

The Relationship of Environmental, Social and Individual Factors and Physical Activity
Participation Level in Young Adults

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Thesis submitted to the faculty of
Virginia Polytechnic Institute and State University
in partial fulfillment of the requirements for the degree of
Master of Science in Psychology

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January 16th, 2008

Blacksburg, Virginia

Keywords: affect, physical activity, social ecology

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ABSTRACT

Objective: To explore the relationship between individual factors (i.e. affect, self-efficacy, and self-regulation), social and environmental factors, and their effects on the level of participation in physical activity (PA). **Design:** Undergraduate and graduate students (N = 386) completed 11 online measures assessing physical activity level and reactions to physical activity participation at Time 1, 9 online measures at Time 2, and a measure of physical activity participation at Time 3. Measures included those assessing affective reactions to PA, outcome expectancy, self-efficacy, self-regulation, social support, and perceptions of the environment. **Results:** Affect had a small total effect on METs ($\beta=.13$, $p=.03$), which was partially mediated by self-regulation, a strong predictor of METs ($\beta=.45$, $p<.01$). The total effect of affect on METs was substantially reduced ($\beta=.05$, $p=.34$) when self-efficacy was added as a precursor in the model. Self-efficacy influenced both METs ($\beta=.39$, $p<.01$) and affect ($\beta=.23$, $p<.01$). Adding environment and social support as predictors of self-efficacy ($\beta=.23$, $p<.01$; $\beta=.19$, $p<.01$, respectively) further reduced the influence of affect on METs ($\beta=.03$, $p=.63$) as environment and social support influenced affect ($\beta=.20$, $p<.01$; $\beta=.14$, $p=.02$, respectively) and METs ($\beta=.15$, $p=.02$; $\beta=.21$, $p<.01$, respectively). **Conclusion:** As in earlier studies of acute affective response to PA, these results provide evidence that anticipatory affect is positively associated with behavioral decision-making related to PA participation. Although increasing an individual's self-efficacy for PA should increase their affective association with the behavior, affect may not influence PA decision-making independently of self-efficacy and ecological factors (i.e. environment and social support)

ACKNOWLEDGEMENTS

There are many people that have helped me through this process that I would like to take this chance to thank. First, I would like to thank Dick Winett, for all of his support and encouragement in the development and completion of this project. I would also like to thank Eileen Anderson for her invaluable advice and patience. Also, thank you to George Clum, for his support and enthusiasm for this project and beyond. To Brenda Davy, I must express what a pleasure it has been to have you as a part of this committee. I have truly enjoyed getting to know you better as a professional and a person. I would also like to thank my family and friends for their willingness to support me through both smooth and challenging times.

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INTRODUCTION

PHYSICAL ACTIVITY

Physical activity and its relationship to overall quality of health, is well established (NIH, 1996; Pate et al., 1995; Roberts & Barnard, 2005; Slentz, 2007). According to the document Healthy People 2010, physical activity is one of the leading health indicators, emphasizing the importance of increasing the amount of physical activity in the population of the United States for improving overall health (USDHHS, 2000). The report points out that in 1997, only 15 percent of adults performed the recommended amounts of physical activity and 40 percent engage in no leisure-time physical activity.

Physical activity is associated with decreased risk of multiple serious health problems including cardiovascular disease, Type II diabetes and stroke (Blair et al., 1989; Hu et al., 2000; Knowler, et al., 2002; Manson et al., 1992). According to a report from the Surgeon General of the United States, engaging in moderate amounts of physical activity can substantially improve health and quality of life (US Department of Health and Human Services, 1996). Participation in moderate-intensity or vigorous-intensity physical activity on most days of the week is recommended for overall health benefits by the Centers for Disease Control and Prevention as well as the American College of Sports Medicine (Pate et al., 1995). Physical activity seems especially important for those in their young adulthood, as relationships have been found between respiratory fitness in young adulthood and the subsequent development of cardiovascular disease risk factors (Carnethon et al., 2003).

Despite the availability of this knowledge, only a small portion of the population is currently active at the recommended levels and 37% reported not participating in leisure-time physical activity in 2003 (USDHHS, 2006). While this is an improvement on previous estimates

from 2000, a large portion of the population still remains inactive. The Healthy People 2010 report emphasizes the importance of physical activity by establishing one of its goals as “improve health, fitness, and quality of life through daily physical activity” (USDHHS, 2000). More specifically, the report sets the objective that people participate in moderate physical activity for 30 minutes a day, for 5 or more days a week, or vigorous physical activity for 20 minutes a day, at least 3 days per week. Interventions to assist people in increasing the amount of time spent devoted to physical activity have focused on meeting this goal.

PHYSICAL ACTIVITY INTERVENTIONS

The emphasis on physical activity as a leading health indicator stands in contrast to the relative effectiveness of physical activity interventions. The most effective interventions to increase physical activity show some success at helping people initiate these behaviors, yet have shown less effectiveness in helping people maintain these behavior changes over time (Kahn et al., 2002). For example, Project Active is one of the most cited of these interventions (Dunn et al., 1999). This 24-month randomized trial included a 6-month intensive intervention followed by an 18-month maintenance phase that involved faded contact. Participants were randomized to either a lifestyle physical activity program or a structured exercise program. At the 6-month point, the lifestyle group increased fitness level by about .40 METs (Metabolic Equivalent of Task), while the structured exercise group had increased fitness level by approximately 1.10 METs. However, at the 24-month assessment point, the lifestyle group had maintained a fitness level change of only about .20 METs, and the structured exercise group maintained a fitness level change of only about .40 METs. A MET is used to estimate the amount of oxygen used by

the body during physical activity and one MET represents the energy used at rest, so two METs would be two times the resting energy expenditure.¹

Project ACT is another often cited trial (Activity Counseling Trial; The Writing Group, 2001). This randomized, 24-month trial compared the effects of physical activity counseling interventions in the primary care setting. Participants were assigned to one of three groups; advice (physician advice and written educational materials); assistance (physician advice, written educational materials, interactive mail, and behavioral counseling at physician visits); or counseling (included advice and assistance components plus regular telephone counseling and behavioral classes). Only women, but not men, in the counseling groups showed any appreciable change in physical activity or fitness (~.33 METs), and despite continued contact, there was minimal evidence for long-term change in activity level or fitness. These intensive, long-term studies demonstrate the difficulties of promoting long-term change in physical activity levels. The very modest outcomes also suggest there are conceptual and strategic problems with current approaches, particularly for behavioral maintenance (Rothman et al., 2004).

Given these disappointing long-term outcomes in physical activity and with other health behaviors, the National Institutes of Health (NIH; Decision Making in Health: Behavior Maintenance, 2004) has issued an initiative to inspire work in the area of decision-making to advance the understanding of both the cognitive and affective processes involved in making health choices for engaging in or not engaging in health behaviors. In exploring research in this

¹ Outcomes in physical activity participation level are often reported in MET hours per week, which is calculated by multiplying the METs per hour of each activity by the number of hours of each activity for each week and then adding all of the activities participated in for that week. One would estimate caloric expenditure using the equation [METs * body weight (kg) * time (hours)].

area further, it appears that factors other than individual cognitions and affect may also be contributing to the difficulty in maintaining physical activity behaviors over time.

SOCIAL COGNITIVE THEORY AND THE SOCIAL ECOLOGICAL MODEL

Both Social Cognitive Theory and the Social Ecological Model acknowledge the importance of examining individual behaviors within a broad, multi-layered context (Alfonzo, 2005; Bandura, 1997; Fisher et al., 2005; McNeill et al., 2006). Albert Bandura wrote that “most human behavior...is determined by many interacting factors, and so people are contributors to, rather than the sole determiners of, what happens to them” (Bandura, 1997). Behavior is conceptualized as a process tied with aspects of the physical and social environment. More specifically, the layers of the social ecological model are delineated into four categories that include societal, community, interpersonal and intrapersonal factors. Community factors include aspects of the physical environment that influence access to physical activity. Environmental conditions and social supports are thought to play a key role in a person’s physical activity engagement (Addy et al., 2004; Brownson et al., 2001; Sallis, Bauman, & Pratt, 1998) and a key factor in engagement in self-management (Fisher et al., 2005; Lorig et al., 2003). Interpersonal factors include family and peer influences and intrapersonal factors encompass psychosocial, lifestyle and biological influences on behavior. From this standpoint, an ecological approach to self-management combines individual skills and choices with the influence and support they receive from the social and physical environment (Stokols, 1996). Each state funded by the Nutrition and Physical Activity Program to prevent obesity and other chronic diseases uses the social ecological model to more fully understand the levels of influence that can be addressed to support long-term, healthy behavioral choices (CDC, 2006; Leupker et al., 1996). As Alfonzo

(2005) remarked, it is important to examine these multiple variables in combination to understand more clearly the decision-making process involved in engaging in physical activity.

