately, participation in regular physical activity drops dramatically during these years. The U.S. Department of Health and Human Services (2000) reported that 70% of 12-year-olds participate in physical activity while 42% of men and 30% of women aged 21-years-old participate in physical activity.

Young adults seem to be particularly vulnerable because of the changes they go through once they leave home where they are out of the structure of a high school routine. There is a need for research to determine how formal education about physical fitness in a college setting could increase the percentage of young adults being physically active by intervening and re-establishing an exercise routine into their lifestyles. This need for research is reinforced in the objectives of HEALTHY CAMPUSES 2010. One objective calls for the increase in college students who have received information on physical activity and fitness while another objective looks to increase physical activity in college students to at least three times per week for thirty minutes. Therefore since statisticians are projecting that by the year 2010 there will be 17.1 to 18.2 million students attending undergraduate institutions for higher learning, these students are

obviously a significant target population for public health initiatives and research (Gerald & Hussar, 2000)

It seems ironic that the subject of physical fitness is often ignored on college campuses when it seems beneficial for universities to require a general course on health and physical fitness. Students' awareness and knowledge of health education can reduce morbidity and their cost of health care (Kittleson & Ragon, 1984). A key aspect of public health initiatives related to the college population is to test the effectiveness of programs designed to promote physical activity. Data-based studies that supports the notion that these interventions are effective will provide evidence that college students should be required to complete courses that will empower them to make wise choices concerning engaging in physical activity over their lifespan.

In an effort to synthesize the data on college student's physical activity, two theoretical approaches were reviewed: self-determination theory and the transtheoretical model. The contributions of both were discussed, as these two theories have been utilized extensively in exercise adherence research. Specifically, self-determination and the stages of change have been utilized together to show that as an individual increases in self-determination, they become intrinsically motivated which leads to an increase in physical activity (Mullan & Markland, 1997). Interventions that are designed to foster a student's sense of autonomy, competence, and relatedness in relation to his/her physical activity should increase the student's intrinsic motivation that will lead to engagement in long-term physical activity. These theoretical predictions need to be tested in data-based studies to determine their effectiveness.

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APPENDIX B: INSTRUMENTATION

Behavioral Regulation in Exercise Questionnaire

The following is a list of reasons why you might choose to exercise. Respond to each statement using the scale given on the basis of how true that response is for you.

1 - not true for me
2 - hardly ever true for me
3 - somewhat true for me
4- true for me
5- very true for me

Why do you exercise?

____1. I exercise because other people say I should.

____2. I feel guilty when I don't exercise.

____3. I value the benefits of exercise.

____4. I exercise because it's fun.

____5. I take part in exercise because my friends/family/spouse say I should.

____6. I feel ashamed when I miss an exercise session.

____7. It's important to me to exercise regularly.

____8. I enjoy my exercise sessions.

____9. I exercise because others will not be pleased with me if I don't.

____10. I feel like a failure when I haven't exercised in a while.

____11. I think it is important to make the effort to exercise regularly.

____12. I find exercise a pleasurable activity.

____13. I feel under pressure from friends/family to exercise.

____14. I get restless if I don't exercise regularly.

____15. I get pleasure and satisfaction from participating in exercise.

Scoring Information

External Regulation: 1, 5, 9, 13
Introjected Regulation: 2, 6, 10
Identified Regulation: 3, 7, 11, 14
Intrinsic Motivation: 4, 8, 12, 15

Motives for Physical Activities Measure - Revised (MPAM-R)

The following is a list of reasons why people engage in physical activity/sport, respond to each question (using the scale given), on the basis of how true that response is for you.

1	2	3	4	5	6	7
not at all true for me						very true for me

1. Because I want to be physically fit.
2. Because it*s fun.
3. Because I like engaging in activities which physically challenge me.
4. Because I want to obtain new skills.
5. Because I want to look or maintain weight so I look better.
6. Because I want to be with my friends.
7. Because I like to do this activity.
8. Because I want to improve existing skills.
9. Because I like the challenge.
10. Because I want to define my muscles so I look better.
11. Because it makes me happy.
12. Because I want to keep up my current skill level.
13. Because I want to have more energy.
14. Because I like activities which are physically challenging.
15. Because I like to be with others who are interested in this activity.
16. Because I want to improve my cardiovascular fitness.
17. Because I want to improve my appearance.
18. Because I think it*s interesting.
19. Because I want to maintain my physical strength to live a healthy life.

20. Because I want to be attractive to others.
21. Because I want to meet new people.
22. Because I enjoy this activity.
23. Because I want to maintain my physical health and well-being.
24. Because I want to improve my body shape.
25. Because I want to get better at my activity.
26. Because I find this activity stimulating.
27. Because I will feel physically unattractive if I don*****t.
28. Because my friends want me to.
29. Because I like the excitement of participation.
30. Because I enjoy spending time with others doing this activity.

Scoring Information

Interest/Enjoyment: 2, 7, 11, 18, 22,26,29

Competence: 3, 4, 8, 9, 12, 14, 25

Appearance: 5, 10, 17, 20, 24,27

Fitness: 1, 13, 16, 19, 23

Social: 6, 15,21,28,30

Physical Activity Stages of Change Questionnaire

For each of the following questions, please circle Yes or No. Please be sure to read the questions carefully.

Physical activity or exercise includes activities such as walking briskly, jogging, bicycling, swimming, or any other activity in which the exertion is at least as intense as these activities.

1.) I am currently physically active. NO YES

2.) I intend to become more physically active in the next 6 months. NO YES

For activity to be regular, it must add up to a total of 30 minutes or more per day and be done at least 3-5 days per week. For example, you could take one 30-minute walk or take three 10-minute walks for a daily total of 30 minutes.

3.) I currently engage in regular physical activity. NO YES

4.) I have been regularly physically active for the past 6 months. NO YES

Scoring Algorithm:

Precontemplation: Question One = No; Question Two = No

Contemplation: Question One = No; Question Two = Yes

Preparation: Question One = Yes and Question Three = No

Action: Question One = Yes; Question Three = Yes; and Question Four = No

Maintenance: Question One = Yes; Question Three = Yes; and Question Four = Yes

Decisional Balance

This section looks at positive and negative aspects of exercise. Read the following items and indicate how important each statement is with respect to your decision to exercise or not to exercise in your leisure time. Please answer using the following 5-point scale:

1 = Not important
2 = A little bit important
3 = Somewhat important
4 = Quite important
5 = Extremely important

If you disagree with a statement and are unsure how to answer, the statement is probably not important to you.