ENVIRONMENT

Studies that have focused on environmental supports of physical activity have found significant relationships between the availability of neighborhood and community settings for physical activity and reduced risk of obesity (Sallis, et al., 2007; Wilson, Ainsworth, & Bowles, 2007). Environmental variables believed to be associated with physical activity are neighborhood safety, traffic levels, enjoyable scenery and accessible sidewalks. Perception of the physical environment has been shown to have both direct and indirect effects on physical activity level (Ewing, et al., 2003; Huston et al., 2003; McNeill et al., 2006). Bandura (1997) writes that environment-oriented approaches create social structures that enable people to exert proactive control over their lives.

SOCIAL SUPPORT

Research has shown that social support is an important factor in the regular engagement in physical activity (McNeill et al., 2006). In one particular study, applying social-cognitive theory to exercise stage of change, family and friend social support were found to predict exercise stage of change in a college student population (Wallace et al., 2000). According to social-cognitive theory, personal change occurs within a network of social factors, and social support fosters the ability to maintain behavior change over time (Bandura, 1997). Health behaviors are not completely under personal control, according to this theoretical approach. Instead, they are functions of a dynamic interaction of personal and social influences. Depending on their specific influences on an individual, social structures can bolster or undermine efforts to change behavior. Within this social-cognitive context, Rovniak et al.

(2002) found that social support indirectly impacted participation in physical activity through its influence on self-efficacy, where higher levels of social support for exercise led to higher levels of exercise self-efficacy. Accordingly, health behavior interventions must address sociocultural influences if they are to achieve greater success.

INDIVIDUAL FACTORS

Because people also select and impact their environmental contexts, it is also of equal importance to understand how individual-level factors influence health behaviors. In addition to environmental and social factors that influence engagement in physical activity, individual-level factors such as affective reactions, self-efficacy, outcome expectancies, and self-regulatory behaviors have been shown to have relationships with the successful participation in regular physical activity (Anderson et al., 2006; Bauman et al., 2002; Lewis et al., 2002; Rovniak et al., 2002; Williams et al., 2007). More specifically, Rovniak et al. (2002), found that self-efficacy and self-regulation both had strong total effects on physical activity participation, while outcome expectancies exerted a small effect which did not reach significance.

Previous work examining the relationship between affect and behavior suggests that affective associations with specific health behaviors may determine behavioral outcomes (French, 2005; Kiviniemi, Voss-Humke, & Seifert, 2007). Although there is some evidence to suggest that affective associations influence behavioral decision-making, there is limited theoretical guidance of how affect influences health behavior. Most studies examining affective responses to physical activity have explored the effect the engagement in physical activity has on acute affective response and subsequent mood (Bryan, et al., 2007; Dunn & McAuley, 2000; Ekkekakis & Petruzzello, 1999). Preliminary evidence supports the relationship between acute affective responses to physical activity and subsequent engagement in physical activity at 6 and

12 month follow-up (Williams, in press), yet few studies have examined the relationship between affect and other variables known to be important influences on physical activity participation.

A study by Bryan, et al. (2007) applied a transdisciplinary model to participation in physical activity, including genetic, physiological and psychological factors. The results of this study suggest that for individuals who are regularly physically active, positive mood during and after the activity are important factors influencing the intent and motivation to be physically active in the future. Participants who experienced more positive mood after engaging in physical activity were more likely to be currently physically active and to be motivated to be physically active in the future. It is generally believed that people engage in behaviors that make them feel good and avoid those that do not, and physical activity is not an exception to this understanding of human behavior (Ekkekakis, Hall, & Petruzzello, 2005). Research in diverse areas such as neuroscience, behavioral economics, and social psychology indicates that affect plays a central role in decision-making. Most studies in this area support the conclusion that exercise does make people feel better (Backhouse et al., 2007); however, less attention has been paid to a possibly more complex relationship that exists between affect and physical activity. According to Backhouse (2007), if exercise does make people feel better, as it seems to, the question that remains is why are so many people inactive? Therefore, increasing our understanding of how affective responses motivate people to engage in higher levels of physical activity, and interact with other variables, may be important for increasing adherence to physical activity interventions and maintenance beyond treatment termination.

PRELIMINARY DATA

Elicitation interviews were conducted with physically active and inactive men and women (N = 10, ages 23-60). The content of these interviews focused on current and past

experiences with physical activity, perceived successes and failures, affective reactions to engaging in physical activity, as well as barriers and facilitators to engaging in regular activity. (Appendix A). The data collected from these interviews supported the importance of affective associations with physical activity and subsequent activity participation. People were able to articulate the means they used to try to make engaging in physical activity more affectively positive and varying amounts of success with such strategies.

This study aimed to clarify the relationship between affective reactions to physical activity, level of participation in physical activity, and variables of the social-cognitive model of behavior, including perceptions of environmental and social supports and the individual-level variables of self-efficacy, outcome expectations, and self-regulatory behaviors.

METHOD

PARTICIPANTS

The participants were undergraduate students enrolled in psychology courses and graduate students in various programs at Virginia Polytechnic and State University. To increase the probability of recruiting participants at all fitness levels, the only exclusionary criteria included for participation in the study required participants be at least 18 years of age.

Participants were recruited through flyers distributed in psychology classrooms, through an online recruitment system managed by the psychology department, and through emails sent via a graduate student email listserv.

PROCEDURE

Three hundred eighty-six undergraduate and graduate students (131 males, 255 females) attended a 60-minute session and completed the initial questionnaire (Time 1) which contained

measures of demographic variables, affect, social support, self-regulation, self-efficacy, outcome expectancies, perceptions of the environment, and recent physical activity participation. A minimum of one week later (Time 2), three hundred thirty-two participants (112 males, 220 females) returned for a second 15-minute session and completed a questionnaire to obtain estimates of test-retest reliability for the measures that were developed for this study, measures substantially modified, or to establish reliability with a young adult population. A minimum of two weeks after the initial questionnaire (Time 3), two hundred sixty-eight participants (87 males, 181 females) returned for a final 10-minute session to complete a questionnaire assessing physical activity level (Table 1; Figure 1). The undergraduate psychology students involved in the study obtained course credit for their participation in each of the three sessions. Graduate students were compensated with \$10 for attendance at each of the three sessions. All participants were entered into a raffle for a gift card to Amazon.com for attending the Time 2 and Time 3 portions of the study. All surveys were administered using a survey development website, surveymonkey.com, in the same computer lab in the psychology department at Virginia Tech. Prior to completing the questionnaire all participants were presented with an informed consent which described their right to withdraw from the study at any time without incurring any penalty. All procedures and measures were approved by the Institutional Review Board of Virginia Tech University prior to recruitment and data collection.

RECRUITMENT

Participants were recruited using a combination of print and email communications. Undergraduate participants were recruited through Virginia Tech undergraduate psychology courses by distributing flyers in classes (Appendix B). Graduate students were recruited via an email distributed through a graduate student listserv at Virginia Tech (Appendix C). All

recruitment communications informed participants of the location and time commitment involved in participating in the study. Upon starting the survey, participants were provided with information about the study, explaining the assessment of current levels of physical activity, personal reactions to physical activity as well as variables such as social support and self-regulation. Participants were reminded of the time commitment involved, the eligibility requirements, the compensation for their participation, the risks and benefits, the protection of the confidential information, and that participation in the study was entirely voluntary (Appendix D). At the end of this introduction, participants were asked to consent or decline to participate. Before moving forward with the survey, participants were required to respond “Yes” to the question of whether they would like to participate which served as a signature to an informed consent disclosing confidentiality, potential risks, and other criteria set forth by Virginia Tech’s Institutional Review Board and the Psychology Department’s Human Subjects Committee. Participants who consented to participate would then continue to the questionnaire items.

MEASURES

DEMOGRAPHIC VARIABLES AND HEALTH STATUS. Participants reported sociodemographic information including age, sex, marital status, ethnicity/race, household size, number of children and ages, years of education, occupation, housing location (i.e. on or off-campus), income, height, weight, as well as basic personal health history.

PHYSICAL ACTIVITY. The International Physical Activity Questionnaire (IPAQ; Booth, 2000; Craig et al., 2003) was used to measure participation in physical activity by asking respondents to report on their activity level retrospectively in the past 7 days at both Time 1 and Time 3. This measure was developed for use with young to middle aged adults (ages 15-69

years) and enables international comparison of physical activity and inactivity and allows respondents to be grouped based on their responses to the items for both continuous and categorical analyses for physical activity levels. For Time 1 and Time 3, energy expenditure was calculated by multiplying the duration of participation in the activity, times the number of days per week and the MET (metabolic equivalent) level of the particular activity [(hours/session)*(session/week)*(METs) = MET hours/week] endorsed by the participant. To assess a participant's level of consistency and to identify the activity they engage in consistently, two items were added to the physical activity portion of the survey. The first item inquired whether they were involved in regular physical activity, which was defined as two or more times a week for at least the past month. If they were regularly active, the second item asked which activities they were currently performing, providing a list from which they could select activities or provide their own. For the purposes of this study, the intentional physical activity (i.e. physical activity for exercise or leisure) reported was used to calculate the MET levels used in the analysis.

PERCEIVED INTENSITY. To assess an estimated level of intensity of the physical activity in which participants are involved, one item asked participants to rate the intensity level of the activity they engage in most often from Easy (1) to Very Hard (10). This item was administered at Time 1 and Time 2 in order to establish reliability of the item. The correlation between perceived intensity level was acceptable ($r_{\text{test-retest}} = .508, p < .00$).

PERCEPTIONS OF THE ENVIRONMENT. Items for the questionnaire assessing student's perceptions of the environmental supports of physical activity were developed based on focus group feedback regarding important factors that facilitate or impede physical activity behavior as well as previous questionnaires developed by the Center for Research in Health

Behavior (CRHB). This scale included 14 statements such as “It is pleasant to exercise in my community because there is so much going on”, and “There are good quality places (tracks, gyms, trails, bike lanes) where I can complete an exercise program”. Participants rated each item on a 5-point scale ranging from (1) Strongly disagree to (5) Strongly agree. These items were administered at Time 1 and Time 2 in order to establish their reliability. The stability between responses at Time 1 and Time 2 for perceptions of the environment was good ($r_{\text{test-retest}} = .754$, $p < .00$). The internal consistency was high (Cronbach alpha = .842).

SOCIAL SUPPORT. At Time 1 and Time 2, the Family and Friend Support for Exercise Habits Scale (Sallis, Grossman, Pinski, Patterson, & Nader, 1987) was utilized to assess the amount of social support for physical activity participants experience from both family and friends over the past three months. This scale has established reliability and internal consistency (Sallis, et al., 1987). Participants rate both family and friends on a scale ranging from (1) Never to (5) Very often, for engaging in behaviors that support their participation in regular physical activity. Statements include “Offered to exercise with me” and “Gave me helpful reminders to exercise”. Interpretation of social support is based on an overall mean score for each participant.

AFFECT. The Feeling Scale (Hardy & Rejeski, 1989) is an 11-point, single-item measure of pleasure-displeasure which has been used to assess the affective response to acute physical activity. The scale ranges from (-5) Very bad to (+5) Very good. In the current study, it was used to assess the retrospective affective responses to the thought of participating in physical activity (anticipatory affect), the actual participation in physical activity (participatory affect), and the period directly following engagement in physical activity (post-participatory affect). These three items were administered at Time 1 and Time 2 in order to establish the reliability of the items in this format. The correlation between Time 1 and Time 2 for affective response was

acceptable ($r_{\text{test-retest}} = .606, p < .00$). Internal consistency was moderate (Cronbach alpha = .747).

SELF-EFFICACY. The Self-Efficacy for Exercise Behaviors Scale (Sallis, Pinski, Grossman, Patterson, & Nader, 1988) measures a participant's belief that they can continue being physically active despite various barriers and has been shown to be a reliable and valid measure. This scale includes 12 statements such as "Stick to your exercise program when you have excessive demands at work or school" and "Get up earlier to exercise" which are rated on a 5-point scale ranging from (1) I know I cannot to (5) I know I can. Four items were added to this scale to assess participant's efficacy for self-regulating their routine to make the experience more effective and positive including items such as "Exercise in a way that makes you feel a sense of enjoyment", or "Make changes in your exercise routine so that it stays interesting". A mean score was computed based on participants' responses. Test-retest reliability ($r_{\text{(test-retest)}} = .830, p < .00$) and internal consistency (Cronbach alpha = .897) for this sample were high.

OUTCOME EXPECTATIONS. The measure of outcome expectancy included at Time 1 and Time 2 was an expanded version of the Benefits of Physical Activity Scale (BPA; Sallis, Hovell, Hofstetter, et al., 1989) which was modified by Rovniak, et al. (2002). The 25-item scale assesses both positive and negative outcome expectancies related to physical activity. It asks participants to rate the likelihood of an outcome from (1) Not at all likely to (5) Extremely Likely and the importance of an outcome from (1) Not at all important to (5) Extremely important. A mean score was computed for comparison from the products of likelihood and importance ratings. This modified version has been shown to have good internal consistency and test-retest reliability. Additional outcome expectation items were added to this portion of the survey to assess expectations for mastery level experiences of the participants. These eight

additional items included statements such as “If I exercise, then I will feel more confident” and “If I reach an exercise goal, then I will feel a sense of accomplishment”, which respondents also rated on a 5-point scale from (1) Strongly disagree to (5) Strongly agree. An overall mean score was computed based on participants’ responses. Test-retest reliability ($r_{(\text{test-retest})} = .787, p < .00$) and internal consistency (Cronbach alpha = .875) for this sample were good.

SELF-REGULATION. At Time 1 and Time 2, the Exercise Goal-Setting Scale (EGS; Rovniak et al., 2002) and the Exercise Planning and Scheduling Scale (EPS; Rovniak, et al., 2002) were administered to participants to assess participants’ engagement in these self-regulatory behaviors. These measures have been shown to exhibit good internal consistency and test-retest reliability (Rovniak, et al., 2002). These scales include items related to goal-setting and attainment strategies, self-monitoring, as well as planning and scheduling strategies. Response options range from (1) Does not describe to (5) Describes completely. Means were computed for each of these scales for comparison.

Additional self-regulation items were developed for this study to assess whether participants used additional self-regulation strategies. Item content was developed to determine whether participants were tracking their physical activity participation, what methods of tracking were being used, what kinds of feedback were most salient, and whether they use said feedback to make changes to their routine. Items developed for this scale include “I know I am making progress when the activity gets easier” and “If I do not see progress, I change what I am doing to see more results”. Other items assessed goal development, disengagement and adjustment with items such as “I set attainable, realistic goals” and “If I can’t meet my goals, I set new ones that I can meet”. Test-retest reliability ($r_{(\text{test-retest})} = .737, p < .00$) and internal consistency (Cronbach

alpha = .894) for this sample were good. All new items developed for this study were first pilot-tested with 8 volunteers to ensure the item content and wording was clear.

DATA ANALYSES

A multiple regression approach with Time 1 and Time 3 data was used to determine how environmental, social and individual factors influence physical activity participation level in young adults. Within the analyses, total and direct effects were evaluated by the size of the standardized coefficient (β) associated with each effect. For all analyses, a very strong effect is defined as .40 and above, a strong effect as .25 to .39, a moderate effect as .16 to .24, and a small effect is defined as any β value less than .15. All statistical analyses were performed using SPSS Version 15.0. Means, standard deviations and intercorrelations of physical activity, perceptions of the environment, social support, affect, self-efficacy, outcome expectancy, self-regulation, planning, and goal-setting are presented in Table 3.

RESULTS

DEMOGRAPHIC AND BASELINE CHARACTERISTICS

Three hundred eight-six participants were included in the Time 1 analyses. Of the 386, 332 (83.4%) returned to complete the Time 2 portion of the study and are included in the Time 2 analyses. At Time 1, participants were 65.5% female and 34.5% male with a mean age of 20 (SD = 2.50). The mean weight and height were 146.07 lbs (SD = 31.25) and 66.92 inches (SD = 3.86), respectively, with a mean BMI of 22.74 (SD = 3.85).

The majority of participants were Caucasian (74.6%), with smaller percentages of participants identifying themselves as Asian (14.9%), African American (6.0%), Hispanic

(3.3%), Multiracial (1.0%), or African (0.2%). Ninety-seven and a half percent identified themselves as never married, and 2.5% reported themselves as married. Three and a half percent of participants reported having a household size of one, while others report 2 (13.6%), 3 (24.9%), 4 (33.8%), 5 (18.9%) or 6 or more (5.3%).

Completion of 12 years of education was reported by 22.4% of participants, while 63.5% have completed some college, 10.3% have completed a 4-year college, 2.8% have completed a master's degree, and 1.0% completed a post-master's degree. Reported household income was below \$30,000 for 19.7% of respondents, \$30,000-49,999 for 8.3%, \$50,000-69,999 for 9.8%, \$70,000-89,999 for 14.1%, and greater than \$90,000 for 34.5%. A portion of participants chose not to respond to this question (13.6%).

The majority of the sample reported no significant health problems. However, 9.1% endorsed having asthma, 4.5% endorsed having a heart murmur, and 2.3% reported high cholesterol. Sociodemographic characteristics for Time 1 are reported in Table 2.

Based on Time 3 (N = 268) physical activity participation data, 84.7% of the participants endorsed engaging in regular physical activity (e.g. two or more times a week for at least the past month). Overall, the endorsed level of physical activity in this sample was high. The mean total number of MET hours per week reported was 30.83 (SD = 28.63). The overall mean for males was 39.29 (SD = 30.68) MET hours per week, while females had an overall mean of 26.81 (SD = 26.77). At Time 1, participants endorsed a mean MET hours per week level of 32.19 (SD = 28.85). The mean at Time 1 for males was 37.04 (SD = 30.02) and for females was 29.77 (SD = 27.00).

Of the people who endorsed regular participation in physical activity, specific activities engaged in were walking (14.5% of men; 50% of women), jogging or running (19.8% of men;

41% of women), stair-climbing (3.1% of men; 17.2% of women), elliptical training (2.2% of men; 26.4% of women), weight training (22.0% of men; 20.3% of women), biking (7.5% of men; 8.4% of women), swimming (2.6% of men; 5.7% of women), aerobics or floor exercise (3.5% of men; 12.3% of women), basketball (10.1% of men; 1.3% of women), soccer (1.8% of men, 5.3% of women), and tennis (3.1% of men; 4.0% of women). Physical activity intensity level was rated on a 1-10 scale from (1) Easy to (10) Hard. Low intensity level was endorsed by 9.2% of respondents, 68.8% endorsed engaging in moderate intensity level activity, and 22% endorsed engaging in high intensity activity.