How important are the following opinions in your decision to exercise or not to exercise?

____ 1. I would have more energy for family and friends if I exercised regularly.
____2. I would feel embarrassed if people saw me exercising.
____3. I would feel less stressed if I exercised regularly.
____4. Exercise prevents me from spending time with my friends.
____5. Exercising puts me in a better mood for the rest of the day.
____6. I feel uncomfortable or embarrassed in exercise clothes.
____7. I would feel more comfortable with my body if I exercised regularly.
____8. There is too much I would have to learn to exercise.
____9. Regular exercise would help me have a more positive outlook on life.
____10. Exercise puts an extra burden on my significant other.

Scoring: 1, 3, 5, 7, 9 - pros 2, 4, 6, 8, 10 - cons

Physical Exercise Self-Efficacy Scale

Please respond to the following questions using this response format:

(1) very uncertain (2) rather uncertain (3) rather certain (4) very certain

How certain are you that you could overcome the following barriers?

I **can manage to carry out my exercise intentions, ...**

____1. ... even when I have worries and problems.

____2.... even if I feel depressed.

____3. ... even when I feel tense.

____4. .... even when I am tired.

____5. .... even when I am busy.

Godin Leisure-Time Exercise Questionnaire

1. During a typical 7-Day period (a week), how many times on the average do you do the following kinds of exercise for more than 15 minutes during your free time (write on each line the appropriate number).

Times per week

A). **Strenuous Exercise** _____

(HEART BEATS RAPIDLY)

(e.g., running, jogging, football, soccer,
basketball, vigorous swimming,
vigorous long distance bicycling)

B). **Moderate Exercise** _____

(Not Exhausting)

(e.g., fast walking, baseball, tennis,
easy bicycling, volleyball, badminton,
easy swimming, popular dancing)

C). **Mild Exercise** _____

(Minimal Effort)

(e.g., yoga, archery, fishing, bowling,
golf, horseshoes, easy walking)

2. During a typical 7-Day period (a week), in your leisure time, how often do you engage in any regular activity long enough to work up a sweat (heart beats rapidly)?

Often _____ Sometimes_____ Never/Rarely_____

Calculations:

For the first question, weekly frequencies of strenuous, moderate, and light activities are multiplied by nine, five, and three, respectively. Total weekly leisure activity is calculated in arbitrary units by summing the products of the separate components, as shown in the following formula:

Weekly leisure activity score = (9 x Strenuous) + (5 x Moderate) + (3 x Light)

The second question is used to calculate the frequency of weekly leisure-time activities pursued "long enough to work up a sweat" (see questionnaire).

Example

Strenuous = 3 times/wk

Moderate = 6 times/wk

Light = 14 times/wk

Total leisure activity score = (9 x 3) + (5 x 6) + (3 x 14) = 99

Consent Form

1. **Study Title:** College Students' Motivation for Physical Activity
2. **Performance Site:** Louisiana College
3. **Investigator:** The following investigator is available for questions about this study, M-F, 9:00am - 2:00 pm. Lori McGaha DeLong (318) 613-1844 ldelong@lacollege.edu
4. **Purpose of the Study:** The purpose of this study is to examine college students' motivations to be physically active by merging the perspectives of the self-determination theory and transtheoretical model. The secondary purpose is to examine the effects of a required physical activity course on college students' levels of physical activity.
5. **Subject Inclusion:** Male and female college students enrolled in Louisiana College during the Spring semester of 2006.
6. **Study Procedures:** Flyers will be placed in each students mailbox as well as a mass email sent to each student to implore them to fill out the web-based surveys. Data collection will occur during the months of March and April. Follow-ups will occur in April as a reminder for those who have not filled out the survey.
7. **Benefits:** The subjects will receive no benefits from participation.
8. **Right to Refuse:** Students may choose not to participate in the study without penalty or loss of any benefit to which they might otherwise be entitled.
9. **Privacy:** Subjects identity will remain confidential unless the law requires disclosure but subjects do agree to the researcher having full disclosure to fitness records if available.
10. **Signatures:**

If I have any questions or concerns about this study, I may contact the investigator with the above contact information. If I have any questions about subject's rights or other concerns, I can contact Robert C. Mathews, Institutional Review Board, (225) 578-8692. I have read and agree to participate in the study as described above. **____YES** **_____NO**

Demographic Information

Name:_____

Age:_____

Male / Female

What semester and year did you first enroll in college?_____

What is your classification now? _____

Have you completed the HP 100 - Personal Fitness course at Louisiana College? Yes No

If so, what semester and year did you complete it?_____

Since the completion of the HP 100 Personal Fitness course, what influence has the class had on your physical activity levels?

Do you think the course helped prepare and influence you for a lifetime of physical activity?