PHYSICAL ACTIVITY AND INDIVIDUAL FACTORS

PERCEIVED INTENSITY. The total sample indicated a mean perceived intensity of physical activity rating in the moderate range ($M = 6.57$, $SD = 1.87$; 10-point scale from 1 to 10). Overall perceived intensity levels as measured by a one-item rating scale were significantly different among males and females ($M = 7.15$, $SD = 1.85$; $M = 6.27$, $SD = 1.81$, respectively, $F_{(1, 386)} = 19.78$, $p = .000$) indicating that males perceived intensity of physical activity was generally higher than that of females in this sample.

AFFECT. The overall sample indicated a mean affective response to physical activity in the moderately positive range ($M = 3.26$, $SD = 1.45$; 11-point scale from -5 to +5). Overall affect means as measured by three items adapted from the Feeling Scale (Hardy & Rejeski, 1989) were similar among males and females ($M = 3.35$, $SD = 1.40$; $M = 3.21$, $SD = 1.47$, respectively, $F_{(1, 386)} = 0.91$, $p = .341$). Anticipatory affect as measured by one item was similar among males and females ($M = 3.17$, $SD = 1.80$; $M = 2.92$, $SD = 1.95$, respectively, $F_{(1, 386)} = 1.50$, $p = .221$). Participatory affect as measured by one item was also similar among males and females ($M = 3.02$, $SD = 1.95$; $M = 2.60$, $SD = 2.04$, respectively, $F_{(1, 386)} = 3.76$, $p = .053$).

Post-Participatory affect as measured by one item was similar among males and females ($M = 3.87$, $SD = 1.28$; $M = 4.09$, $SD = 1.33$, respectively, $F_{(1, 386)} = 2.52$, $p = .113$).

OUTCOME EXPECTANCY. The overall sample indicated moderate outcome expectancy for physical activity ($M = 11.42$, $SD = 2.75$). Means were calculated for this measure from items of the adapted version of the Benefits for Physical Activity Scale from the products of importance and value ratings. Means were similar among males and females ($M = 11.12$, $SD = 2.75$; $M = 11.59$, $SD = 2.75$, respectively, $F_{(1, 386)} = 2.48$, $p = .116$). Means were also calculated for the items developed to assess participants expectations for mastery experiences indicated that the sample had a moderate to high level of mastery expectations ($M = 4.12$, $SD = .48$). Means were similar among males and females ($M = 4.11$, $SD = .52$; $M = 4.12$, $SD = .46$, respectively, $F_{(1, 386)} = .027$, $p = .868$).

SELF-EFFICACY. The overall sample indicated moderate self-efficacy for physical activity ($M = 3.31$, $SD = 0.71$; 5-point scale). Self-efficacy means as measured by the Self-Efficacy for Exercise Behaviors Scale, as well as additional items added for this study, were similar among males and females ($M = 3.39$, $SD = 0.70$; $M = 3.27$, $SD = 0.71$, respectively, $F_{(1, 386)} = 2.34$, $p = .127$).

SELF-REGULATION. Self-regulation behaviors of participants, including tracking behaviors, were measured by additional items developed for this study. The overall sample mean, based on these newly developed items, indicated a moderate level of participation in these self-regulatory behaviors ($M = 3.68$, $SD = 0.50$; 5-point scale). Scores for males and females in the sample were similar ($M = 3.72$, $SD = 0.53$; $M = 3.66$, $SD = 0.49$, respectively, $F_{(1, 386)} = 1.34$, $p = .247$). Based on previously established measures of goal-setting (EGS; Exercise Goal-Setting Scale) and planning (EPS; Exercise Planning and Scheduling Scale), participants in this

sample endorsed engaging in a moderate level of goal-setting ($M = 2.92$, $SD = .76$; 5-point scale) and a low to moderate level of planning ($M = 2.56$, $SD = .69$; 5-point scale) for physical activity. Goal-setting means as measured by the EGS, were similar among males and females ($M = 2.99$, $SD = 0.76$; $M = 2.88$, $SD = 0.76$, respectively, $F_{(1, 386)} = 1.83$, $p = .177$). Planning and scheduling means, as measured by the EPS, were similar among males and females ($M = 2.65$, $SD = 0.64$; $M = 2.51$, $SD = 0.71$, respectively, $F_{(1, 386)} = 3.26$, $p = .072$).

PHYSICAL ACTIVITY AND SOCIAL SUPPORT

The variables of social support and environment were combined with individual level variables to construct a more comprehensive model of the influence of various factors on physical activity participation.

The overall sample indicated a moderate level of family and friend social support for physical activity ($M = 2.89$, $SD = .63$; 5-point scale). Means as measured by The Family and Friend Support for Exercise Habits Scale were similar for males and females ($M = 2.85$, $SD = 0.62$; $M = 2.92$, $SD = 0.63$, respectively, $F_{(1, 386)} = 0.97$, $p = .326$). The mean of endorsed social support from family for the sample was slightly lower than the overall mean ($M = 2.75$, $SD = 0.74$), and the means were similar for males and females ($M = 2.68$, $SD = 0.72$; $M = 2.79$, $SD = 0.75$, respectively, $F_{(1, 386)} = 1.68$, $p = .196$). The mean of endorsed social support from friends for the sample was slightly higher than the overall mean ($M = 3.03$, $SD = 0.69$), and the means were similar for males and females ($M = 3.02$, $SD = 0.69$; $M = 3.04$, $SD = 0.69$, respectively, $F_{(1, 386)} = 0.036$, $p = .850$).

PHYSICAL ACTIVITY AND ENVIRONMENT

The overall sample indicated moderate to high perceptions of the physical environment for physical activity ($M = 3.73$, $SD = 0.59$; 5-point scale). Means were significantly different for

males and females ($M = 3.85$, $SD = 0.52$; $M = 3.68$, $SD = 0.62$, respectively, $F_{(1, 386)} = 7.30$, $p = .007$) indicating that males in this sample had a more positive view of the physical environment related to physical activity participation. The standardized coefficients from the analysis of the influence of perceptions of the environment on physical activity participation level are shown in Figure 5. Direct effects are displayed on the path lines connecting the variables and the total effects of each variable on physical activity participation level are displayed under each variable, along with the R^2 from the analysis for each variable.

MODEL DEVELOPMENT

The initial relationship explored between affect and MET hours/week ($\beta_{\text{total}} = .132$, $p = .027$) indicated a significant relationship between these two variables when controlling for age and gender (Figure 2). The relationship between age and gender and anticipatory affect was not significant ($\beta_{\text{direct}} = .052$, $p = .392$; $\beta_{\text{direct}} = -.081$, $p = .188$, respectively). The relationship between gender and MET hours/week was significant ($\beta_{\text{direct}} = -.192$, $p = .001$), while age was not significantly related to MET hours/week in this sample ($\beta_{\text{direct}} = -.058$, $p = .330$). This model explained 6% of the variance in physical activity level.

When a self-regulatory behavior (i.e. planning) was added to the model (Figure 3), the direct effect of affect on MET hours/week was reduced ($\beta_{\text{direct}} = .089$, $p = .097$). Affect had an effect on self-regulatory behavior in this model that approached significance ($\beta_{\text{direct}} = .097$, $p = .113$) and self-regulatory planning was found to have a significant total effect on MET hours/week in this model ($\beta_{\text{total}} = .448$, $p = .000$). This model explained 26% of the variance in physical activity level.

The next step in the analysis involved the incorporation of social-cognitive variables into the model to determine the relationship of affect on METs in the context of social-cognitive

theory. When self-efficacy was added to the model (Figure 4) as a precursor to affect, the influence of affect on METs was substantially reduced ($\beta_{\text{direct}} = .051, p = .342; \beta_{\text{total}} = .047, p = .410$). Self-efficacy significantly influenced MET hours/week ($\beta_{\text{direct}} = .211, p = .001; \beta_{\text{total}} = .391, p = .000$), affect ($\beta_{\text{direct}} = .227, p = .000$) and self-regulatory planning in this model ($\beta_{\text{direct}} = .482, p = .000$). Self-regulatory planning continued to have significant total and direct effects on MET hours/week in this model ($\beta = .352, p = .000$). The addition of outcome expectancies to this model did not appreciably add to the accounted variance and did not indicate significant total effects ($\beta_{\text{total}} = .082, p = .138$) and was therefore not retained in the final model. The addition of outcome expectancies for mastery experiences also did not add to the variance accounted for by the model or have significant total effects on MET hours/week ($\beta_{\text{total}} = -.030, p = .618$).