APPENDIX C: RAW DATA

db	se	ext	intj	idt	inst	intjoy	comp	app	fit	rai	socl	soc	godn
13.00	1.80	1.25	3.00	3.75	3.75	4.29	4.14	6.67	6.20	2.94	3.40	4	39
8.00	2.00	1.25	2.67	3.25	4.00	5.00	4.86	4.17	5.60	2.85	3.80	5	27
12.00	4.00	1.75	4.00	3.75	3.50	5.00	5.43	7.00	6.00	2.81	4.40	5	96
14.00	3.00	1.50	3.00	4.75	4.00	5.86	5.86	6.33	6.80	3.19	2.40	5	43
-4.00	2.20	1.00	1.00	2.25	2.25	1.29	1.57	2.67	4.20	1.44	1.00	2	26
7.00	1.60	1.75	2.00	2.75	2.25	1.86	2.00	4.83	3.40	1.44	1.00	3	49
6.00	2.60	1.50	2.67	4.25	4.00	4.86	5.71	5.17	5.40	2.98	3.80	4	76
2.00	3.00	1.50	4.33	5.00	4.75	6.86	6.14	7.00	7.00	3.96	6.60	4	37
17.00	4.00	1.00	5.00	5.00	5.00	7.00	6.71	3.67	7.00	4.50	3.40	5	92
8.00	2.60	2.75	1.67	2.25	1.75	2.14	4.00	4.50	4.00	.48	3.60	4	42
14.00	2.20	2.50	2.67	2.50	3.00	3.71	3.43	5.50	6.00	1.54	4.00	2	44
12.00	2.00	1.00	3.00	4.25	4.75	5.57	5.14	5.33	5.60	3.69	4.00	5	58
19.00	3.40	1.25	4.67	4.75	5.00	6.43	6.43	7.00	7.00	4.23	3.60	5	49
16.00	3.20	1.00	1.67	2.50	3.50	4.57	5.71	6.50	4.60	2.29	2.20	4	64
10.00	2.00	2.25	2.00	3.00	3.00	4.14	5.14	4.00	4.20	1.63	2.20	5	29
9.00	2.80	1.00	3.00	3.25	4.00	5.00	4.00	4.17	4.60	3.06	2.40	4	28
18.00	3.40	2.25	2.33	4.50	4.25	7.00	7.00	6.50	7.00	2.71	5.00	5	101
14.00	3.20	2.00	3.33	4.25	3.75	4.71	5.71	6.50	6.00	2.77	4.00	5	62
14.00	2.40	3.00	3.67	4.00	3.25	6.14	6.57	7.00	7.00	2.04	5.80	5	28
10.00	2.80	2.25	4.00	4.50	3.25	5.57	6.14	5.33	6.60	2.63	2.80	5	56
14.00	3.20	1.25	4.00	4.00	4.00	5.71	6.71	5.83	6.20	3.38	5.20	5	82
9.00	3.00	2.25	3.67	4.25	4.50	5.86	6.57	6.67	6.60	3.10	4.80	2	63
6.00	2.80	1.25	1.67	3.75	4.25	4.29	4.43	5.17	6.20	2.85	1.60	5	25
13.00	3.60	1.00	3.67	4.00	4.50	5.29	3.57	2.83	6.20	3.67	2.80	4	64
17.00	2.60	1.00	2.00	3.75	4.00	7.00	7.00	4.00	6.20	2.94	6.00	5	59
13.00	3.20	1.00	4.33	3.75	4.25	4.43	5.29	6.50	4.40	3.65	2.00	5	54
16.00	1.80	1.75	4.33	4.25	4.25	5.14	6.00	7.00	6.80	3.40	3.20	5	71
11.00	2.80	1.00	4.33	5.00	5.00	5.71	6.29	4.50	6.40	4.33	3.40	3	17
17.00	4.00	1.50	3.00	5.00	4.25	4.57	5.57	6.50	7.00	3.38	2.80	5	98
7.00	3.00	3.00	3.00	3.00	3.00	4.57	4.57	4.67	4.80	1.50	4.40	2	31
9.00	2.60	2.00	1.33	3.00	3.00	2.86	2.86	2.50	3.20	1.58	3.20	3	17
14.00	2.60	2.00	1.00	3.50	3.00	4.71	4.71	3.83	6.20	1.63	2.80	4	52
11.00	1.60	1.25	5.00	5.00	5.00	7.00	7.00	6.00	7.00	4.38	5.80	5	96
6.00	2.60	2.00	2.00	2.75	3.25	5.29	4.29	6.83	6.40	1.81	3.00	4	25
.00	2.00	2.00	3.00	3.00	3.00	4.00	4.00	4.00	4.00	2.00	3.40	2	30
10.00	2.20	1.25	2.33	2.50	3.25	3.43	5.29	4.50	6.20	2.21	1.60	5	64
6.00	1.80	1.75	2.00	2.75	1.00	1.43	1.57	5.17	2.80	.81	1.00	2	46
14.00	3.20	1.00	3.33	4.25	4.25	5.71	5.86	4.33	7.00	3.52	3.00	5	96
15.00	3.80	2.25	4.00	4.50	5.00	6.00	6.29	5.33	5.80	3.50	5.40	5	105
9.00	3.20	1.00	2.00	4.00	4.00	3.71	4.71	5.33	5.40	3.00	1.60	3	54
15.00	3.40	1.50	5.00	5.00	5.00	7.00	7.00	7.00	7.00	4.25	5.40	5	64
9.00	2.40	1.50	1.33	2.75	2.50	5.43	2.43	3.67	4.20	1.52	2.60	4	15
19.00	4.00	3.25	4.00	5.00	5.00	7.00	7.00	6.33	7.00	3.13	4.60	5	105

db	se	ext	intj	idt	inst	intjoy	comp	app	fit	rai	socl	soc	godn
11.00	2.60	1.00	5.00	4.00	4.75	5.71	7.00	6.00	7.00	4.13	4.60	5	119
9.00	3.40	1.00	2.00	4.25	4.25	5.29	5.43	5.33	6.40	3.19	2.20	5	92
8.00	2.20	1.25	2.67	4.00	3.25	3.57	4.57	6.83	6.20	2.67	1.40	5	20
6.00	3.00	1.75	3.33	4.25	3.50	4.57	5.71	6.00	6.60	2.77	4.40	5	63
13.00	3.20	1.00	2.33	3.50	4.00	7.00	6.57	3.50	5.20	2.96	2.80	5	73
16.00	3.40	1.25	3.00	3.50	4.25	5.00	5.57	5.17	6.20	3.13	4.80	5	38
14.00	2.80	2.25	4.33	5.00	5.00	7.00	7.00	4.67	7.00	3.71	5.80	5	101
14.00	2.40	1.25	4.67	4.50	5.00	6.71	7.00	6.50	7.00	4.17	4.20	5	36
20.00	4.00	2.00	5.00	5.00	5.00	7.00	7.00	5.67	7.00	4.00	3.40	3	57
16.00	3.60	1.00	3.00	3.50	4.00	5.57	5.29	5.33	6.00	3.13	4.00	5	119
8.00	2.00	2.50	4.00	3.75	4.00	6.00	5.86	6.50	6.20	2.69	4.00	4	32
11.00	3.80	1.00	3.67	4.25	4.75	5.86	5.57	3.17	5.40	3.85	3.20	5	73
11.00	2.80	2.25	2.33	3.00	3.25	4.29	6.57	5.17	6.40	1.83	1.20	5	57
6.00	2.20	2.75	3.00	3.50	3.00	4.57	4.71	3.67	4.60	1.75	3.20	5	61
14.00	2.40	2.00	2.33	3.75	3.00	4.00	3.71	6.17	6.60	2.02	2.80	2	31
8.00	2.20	2.75	3.67	3.25	2.25	3.14	4.43	7.00	7.00	1.48	2.20	3	80
7.00	2.60	1.50	3.00	3.00	3.50	4.14	4.00	4.00	4.40	2.50	2.40	5	17
9.00	1.80	1.25	1.67	2.50	2.25	3.00	3.14	6.33	5.20	1.54	3.20	3	17
17.00	2.80	1.00	1.33	4.25	3.25	6.86	6.00	3.17	6.80	2.52	4.20	3	20
14.00	3.40	3.00	4.00	3.75	4.25	4.14	4.29	5.33	4.80	2.56	1.80	3	48
17.00	3.00	3.25	4.33	4.00	1.25	2.57	2.57	6.33	7.00	1.08	2.40	4	78
5.00	2.20	2.25	2.33	3.00	3.00	5.14	5.14	4.00	4.20	1.71	4.60	2	30
-4.00	1.60	1.00	1.00	1.75	1.00	1.00	1.00	1.00	1.00	.69	1.00	2	19
13.00	4.00	5.00	5.00	5.00	5.00	7.00	7.00	7.00	7.00	2.50	7.00	5	67
11.00	3.00	2.00	2.33	3.75	4.00	4.86	5.29	5.50	6.60	2.52	2.40	3	25
12.00	2.80	2.00	4.33	4.50	4.00	4.71	5.43	4.67	6.00	3.21	4.00	5	64
12.00	4.00	1.00	3.33	3.75	4.00	5.71	7.00	7.00	6.40	3.27	5.80	5	91
13.00	2.40	1.75	2.67	3.25	3.50	4.14	3.00	6.83	5.40	2.35	2.40	2	30
14.00	1.80	2.00	2.33	3.00	2.25	2.86	4.57	3.50	4.60	1.46	2.20	5	52
2.00	2.80	1.50	2.00	3.25	4.00	4.43	5.14	3.50	4.60	2.56	3.60	5	44
16.00	2.80	1.00	4.33	4.75	5.00	6.43	4.86	6.17	7.00	4.27	1.00	4	46
13.00	2.60	1.25	4.00	4.50	4.00	4.14	5.43	3.33	6.60	3.50	3.60	5	102
12.00	2.80	2.75	1.67	3.75	4.00	5.71	7.00	6.33	5.80	1.98	4.60	5	91
15.00	4.00	1.00	3.33	4.75	4.75	6.71	5.43	5.33	7.00	3.90	3.20	5	52
10.00	3.40	2.00	5.00	5.00	5.00	5.29	6.29	6.67	6.60	4.00	1.20	5	63
8.00	2.60	2.75	2.33	2.00	3.00	3.00	2.71	4.83	3.80	1.21	2.00	5	49
20.00	3.80	1.50	3.33	5.00	4.75	7.00	6.29	5.50	6.80	3.71	4.80	5	85
19.00	3.40	3.50	5.00	4.50	5.00	7.00	7.00	6.50	7.00	3.13	6.60	5	96
6.00	1.80	1.75	4.00	3.75	3.25	4.57	4.71	5.50	5.20	2.69	3.00	3	31
10.00	2.20	1.50	1.00	2.50	3.75	5.43	3.57	5.17	4.20	2.00	3.40	4	58
9.00	3.00	1.50	2.67	3.50	4.00	6.86	6.86	6.33	7.00	2.79	6.40	5	92
-8.00	1.00	1.00	1.33	2.00	2.00	3.14	2.86	2.67	4.20	1.33	2.60	2	3
5.00	1.60	1.50	2.33	2.50	1.25	4.43	4.00	4.00	4.00	1.08	4.60	2	0
.00	1.00	1.75	3.00	3.50	1.75	1.86	2.00	6.17	4.40	1.63	1.20	2	6