Next, social support and environment were added as precursors to self-efficacy in the model. The final model (Figure 5) contained seven predictors of MET hours/week; age ($\beta_{\text{direct}} = -.022, p = .685; \beta_{\text{total}} = -.051, p = .393$); gender ($\beta_{\text{direct}} = -.159, p = .003; \beta_{\text{total}} = -.202, p = .001$); exercise environment ($\beta_{\text{direct}} = .007, p = .896; \beta_{\text{total}} = .149, p = .015$); social support ($\beta_{\text{direct}} = .114, p = .039; \beta_{\text{total}} = .213, p = .000$); self-efficacy ($\beta_{\text{direct}} = .195, p = .002; \beta_{\text{total}} = .350, p = .000$); anticipatory affect ($\beta_{\text{direct}} = .039, p = .475; \beta_{\text{total}} = .027, p = .634$); and self-regulatory planning ($\beta_{\text{direct}} = .336, p = .000; \beta_{\text{total}} = .336, p = .000$). The final additions of exercise environment and social support as sources of self-efficacy, further reduced the influence of affect on MET hours/week as environment and social support influenced affect ($\beta_{\text{total}} = .203, p = .001; \beta_{\text{total}} = .143, p = .020$, respectively) and environment and social support influenced METs ($\beta_{\text{total}} = .149, p = .015; \beta_{\text{total}} = .213, p = .000$, respectively). Self-efficacy continued to have a significant direct effect on self-regulatory planning ($\beta_{\text{direct}} = .440, p = .000$). The final model explained 30% of the variance in physical activity level.

DISCUSSION

The purpose of the current study was to test how affective associations fit into a social-cognitive model including ecological variables (i.e. environment and social support) in a student population. Variables at the level of the individual, social supports, and environmental structure were tested as predictors of physical activity participation level.

There continues to be a fundamental theoretical controversy in the field of psychology over whether affect should be seen as a separate response system (Zajonc, 2000) or as an integral part of the cognitive-representational system (Clore & Storbeck, 2006). However, research and theory support the interactionist conceptualization of affect, cognition and behavior. Affect influences social-cognitive functions, and cognitive processes influence the elicitation and management of affective states (Forgas, 2006).

FINDINGS AND CONSIDERATIONS

In this study, the initial relationship tested was the effect of affective associations on subsequent physical activity participation. In subsequent models, the effects of self-regulatory planning, self-efficacy, social support, and exercise environment revealed a more complex relationship between these affective reactions and subsequent physical activity level as these variables related to affective response and physical activity participation level. This indicates that affect is positively related with the behavioral decision-making process involved in being physically active, but that the effect of affect on physical activity behaviors may not be independent from levels of self-efficacy, social support, and perceptions of the exercise environment.

The results of this study did not reveal a significant direct relationship between affective associations with physical activity and subsequent physical activity participation level. There could be several factors involved in this finding, one of which is the fluctuation in affect over time that may inherently make it a more difficult factor to use in prediction over time. Another possibility is the difficulty in development of reliable measures of this construct. Despite the lack of a causal effect, the relationships found in this study offer important information about the role of affect in the behavioral decision-making process. A previously mentioned study Williams et al. (in press) demonstrated the relationship between acute affective responses to physical activity behaviors and subsequent levels of physical activity engagement at 6 and 12-month follow-up points. The authors also note that the relationship became non-significant when controlling for the rating of perceived exertion. Although affect appears to have an important connection with the engagement in physical activity, it seems to have a more complex relationship with physical activity behavior that is yet to be completely explored.

LIMITATIONS

The limitations of this study include use of a student population that may limit the generalizability of the results to a more diverse general population. The sample was predominantly Caucasian, had a relatively lean body mass index, and a higher mean level of exercise participation than is generally found in national samples. Future studies should examine these relationships in a more representative population. The strength of the relationships may have also been limited by the lack of availability of established measures of affective associations of participation in physical activity as most measures are developed to assess acute affect. Also, this study could have incorporated a more objective measure of physical activity participation, to reduce the likelihood of error in reporting participation levels. Also, the new

items developed for this study need to be tested further to establish their reliability and usefulness in more representative samples.

IMPLICATIONS

Findings suggest that interventions to increase the level of physical activity participation may be most successful when they target this complex behavior at multiple levels of influence. The results of this study indicate that affect may play a role in the decision to engage in physical activity; however, the affective response may be inextricably linked to the level of self-efficacy for physical activity. As social-cognitive theory posits, individuals who are inefficacious about a given behavior are more likely to develop negative attributions toward a behavior (Bandura, 1997). Emotional reactions to outcomes that stem from the decision to be physically active may be a crucial part of the process as they may effect subsequent efficacy beliefs. Rather than emotion causing behavior, emotion may be primarily a feedback system and an important guiding principle behind behavior (Baumeister, Vohs, & Tice, 2006). If an individual does not perceive themselves as having control over a given domain, anxiety may ensue, which then may be given a negative attribution depending on situational factors. Therefore, interventions that aim to increase self-efficacy for a given behavior may also see an increase in the positive associations with that behavior.

Affect and self-efficacy are distinct constructs, yet affect appears to be related to physical activity participation through its relationship with self-efficacy, and not through a direct relationship with the behavior itself. If an individual feels confident in their ability to participate in a behavior they are more likely to have positive affective associations with that behavior. Conversely, when an individual has positive associations with a behavior, these positive associations may also foster efficacy beliefs. It is clear that when a person enjoys and reacts

positively to a behavior, they are more likely to engage in a behavior, and without self-efficacy and variables such as affect that appear to relate to self-efficacy, engaging regularly in a behavior will be less likely.

Additional results from this study indicate that the level of self-efficacy and affect are influenced by perceptions of the exercise environment as well as the social support structures in place. According to Bandura, people are partially a product of their environment, and people are likely to avoid environments that they believe exceed their capabilities. Establishing environments that are conducive to building efficacy may be an important level of intervention, as exercise environments seem to have a connection to level of efficacy as well as affective association with the behavior.

This study sought to extend previous research findings by exploring the relationship between affective associations with physical activity behavior and the aforementioned social-cognitive and ecological variables. Understanding more about the processes that lead to higher levels of physical activity is an important step toward developing better interventions to increase physical activity in young adults. Increasing physical activity in this population could potentially have an impact on physical activities later in life, preventing the diseases that are influenced by a sedentary lifestyle. The results of this study were consistent with previous research supporting the relationship between environmental factors, social support, self-efficacy and self-regulation and physical activity participation (Anderson, et al., 2006; McNeill et al., 2006; Sallis, et al., 2007). To increase the affective association with the behavior, it seems to be important to consider the influence of self-efficacy as well as ecological factors (i.e. social support and environment). If these relationships are considered when designing interventions to increase physical activity levels, there is potential for greater impact and maintenance of behavior change.

FUTURE DIRECTIONS

The results of this study suggest that people with greater self-efficacy are more likely to engage in higher levels of physical activity, and that exercise self-efficacy is influenced by the amount of social support received as well as qualities of the exercise environment. Self-efficacy was also shown to have significant effects on engagement in self-regulatory behaviors such as planning and scheduling. Affective associations with physical activity were influenced by the level of self-efficacy, as well as ecological factors. Therefore, it may be important for future interventions to raise self-efficacy not only through mastery experiences (Bandura, 1997) but also through ecologically-focused strategies. Increasing self-efficacy may lead to increases in positive affective associations with the behavior, and further support the decision to be active. As King et al. (2002) state, “Given the scope of the physical inactivity epidemic facing the U.S. population currently and in the future, methods and approaches that integrate theory and concepts across a broader group of disciplines will be increasingly necessary.” Studies examining the various levels of influence on this complex behavior should continue to create more effective intervention strategies to help people become more active.

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TABLE 1

Schedule of Assessment Delivery

Time 1	<p>Sociodemographics International Physical Activity Questionnaire (IPAQ) Perceived Intensity of Activity Level Perceived Exercise Environment Family and Friend Social Support for Exercise Habits Scale The Feeling Scale, Adapted Self-Efficacy for Exercise Behaviors Scale, Adapted Benefits of Physical Activity Scale, Adapted Self Regulation Scale Exercise Planning and Scheduling Scale (EPS) Exercise Goal-Setting Scale (EGS)</p>
Time 2	<p>Perceived Intensity of Activity Level Perceived Exercise Environment Family and Friend Social Support for Exercise Habits Scale The Feeling Scale, Adapted Self-Efficacy for Exercise Behaviors Scale, Adapted Benefits of Physical Activity Scale, Adapted Self Regulation Scale Exercise Planning and Scheduling Scale (EPS) Exercise Goal-Setting Scale (EGS)</p>
Time 3	<p>International Physical Activity Questionnaire (IPAQ)</p>

TABLE 2

Summary of Sociodemographic Characteristics

Demographic Characteristic	% based on N = 386	M	SD
Gender			
Female	65.5		
Male	34.5		
Age		20.1	2.50
Weight		146.1	31.25
Height		66.9	3.86
BMI		22.7	3.85
Race			
Caucasian	74.6		
Asian or Pacific Islander	14.9		
African American	6.0		
Hispanic or Latino	3.3		
Multi-Racial	1.0		
African	0.2		
Marital Status			
Single	97.5		
Married	2.5		
Separated	0.0		
Divorced	0.0		
Widowed or Other	0.0		
Education Level			
12 Years	22.4		
Some College	63.5		
4 Year College	10.3		
Masters Degree	2.8		
Post/Doctoral	1.0		
Household Size			
1	3.5		
2	13.6		
3	24.9		
4	33.8		
5	18.9		
6 or more	5.3		
Household Income			
under \$30,000	19.7		
\$30,000-\$49,999	8.3		
\$50,000-\$69,999	9.8		
\$70,000-\$89,999	14.1		
Greater than \$90,000	34.5		
Rather Not Say	13.6		

TABLE 3
Correlations, Means, and Standard Deviations for Measured Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Age																		
2. Gender	.041																	
3. Environment Means	-.166**	-.137**																
4. Social Support Means	-.165**	.050	.190**															
5. Family SS Means	-.099	.066	.144**	.847**														
6. Friends SS Means	-.165**	.010	.187**	.846**	.489**													
7. Anticipatory Affect	.031	-.062	.256**	.119*	.079	.148**												
8. Participatory Affect	.052	-.098	.271**	.086	.058	.100*	.592**											
9. Post-PA Affect	-.028	.081	.187**	.160**	.113*	.166**	.495**	.457**										
10. Self-Efficacy Means	-.069	-.078	.248**	.302**	.220**	.295**	.333**	.270**	.367**									
11. OE Means	.057	.080	.042	.113*	.102*	.095	-.056	-.038	.112*	.093								
12. Mastery OE Means	.010	.008	.262**	.245**	.200**	.238**	.297**	.271**	.385**	.483**	.395**							
13. SR Means	-.103*	-.059	.292**	.343**	.301**	.301**	.298**	.277**	.332**	.567**	.234**	.556**						
14. Enjoyment Means	.048	.023	.266**	.213**	.156**	.221**	.627**	.579**	.476**	.444**	.005	.475**	.654**					
15. Planning Means	.051	-.092	.233**	.209**	.120*	.243**	.214**	.146**	.190**	.541**	-.006	.259**	.409**	.266**				
16. Goal-Setting Means	-.091	-.069	.189**	.317**	.279**	.288**	.213**	.148**	.239**	.445**	.242**	.468**	.644**	.324**	.409**			
17. PA Intensity Level	-.118*	-.221**	.051*	.127*	.076	.150**	.193**	.129*	.175**	.359**	.071	.189**	.281**	.259**	.226**	.214**		
18. Exer/Leis METs	-.059	-.204**	.182**	.163**	.046	.233**	.145*	.111	.079	.403**	.112	.181**	.273**	.204**	.468**	.251**	.233**	
Means	20.04		3.73	2.89	2.75	3.03	3.00	2.75	4.02	3.31	11.43	4.12	3.68	5.51	2.56	2.92	6.57	30.83
Standard Deviations	2.50		0.59	.63	.74	.69	1.90	2.02	1.31	.71	2.75	.48	.50	1.02	.69	.76	1.87	28.63

**Correlation is significant at the .01 level (2-tailed)

*Correlation is significant at the .05 level (2-tailed)