db	se	ext	intj	idt	inst	intjoy	comp	app	fit	rai	socl	soc	godn
18.00	3.00	2.25	2.67	3.25	3.25	2.71	2.29	7.00	7.00	1.98	1.40	4	62
16.00	2.40	1.75	2.33	4.50	4.00	5.43	6.00	4.67	6.00	2.83	4.80	5	54
12.00	3.00	1.00	2.33	3.50	4.25	4.86	5.14	4.50	4.60	3.08	1.20	2	40
20.00	4.00	3.25	2.33	3.25	3.50	4.57	4.43	6.17	6.80	1.52	3.60	5	52
-14.00	3.00	1.00	2.00	3.75	3.00	6.57	7.00	4.50	7.00	2.44	3.40	5	63
17.00	3.00	2.00	1.67	3.25	3.50	4.86	4.29	4.67	5.60	1.98	4.60	5	76
10.00	2.40	1.50	1.33	3.00	3.00	4.00	3.14	1.83	4.60	1.83	1.80	4	51
11.00	2.80	1.50	3.33	3.25	3.25	5.14	5.29	4.17	5.40	2.52	4.00	5	69
10.00	2.40	2.25	3.33	4.25	3.75	4.00	4.14	4.33	5.60	2.65	1.00	3	54
7.00	2.20	1.75	3.00	3.25	2.50	2.29	2.29	4.50	4.00	1.94	2.20	2	0
3.00	1.80	2.00	3.00	3.00	3.75	4.00	4.43	6.00	5.60	2.38	3.20	4	63
4.00	3.00	1.75	2.00	3.50	4.25	5.57	5.86	6.00	6.00	2.63	5.40	5	91
-1.00	2.40	3.00	3.33	3.50	3.50	5.00	5.57	5.17	5.00	1.96	5.40	5	96
9.00	2.40	2.00	1.67	4.25	3.75	6.71	5.57	6.17	6.80	2.35	5.80	5	64
12.00	1.60	2.00	3.00	2.75	2.50	2.71	3.14	6.67	5.40	1.69	1.20	3	65
12.00	3.60	1.00	3.33	4.25	4.25	5.57	6.14	5.33	6.20	3.52	3.20	5	87
11.00	2.80	1.50	4.33	3.50	2.25	3.00	4.14	6.00	6.20	2.33	1.80	3	13
12.00	2.40	1.00	2.00	2.50	3.75	4.43	4.14	4.17	3.80	2.50	4.20	4	28
4.00	1.60	2.25	2.67	1.75	1.75	2.29	2.71	6.50	5.80	.85	2.20	2	17
14.00	2.60	2.00	3.00	4.00	4.00	5.29	7.00	4.00	7.00	2.75	3.00	5	96
-8.00	4.00	1.75	1.33	4.00	5.00	6.14	6.14	6.00	7.00	2.96	2.20	2	89
10.00	2.60	1.00	1.00	2.75	3.25	6.57	5.71	1.00	3.00	2.06	4.60	2	18
.00	2.00	1.25	1.00	2.75	2.50	3.00	3.43	3.67	3.60	1.56	3.20	2	28
18.00	3.60	2.00	2.00	2.50	2.50	6.57	7.00	6.33	6.40	1.38	6.40	5	27
14.00	2.80	1.00	2.33	4.25	5.00	6.29	6.86	4.33	7.00	3.65	4.60	5	74
-3.00	2.40	3.00	3.00	3.75	3.75	5.71	5.29	6.83	6.40	2.06	5.40	2	46
7.00	2.40	2.25	1.67	1.75	2.25	6.86	6.57	2.17	3.80	.85	6.00	2	42
5.00	1.40	2.25	1.67	3.00	2.75	1.43	1.29	3.83	2.20	1.42	2.20	2	5
10.00	3.00	2.25	2.00	3.50	3.00	5.71	5.29	5.83	4.80	1.75	6.20	4	48
14.00	3.00	3.00	5.00	5.00	5.00	7.00	7.00	7.00	7.00	3.50	6.40	5	95
8.00	3.40	2.00	2.33	3.50	4.00	5.86	6.00	6.00	6.00	2.46	4.00	5	74
2.00	2.60	1.50	1.33	2.25	2.25	1.86	1.57	4.67	5.00	1.27	1.60	2	22
14.00	2.60	1.25	2.33	4.75	4.50	5.71	4.86	5.50	6.40	3.40	3.20	5	99
14.00	2.80	3.25	4.00	4.75	5.00	6.57	5.00	7.00	6.60	3.06	5.40	5	35
14.00	2.80	2.75	4.67	4.75	5.00	6.29	6.57	7.00	7.00	3.48	5.20	5	49
10.00	2.20	1.75	3.00	3.50	3.00	3.71	3.43	4.83	5.00	2.25	2.60	5	56
9.00	3.40	1.75	5.00	5.00	5.00	7.00	7.00	7.00	7.00	4.13	7.00	5	78
10.00	2.40	1.75	2.67	2.00	1.00	1.29	1.00	5.00	6.00	.79	1.00	2	15
3.00	2.20	2.25	2.67	2.25	2.00	2.71	2.29	2.00	2.80	1.10	3.00	2	31
15.00	2.60	1.00	2.33	3.25	5.00	5.86	3.71	5.67	6.80	3.40	1.60	3	35
12.00	4.00	2.00	3.33	4.25	4.00	4.57	6.43	4.67	6.40	2.90	2.80	5	93
7.00	3.00	2.75	2.67	3.75	3.75	6.57	6.71	6.00	5.60	2.10	5.40	5	86
4.00	3.40	1.00	4.33	5.00	3.25	6.14	6.71	6.33	6.80	3.46	3.80	5	73
12.00	3.00	1.25	2.33	4.25	4.25	5.14	5.29	4.67	6.20	3.15	2.00	5	84

db	se	ext	intj	idt	inst	intjoy	comp	app	fit	rai	socl	soc	godn
8.00	3.00	1.00	3.00	5.00	5.00	5.29	4.57	3.50	5.40	4.00	1.20	5	75
10.00	2.60	2.50	2.67	3.50	3.25	4.57	4.00	4.00	6.00	1.92	4.00	3	45
-2.00	2.20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	.50	1.00	2	0
13.00	2.60	2.50	3.33	4.00	4.25	4.43	3.29	4.67	5.00	2.71	2.20	4	32
11.00	1.60	2.75	4.00	3.50	3.00	4.00	2.71	5.83	7.00	2.00	2.00	3	37
7.00	2.40	1.25	2.67	3.25	3.75	3.71	3.43	4.50	5.40	2.73	2.20	2	32
10.00	3.40	1.00	1.67	4.75	3.75	5.43	5.29	4.50	6.40	2.98	5.00	5	33
18.00	1.80	1.75	2.67	3.75	3.00	3.86	3.43	6.83	7.00	2.23	3.80	3	22
10.00	2.00	1.75	1.33	3.50	3.50	4.71	5.00	5.17	5.80	2.08	5.00	5	42
14.00	3.00	2.00	1.00	2.25	1.00	5.57	4.43	4.83	6.00	.31	2.60	5	53
12.00	1.80	1.50	3.67	3.75	2.75	3.14	1.86	6.00	7.00	2.48	1.60	2	30
8.00	3.00	3.00	3.67	4.00	4.00	5.00	5.00	4.67	5.00	2.42	3.00	4	23
9.00	4.00	2.00	2.33	3.50	3.50	4.71	4.71	2.83	5.80	2.21	3.40	3	59
9.00	2.20	2.75	3.33	4.00	4.00	5.00	5.14	4.50	4.40	2.46	2.00	4	35
.00	3.60	1.50	1.00	4.00	4.50	5.86	7.00	4.50	6.40	2.75	3.80	5	105
12.00	2.80	1.75	2.67	4.75	3.50	5.71	6.14	5.50	6.20	2.73	5.00	5	51
18.00	4.00	1.00	5.00	5.00	4.75	7.00	7.00	7.00	7.00	4.38	2.20	5	85
14.00	4.00	2.75	4.67	4.75	3.75	5.00	5.57	5.00	5.00	2.85	3.80	5	96
7.00	2.40	2.00	3.00	4.25	2.75	4.71	6.14	6.33	7.00	2.19	3.40	4	42
13.00	3.40	2.00	3.00	4.25	4.00	4.43	3.86	7.00	7.00	2.81	4.00	5	73
3.00	2.20	4.25	3.67	3.75	2.50	4.14	5.57	6.67	6.60	.98	2.00	4	36
12.00	3.00	1.00	2.00	3.50	2.50	2.14	1.43	5.00	5.80	2.13	2.80	4	0
9.00	2.40	1.50	3.33	3.00	3.25	3.43	3.71	5.00	4.00	2.46	1.60	2	8
15.00	2.80	1.50	2.33	3.50	4.25	7.00	6.86	5.17	6.60	2.83	5.60	5	59
12.00	2.60	1.00	4.00	4.50	3.00	3.71	5.43	6.67	6.00	3.13	2.00	5	67
11.00	2.80	1.75	3.67	3.25	2.75	3.29	4.57	4.50	4.40	2.23	2.00	5	75
12.00	3.40	1.00	1.67	4.75	4.75	5.86	6.00	2.83	6.00	3.48	1.60	4	82
11.00	2.20	2.75	4.00	4.00	3.25	3.57	6.14	7.00	5.80	2.25	4.60	5	52
14.00	2.00	1.00	2.67	4.00	3.75	5.43	6.29	4.83	6.40	3.04	4.20	5	105
8.00	2.80	1.00	3.00	4.50	3.50	6.29	6.43	5.67	6.80	3.13	4.20	5	46
13.00	3.60	2.00	3.00	4.25	3.75	4.71	3.57	3.00	6.40	2.69	2.40	5	36
12.00	2.40	2.00	3.33	4.00	4.25	5.14	4.57	5.50	6.20	2.96	4.20	5	52
16.00	3.60	2.75	4.67	4.75	5.00	6.43	7.00	7.00	7.00	3.48	4.80	5	105
10.00	3.60	1.25	4.00	4.50	4.75	6.00	6.00	4.67	5.00	3.88	3.60	5	27
14.00	3.20	1.50	3.33	4.75	5.00	6.00	6.57	6.50	6.40	3.77	2.20	5	58
14.00	2.00	1.25	2.00	3.00	3.50	3.57	4.00	3.17	4.00	2.38	1.80	3	36
11.00	2.60	1.50	3.33	3.75	4.00	4.71	3.86	4.67	4.40	3.02	3.20	4	25
12.00	3.40	2.00	2.33	4.25	4.00	5.71	6.00	5.00	6.20	2.65	4.80	4	76
9.00	2.60	2.50	2.67	3.75	3.75	4.29	3.57	5.83	5.80	2.23	4.00	5	18
5.00	2.00	2.75	2.33	4.25	4.00	5.57	5.43	6.50	6.60	2.27	4.20	5	49
17.00	3.00	1.00	2.33	3.50	3.75	4.71	4.57	5.17	6.00	2.83	1.60	2	5
6.00	2.00	2.25	1.67	3.00	3.25	3.71	3.86	3.50	4.40	1.67	3.60	2	6
11.00	2.00	1.25	2.00	4.00	4.75	5.29	2.71	3.83	5.20	3.25	3.20	3	52
16.00	3.80	3.75	4.33	4.75	4.25	6.00	7.00	7.00	6.80	2.52	6.60	5	36