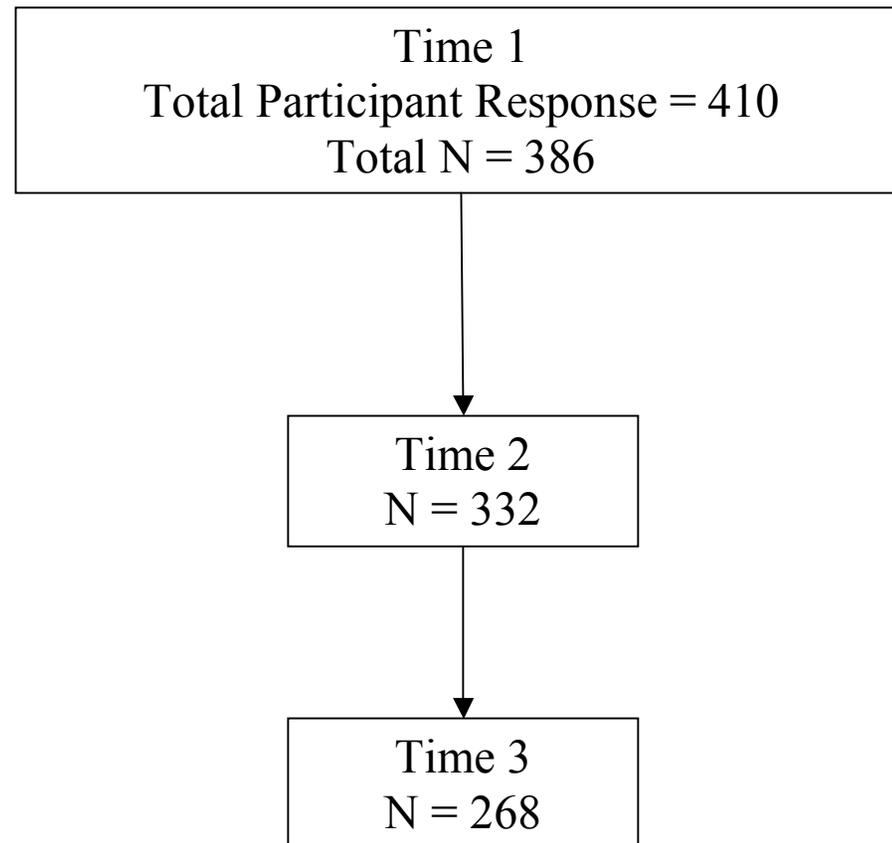


Figure 1. Consort Flow Diagram

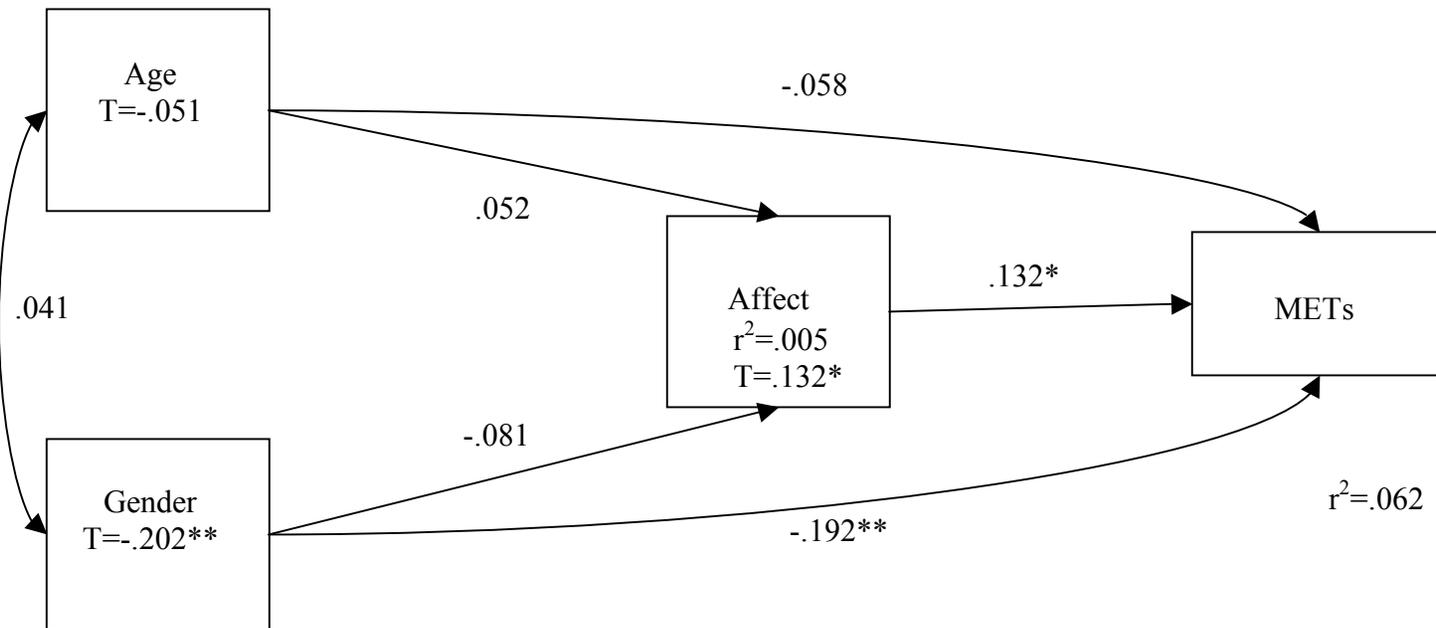


Figure 2. Influence of Affect on METs

Note: * = $p < .05$; ** = $p < .01$; *** = $p < .001$

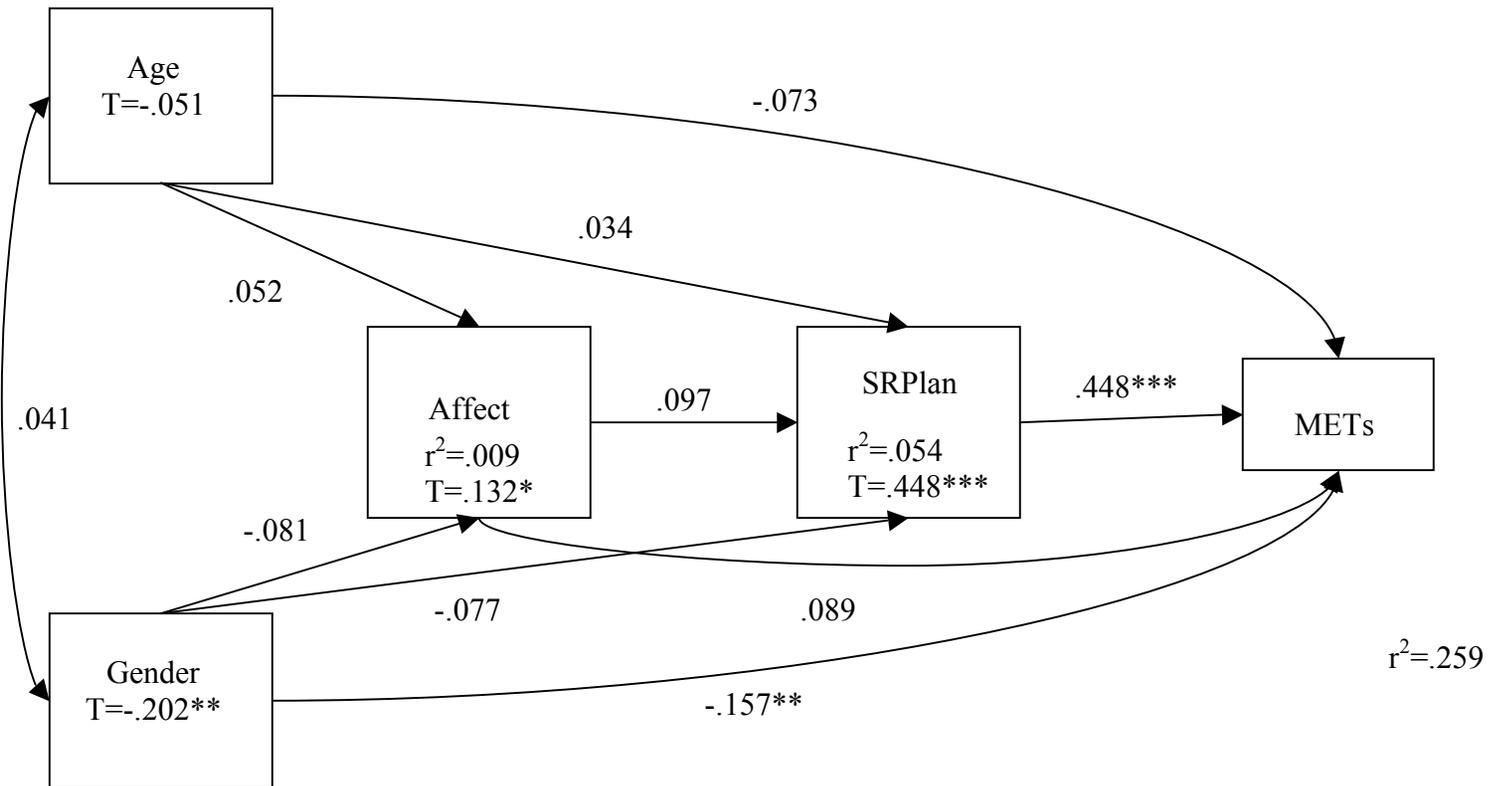


Figure 3. Influence of Affect and Self-Regulatory Planning on METs

Note: * = $p < .05$; ** = $p < .01$; *** = $p < .001$

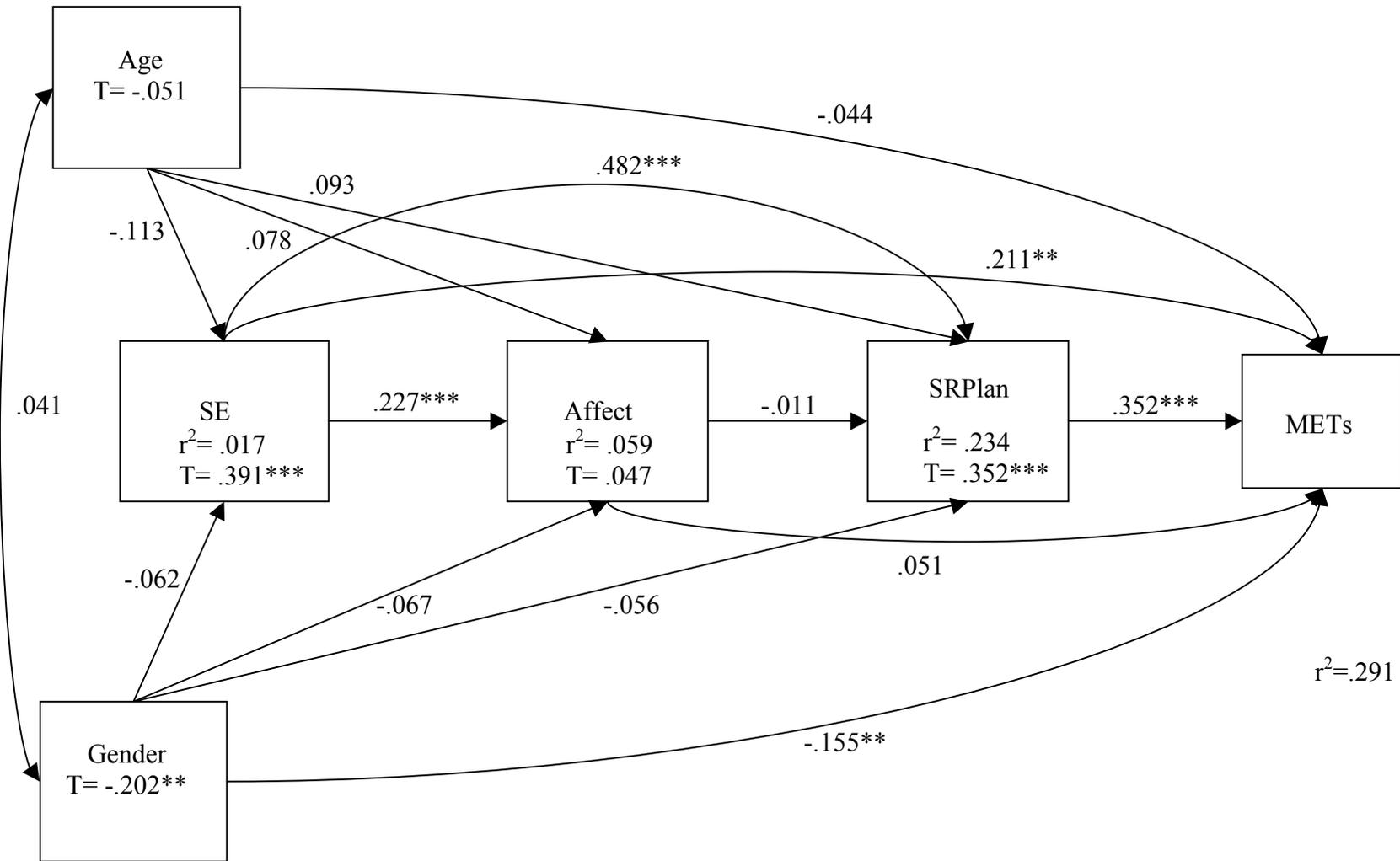


Figure 4. Influence of Self-Efficacy, Affect, and Self-Regulatory Planning on METs