db	se	ext	intj	idt	inst	intjoy	comp	app	fit	rai	socl	soc	godn
14.00	3.20	2.75	4.33	4.75	4.50	6.43	6.57	7.00	6.40	3.15	5.00	5	85
3.00	1.40	1.25	1.67	2.75	2.00	1.86	2.71	4.33	6.00	1.48	1.60	2	17
8.00	2.60	2.00	2.67	4.00	4.00	6.00	5.86	5.83	6.00	2.67	4.60	5	19
8.00	3.60	3.00	3.33	4.50	4.00	5.71	6.00	5.67	6.20	2.46	5.20	5	62
1.00	1.00	4.00	3.67	2.50	2.00	1.86	1.14	5.50	2.80	.54	1.60	2	24
13.00	3.00	2.00	3.00	4.00	3.75	4.00	5.29	6.00	7.00	2.63	2.20	5	39
13.00	3.20	1.00	3.00	3.75	4.00	5.14	5.14	4.17	5.20	3.19	4.20	5	66
8.00	2.40	1.00	3.00	4.50	4.50	4.71	5.00	5.17	5.80	3.63	3.00	5	45
1.00	2.00	2.50	2.00	2.50	2.75	7.00	5.71	4.00	5.20	1.25	5.80	2	31
10.00	4.00	1.25	1.00	2.75	3.00	5.29	7.00	3.00	4.20	1.81	4.20	5	90
9.00	2.80	2.00	3.67	3.75	3.25	4.43	4.86	5.50	5.80	2.48	2.80	2	3
18.00	2.80	2.00	5.00	4.75	4.25	4.43	4.00	7.00	7.00	3.56	2.00	5	61
10.00	2.20	1.50	2.33	3.25	3.25	5.43	5.57	6.33	6.60	2.27	3.80	2	74
-2.00	2.00	2.50	2.33	2.50	2.25	3.14	3.86	3.83	4.20	1.08	3.60	3	45
7.00	2.40	2.00	3.00	2.25	1.25	1.29	1.14	3.00	3.00	.94	1.00	2	11
9.00	2.60	1.25	1.67	3.00	3.00	4.71	5.00	4.17	4.60	2.04	4.60	3	60
5.00	1.60	1.00	1.00	2.50	2.75	2.86	2.29	2.83	3.40	1.75	2.80	5	35
14.00	1.20	1.00	2.33	3.25	3.00	2.43	2.43	6.00	4.80	2.40	1.00	3	43
4.00	3.60	1.25	1.33	3.75	4.00	5.00	5.29	4.83	6.60	2.65	3.60	4	89
10.00	2.60	1.75	4.33	5.00	4.00	5.29	3.71	6.50	6.40	3.46	3.60	5	50
15.00	2.80	1.50	2.33	3.75	2.50	2.29	3.14	5.50	6.40	2.02	3.20	3	25
11.00	2.80	1.25	2.00	3.50	4.00	4.57	3.57	4.00	6.60	2.75	1.80	3	39
6.00	3.00	1.25	1.67	3.25	4.00	7.00	7.00	6.00	7.00	2.60	6.40	4	64
18.00	2.60	1.25	3.33	4.50	4.50	7.00	6.86	5.00	6.60	3.58	5.60	5	119
8.00	2.20	2.00	2.00	3.50	3.75	4.86	4.71	5.83	6.40	2.25	4.00	4	60
10.00	4.00	1.00	2.33	4.50	4.75	6.86	7.00	6.33	6.60	3.58	4.80	5	85
11.00	1.60	2.50	3.67	3.75	3.00	4.43	4.43	6.33	6.60	2.10	2.60	5	63
17.00	3.60	2.25	3.33	4.75	5.00	7.00	6.57	7.00	7.00	3.40	5.40	5	27
6.00	2.00	1.50	1.33	2.00	1.50	2.29	1.86	3.00	4.00	.83	2.20	2	3
3.00	2.60	1.00	1.00	2.00	3.00	5.14	4.86	5.00	5.00	1.75	3.80	5	34
17.00	4.00	1.00	4.33	5.00	5.00	6.86	6.71	6.33	7.00	4.33	1.00	5	52
3.00	2.40	1.25	1.33	2.25	2.50	2.43	2.43	3.17	3.60	1.52	1.40	2	29
3.00	1.80	1.00	3.00	2.50	2.75	2.43	1.57	2.50	4.00	2.25	1.20	2	0
16.00	2.80	1.00	2.33	4.25	4.25	4.57	4.57	6.17	7.00	3.27	1.60	5	42
17.00	3.20	2.00	3.00	3.75	2.75	5.57	4.14	7.00	7.00	2.06	1.40	5	51
4.00	2.00	1.25	3.33	2.50	1.50	2.29	1.57	5.17	6.00	1.58	1.00	2	0
17.00	2.60	1.00	2.67	5.00	4.50	6.57	7.00	7.00	7.00	3.67	2.80	5	32
18.00	2.60	1.00	1.67	3.00	3.25	5.57	4.71	5.83	6.80	2.29	3.80	2	20
17.00	2.40	2.75	2.33	4.75	5.00	7.00	7.00	7.00	7.00	2.90	6.00	4	54
14.00	2.80	3.75	4.33	4.75	4.50	5.57	4.71	6.50	6.40	2.65	3.80	5	35
13.00	1.60	1.50	2.33	3.00	3.00	3.86	4.86	6.83	5.80	2.08	2.60	5	37
12.00	2.60	1.50	4.00	5.00	4.75	6.43	6.00	5.17	6.80	3.88	3.20	5	43
1.00	2.40	2.75	3.33	3.00	3.50	5.86	5.29	4.00	5.20	1.96	4.40	2	40
18.00	2.80	2.00	3.33	4.25	4.50	5.86	5.14	6.67	6.60	3.15	3.60	5	80

db	se	ext	intj	idt	inst	intjoy	comp	app	fit	rai	socl	soc	godn
19.00	3.00	2.75	3.33	4.00	4.00	6.29	6.43	5.17	6.20	2.46	5.20	5	78
16.00	3.20	1.75	3.67	3.75	3.00	4.86	6.00	5.83	6.40	2.48	3.00	3	21
11.00	3.60	2.00	2.67	4.75	3.00	5.29	3.86	7.00	7.00	2.35	2.40	4	87
16.00	3.60	1.50	3.67	4.75	4.00	4.86	4.43	7.00	6.20	3.35	2.80	5	44
9.00	2.80	1.25	2.00	3.75	3.75	4.71	5.43	3.00	5.60	2.69	2.40	5	79
-1.00	2.40	1.00	1.00	2.00	2.50	1.14	1.00	1.17	1.60	1.50	1.00	2	22
17.00	2.60	2.25	1.67	4.00	4.00	5.43	5.86	6.33	5.80	2.29	5.20	5	43
16.00	2.20	1.00	4.33	3.75	4.50	6.86	6.86	6.83	7.00	3.77	5.20	5	59
17.00	3.00	2.00	4.00	4.25	3.75	5.71	7.00	6.00	6.40	2.94	3.40	5	87
16.00	3.60	2.00	2.33	4.50	4.00	4.86	4.71	6.67	6.60	2.71	1.40	5	46
11.00	3.20	1.50	2.33	4.00	4.25	5.71	6.14	4.00	5.20	2.96	4.20	4	31
13.00	2.60	1.00	2.67	4.00	4.25	5.29	5.00	6.50	6.60	3.29	2.60	4	65
19.00	2.40	3.00	3.67	3.25	3.00	4.00	4.86	6.50	7.00	1.73	3.40	2	56
7.00	2.80	1.25	1.33	3.00	4.75	5.71	4.86	4.50	4.40	2.83	1.20	3	65
12.00	2.60	1.75	2.00	3.50	4.00	5.57	5.86	4.83	5.20	2.50	5.20	5	31
8.00	2.80	1.00	3.00	3.00	4.00	5.43	4.43	5.50	5.60	3.00	3.60	5	57
14.00	4.00	1.50	3.67	5.00	5.00	5.86	2.86	7.00	5.20	3.92	2.20	4	5
14.00	3.60	2.00	3.00	4.75	4.50	7.00	6.57	5.50	7.00	3.19	5.20	5	89
15.00	2.40	1.00	1.00	4.00	4.25	4.71	2.57	4.33	7.00	2.88	2.00	4	33
14.00	3.60	1.75	2.00	4.75	3.25	4.14	5.43	5.00	6.40	2.44	1.80	5	32
4.00	4.00	1.00	1.00	4.00	5.00	6.14	7.00	2.00	5.80	3.25	1.00	3	44
11.00	2.60	1.00	3.00	4.00	4.25	4.00	5.43	4.83	5.60	3.38	1.60	5	36
5.00	2.20	3.00	4.33	4.75	4.50	5.00	5.14	7.00	6.80	3.02	4.80	4	90
-7.00	1.60	2.00	2.67	3.75	4.50	7.00	7.00	7.00	7.00	2.85	6.80	5	52
15.00	1.00	2.00	3.67	3.75	4.00	5.00	5.00	4.83	5.00	2.85	2.80	5	64
20.00	1.80	2.00	2.67	2.75	3.25	5.86	6.43	3.67	5.80	1.98	4.00	2	21
13.00	4.00	4.00	5.00	5.00	4.50	6.57	7.00	7.00	7.00	2.75	5.20	5	67
4.00	4.00	1.25	2.00	3.75	3.00	3.14	4.00	4.50	2.20	2.31	2.80	4	57
16.00	2.60	3.00	5.00	4.25	4.75	7.00	7.00	7.00	7.00	3.19	5.00	5	96
11.00	3.40	1.00	2.00	2.25	3.00	4.43	4.43	2.50	6.40	2.06	1.00	3	14
13.00	3.60	1.00	4.00	5.00	4.50	6.43	6.43	6.83	7.00	4.00	4.60	5	85
15.00	2.40	3.75	4.00	4.50	4.50	6.71	6.43	6.83	6.20	2.50	6.20	5	91
15.00	3.40	3.00	4.00	4.25	4.00	5.00	5.14	6.00	5.20	2.56	4.00	5	36
7.00	3.00	1.50	2.67	3.50	4.00	4.86	4.71	4.50	5.20	2.79	2.40	4	48
8.00	1.00	1.25	4.67	4.75	4.50	4.29	4.00	7.00	6.60	3.98	1.20	2	17
12.00	3.40	1.00	4.33	4.75	4.00	5.00	5.00	7.00	6.60	3.77	1.80	5	71
3.00	2.20	1.25	4.00	3.75	4.25	5.14	3.57	5.67	6.40	3.44	5.40	2	34
6.00	2.00	1.25	1.67	4.25	3.75	4.71	6.14	5.50	6.60	2.73	2.20	5	46
5.00	2.60	2.00	1.67	3.00	3.25	4.29	4.29	2.83	4.20	1.79	3.00	4	56
14.00	2.20	2.25	2.67	3.50	3.00	4.29	4.86	6.17	6.80	1.92	2.00	3	65
8.00	2.80	2.00	2.33	3.75	3.75	5.86	5.71	5.33	6.00	2.40	4.00	3	16
-2.00	2.60	2.00	1.67	2.25	3.50	6.00	5.57	2.33	3.40	1.73	4.80	2	45
10.00	3.00	1.00	3.67	4.00	3.25	4.00	7.00	3.50	7.00	3.04	1.00	5	70
-8.00	2.80	1.00	1.33	4.25	4.00	6.00	6.00	5.17	6.00	2.90	2.40	5	36