Note: * = $p < .05$; ** = $p < .01$; *** = $p < .001$

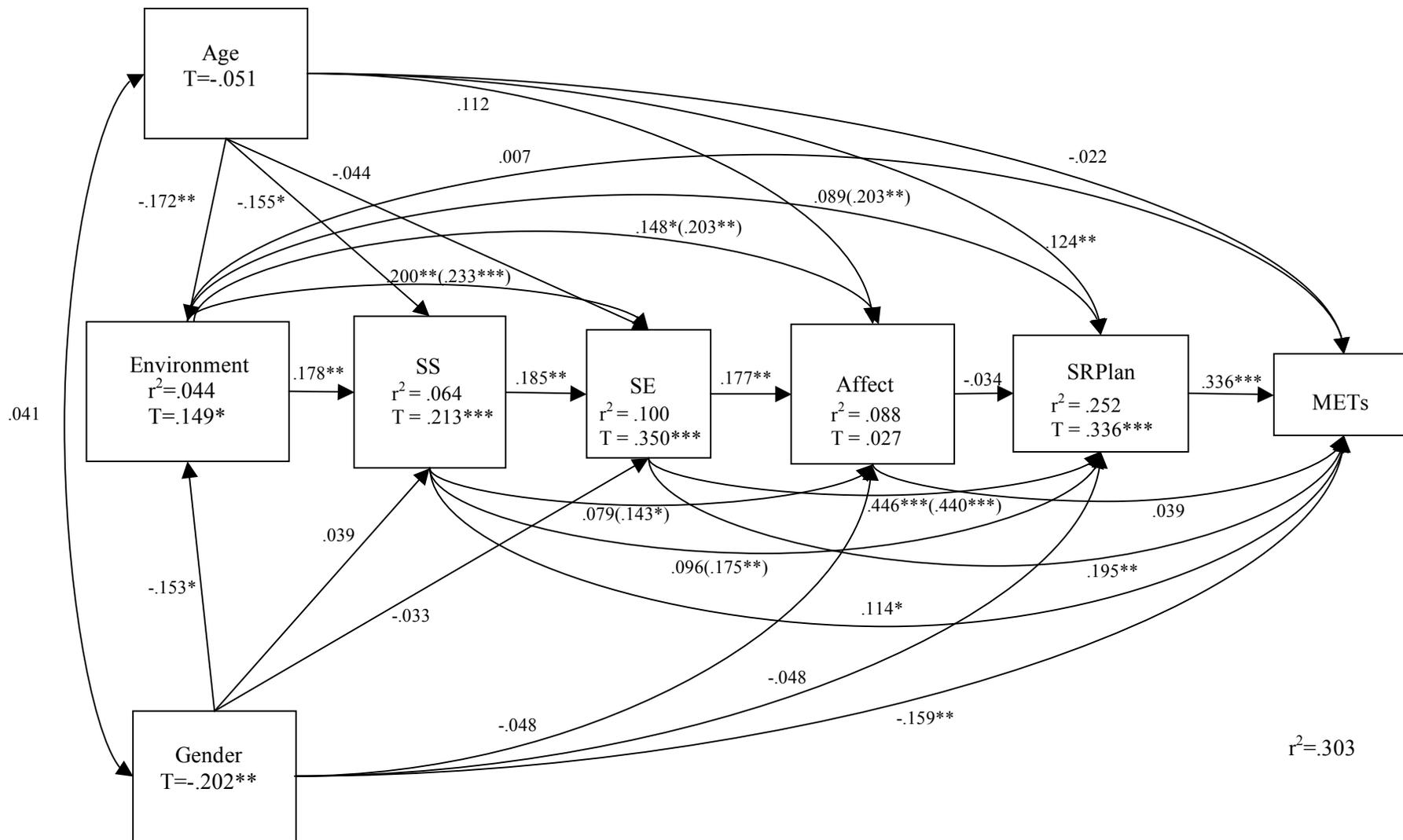


Figure 5: Influence of Exercise Environment, Social Support, Self-Efficacy, Affect, and Self-Regulatory Planning on METs
 Note: * = $p < .05$; ** = $p < .01$; *** = $p < .001$

APPENDIX A

Physical Activity Elicitation Interview Questions

1. What has the history of your physical activity been?
 - a. What are the successes?
 - b. Have there been any failures?
 - c. When and how did your current physical activity begin?
 - d. Have there been times/places/types of activities that you recall being very good/very bad/in the middle?
2. What activities are you currently taking part in?
 - a. How often?
 - b. How long?
 - c. At what time of day?
 - d. Have you had any periods where you were not active for a couple weeks or more?
3. What are the positive and negative aspects of your physical activity routine?
4. What priority do you place on physical activity? (1 hardly important to 10 very important)
5. Have you tried making any changes to it to make it a more positive experience?
 - a. Did these changes work?
6. What are the challenges you face when attempting to remain consistent with your physical activity routine?
7. What are the benefits you see to being active? What are the costs?
8. When you think about going to exercise, what do you feel and think about?
 - a. Does this reaction affect whether you go?
 - b. Does this reaction vary from day to day? If so, why?
9. When you start your next session of physical activity how do you expect to feel?
10. Take me through a typical day for you. Throughout the day what are you thinking and feeling about your exercise plan?
11. What do you think and feel while you are exercising?
12. What do you think about and feel afterwards?

APPENDIX B

Undergraduate Student Recruitment Flyer

**PARTICIPANTS SOUGHT FOR RESEARCH PROJECT****The Health Lifestyle of Students**

Students are invited to participate in a research project developed by the Center for Research in Health Behavior at Virginia Tech examining the health behaviors of students.

This study involves participating in a survey administered in the Psychology Department at Virginia Tech in 3 phases.

For participating, you will receive:

Phase I: 1 Research Credit.

Phase II: 1 Research Credit and entry into a drawing for a \$50 Amazon.com gift card.

Phase III: 1 Research Credit and entry into a drawing for a \$100 Amazon.com gift card.

For more information about participating, log on to the SONA system (<http://vt-psyc.sona-systems.com>) or contact Elizabeth Johnson at ejohns05@vt.edu.

APPENDIX C

Graduate Student Recruitment Email

PARTICIPANTS SOUGHT FOR RESEARCH PROJECT: Graduate students are invited to participate in a research project developed by the Center for Research in Health Behavior at Virginia Tech examining the health behaviors of students. Participant responses to this survey-based study will provide us with information regarding health behaviors that will help us understand how to construct and facilitate tailored programs that will increase health behavior knowledge as well as improve overall health. To participate in this study you must be 18-30 years of age. This study involves participating in a survey administered in the psychology department at Virginia Tech. There are three portions of the survey that are completed on three separate occasions. In exchange for your participation you will receive \$10 for participating in each of the three sessions. For more information about participating, please contact Elizabeth Johnson at ejohns05@vt.edu.

APPENDIX D

Informed Consent Form

Introduction

This study is part of a research project at Virginia Tech. The information obtained will provide us with data regarding individuals' levels of physical activity, his/her reactions to physical activity, and other social-cognitive variables associated with physical activity (i.e. self-efficacy, self-regulation). In turn, this will help us understand how to construct and facilitate tailored programs that will increase health behavior knowledge as well as improve overall health. This research project is developed by the Center for Research in Health Behavior at Virginia Tech. To participate in this study you must be at least 18 years of age.

How long will it take?

There are three parts to this study. The first part is a survey that will last about 60 minutes. You will be asked about your current or past physical activities, the length and intensity levels at which you exercise, and your reactions to these activities. You will also be asked to tell us about the social support you receive, and what you think about the opportunities there are to be active in your school community. In addition, you will be asked to consider your confidence levels and goals with respect to physical activity. This survey will be completed entirely in computer labs in the psychology department. The second and third portions of the study will each last approximately 15 minutes and will be spaced one week apart. You will be asked to return to the computer lab to complete these additional portions of the survey. An email will be sent to you as a reminder to return for the second and third part of the study.

Is it confidential?

Your answers will be entirely confidential and private. We will guard your privacy in this way: As part of the survey, each participant will be asked to provide us with contact information in order for us to assign course credit and send a follow-up email to remind you about the second and third portions of the study. Contact information will also ensure the participant is entered in a pool for the chance to win a \$50 and \$100 gift card to Amazon.com, based on their participation in the second and third portions of the study. Your email address will be recorded only for these purposes and will be held confidential and independent of your responses. A participant number will be assigned to your survey. Only your participant number will be identified with your responses. After the survey, our staff will use your responses to look for common themes and ideas among all the responses. Once the survey is complete, we will destroy the computerized responses. We will keep all data in a password protected computer data base until it is analyzed and subsequently destroyed.

What do I receive in return?

If you are an undergraduate student, your contact information (email address) and enrollment through the Sona System will ensure that you receive course credit for your participation. You

will receive one credit point for each portion of the study that you choose to participate in. Participation in the second and third survey will guarantee that you are also entered into a drawing to win a gift card to Amazon.com.

If you are a graduate student, you will also be compensated for each portion of the survey you complete. You will receive \$10 for participating in each phase of the study, for an overall total of \$30. If you choose not to complete all three portions, you will be compensated for each phase you do complete. Participation in the second and third survey will guarantee that you are also entered into a drawing to win a gift card to Amazon.com.

Is this voluntary?

Your participation is voluntary. You may decide at any time to discontinue the survey. There is no penalty for deciding not to complete the survey or for not answering any question.

Potential Risks/Benefits

Potential Risks:

You may feel uncomfortable answering questions about your exercise habits or personal health history.

Potential Benefits:

Your responses could help us develop a program to improve exercise of people living in our area and across the country. For your time today, we would like to extend to you the opportunity to access the results of this study at your convenience through contact information that will be provided to you at the end of this consent form. In addition to receiving extra course credit, by completing the second and third portions of the survey you will be entered into a drawing in which one individual will receive a \$50 and \$100 gift card to Amazon.com.

What will my responses be used for?

The information from this research may be used for scientific or educational purposes. It may be presented at meetings, published in books, or professional journals, or used for other purposes Virginia Tech's Department of Psychology considers proper in the interest of education, knowledge, or research. However, your name will not be used or associated with any aspect of this research.

Study Contact Information

This research has been approved, as required, by the Institutional Review Board for Research Involving Human Subjects at Virginia Polytechnic and State University and by the Human Subjects Committee of the Department of Psychology at Virginia Polytechnic and State University. You may contact any of the following people at Virginia Tech if you have any questions.

Dr. Richard A. Winett, Dr. Eileen S. Anderson,

or Elizabeth J. Johnson, CRHB Researchers 540.231.8747
Dr. David W. Harrison, Chair of Human Subjects Committee 540.231.4422
Dr. Robert S. Stephens, Chair of Psychology Department 540.231.6304
Dr. David M. Moore, Chair of Institutional Review Board 540.231.4991

By answering YES below, you agree that you have read and understand the purpose of this research and hereby give your voluntary consent to participate in the research.

Would you like to continue?

- YES
- NO