db	se	ext	intj	idt	inst	intjoy	comp	app	fit	rai	socl	soc	godn
15.00	3.20	2.50	4.33	4.75	4.75	6.57	6.57	6.50	7.00	3.40	6.40	5	70
19.00	3.60	2.50	3.67	4.75	4.00	4.29	4.29	7.00	7.00	2.85	3.20	5	23
20.00	2.20	1.00	2.67	4.50	4.00	5.43	5.57	4.83	5.60	3.29	5.00	3	0
.00	1.00	3.00	3.00	3.00	3.00	4.00	4.00	4.00	4.00	1.50	4.00	5	51
18.00	1.40	1.50	3.33	4.75	4.25	3.86	2.71	6.33	7.00	3.40	1.60	4	52
11.00	3.40	1.00	2.33	4.50	5.00	6.14	5.43	5.83	4.80	3.71	2.00	5	100
12.00	2.40	1.00	1.00	3.75	3.75	5.57	6.00	5.17	6.00	2.56	3.60	5	91
15.00	3.40	1.00	3.00	4.50	4.25	4.29	5.43	5.00	6.80	3.50	4.00	4	37
3.00	2.20	1.00	1.33	2.50	3.00	5.43	4.57	4.17	3.60	1.96	4.60	2	10
11.00	2.60	2.50	2.33	3.50	3.00	4.43	4.29	5.83	6.60	1.71	3.40	3	27
10.00	1.40	1.50	2.67	3.25	2.00	2.00	2.43	5.50	4.40	1.73	1.40	4	22
8.00	3.00	2.25	3.33	4.50	4.00	5.43	5.43	6.00	6.20	2.83	2.80	3	56
7.00	3.60	1.75	3.33	4.50	5.00	6.57	7.00	4.50	7.00	3.58	4.00	3	57
1.00	2.40	1.75	2.67	3.25	4.00	3.86	3.57	4.00	4.60	2.60	3.00	2	82

VITA

Lori McGaha DeLong received her Bachelor of Arts from Louisiana College in Pineville, Louisiana. She then attended the University of Louisiana at Monroe where she completed her Master of Education with an exercise science emphasis. During the time that Lori was completing her master's, she was the assistant women's basketball coach at Louisiana College. Lori continued in this capacity as she was admitted into the doctoral program at Louisiana State University in the Department of Kinesiology in the spring of 1999. In the spring of 2001, Lori became a certified and licensed athletic trainer. She then accepted a full-time teaching position in the fall of 2001 at Louisiana College and became an assistant professor with some athletic training responsibilities. Lori is the clinical coordinator of the athletic training educational program at Louisiana College. She coordinates and supervises the athletic training students in the clinical settings. Lori was one of two professors who developed the athletic training educational curriculum for accreditation at Louisiana College. Lori has been an active member of the Louisiana Athletic Trainers' Association (LATA) , District IX Southeast Athletic Trainers' Association (SEATA), and the National Athletic Trainers' Association (NATA). She serves on the Educational committee at LATA and the Women in Athletic Training committee at the district level. Lori also volunteered at the 2004 Summer Olympics in Athens, Greece. She was one of the athletic trainers at the baseball venue. The focus of Lori's research has been on college students' motivation and self-determination to be physically activity. Lori plans to continue teaching at Louisiana College where she will seek to become tenured in the near future. At the December 2006 commencement she will receive her Doctor of Philosophy in kinesiology.