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The Mobius Strip of Total Health: Manipulation of Thinking Prior to Exercise Activity

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Manipulation of Thinking Prior to Exercise Activity

An Honors Thesis submitted in partial fulfillment of the requirements for Honors in Psychology.

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ABSTRACT

Research shows mental and physical health are interdependent. We sought to test various methods of external motivation to effect change in the physical performance and mental health of students enrolled in walking classes. We hypothesized that if there was a correlation between physical exercise and mental health and we could motivate individuals to exercise, then that motivation would in turn result in better mental health. Participants, 19 in the pilot and 320 in the main study, were randomly assigned into three groups to receive messages prior to conducting physical activity: those who received neutral messages about exercise, those who received positive affirmations designed to promote self-worth and accomplishment, and those who received more military-type messages intended to illicit resistance to the messages and draw out a desire to overcome. We found support for both a correlational relationship between physical exercise and mental health as well as some support that women reported feeling more motivated by positive affirmations than military-type messages. However, we did not find that type of message affected either actual amount of time spent working out or mental health. Although this study provides preliminary support for how to make people feel motivated, more research is needed to make the connection between motivation to exercise and actual follow-through.

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Humans are a species born of the wilds, running and jumping as we hunted our next meal or conquered our next land. As we grew, so did our knowledge, and with it our technology advanced, negating the need to physically hunt for food or run for our lives. Reports from the National Center for Health Statistics (NCHS) at the Center for Disease Control (CDC, 2011), the World Health Organization (WHO, 2002), the Department of Health and Human Services. (DHHS, 2011), and many other health organizations all say the same thing: consumption of readily available food and adoption of a sedentary lifestyle have brought our population to new heights in the reported cases of chronic diseases. Cardiovascular disease, adult-onset diabetes, and strokes are becoming more prevalent in middle age adults (30-45 years). The most troubling aspect is that most of these chronic diseases preventable with regular exercise (Wen et al., 2011). With only 15 minutes regular of exercise three times a week, the average human life expectancy is increased by three years (Wen et al., 2011).

Shields (2009) reports that over 66% of Americans are already overweight or obese, and that number continues to get fatter as the trend shows obesity doubling since 1980 (Flegal, Carroll, & Ogden, 2002; Hedley et al., 2004). According to the CDC, as of September 21st, 2015, over a third – roughly 79 million American adults – were obese (Ogden, Carroll, Kit, & Flegal, 2014). The CDC provides a demographic breakdown of this figure: 10.8% of Asian, 32.6% of White, 42.5% of Latino, and 47.8% of Black Americans make up the obese population (Ogden et al., 2014). Janney and Jakicic's (2010) study of body mass index (BMI) and exercise stated BMI as "a significant

contributor to the onset of illness or injury" (pg. 8), giving credence that people categorized as overweight or obese have a greater likelihood of suffering from a myriad of negative medical conditions, thus potentially lowering their quality of life and mental health. The damage of obesity is not limited to the individual either. The CDC features reports claiming it costs $1,429 more annually to treat an obese individual than it does one of healthy weight, and some researchers state the increase in medical spending is "undeniably linked" to increased rates of obesity (Finkelstein, Trogdon, Cohen, & Dietz, 2009).

More than the monetary importance of physical health is the humanitarian one. About 2.5 million people living in the United States were recorded to have died in 2013. Of that number, 611,105 died from heart diseases (23.5%), 149,205 from lung diseases (5.7%), 128,978 from strokes (5%), and 75,578 from diabetes (2.9%; Xu, Murphy, Kochanek, & Bastian, 2016). That is over a million deaths linked to exercise, or lack thereof.

Although numbers can paint a clear picture of cost in dollars and lives, it is more difficult to establish numbers for psychological problems caused by lack of physical health. In psychology, we often ask individuals to rate their psychological symptoms on scales, with numbers tied to "often" or "rarely" feeling symptoms. However, a 1 to7 Likert scale does not do justice to effects of mental illness. As a society, we often overlook the correlation between an unhealthy lifestyle and poor mental health. In addition to the effects of physically feeling bad and visually looking bad affecting our perception of ourselves, if a person is always physically tired, his/her emotional state mirrors this, casting dispersions not only inward but outward in daily interactions with

other people. For example, Nigatu, Reijneveld, de Jonge, van Rossum, and Bültmann (2016) showed that quality of life decreased as weight increased and that a synergistic effect was present in cases where major depressive disorder was present, compounding the negative levels in quality of life.

Andrews and Wilding (2004) showed that emotional and financial stressors increase levels of anxiety and depression, which in turn affect quality of life and academic performance. Some people find themselves in a perpetual cycle of eating as a method of self-medicating (Nguyen-Rodriguez, Unger, & Spruijt-Metz, 2009). This "stress eating" only compounds the problem when intake of calories outweighs output. The CDC collected data from 2009 to 2013 and found that 3.9% of women and 2.8% of men over the age of 18 suffer from serious psychological distress, defining it as an impairment of mid to high severity, in which one's life is affected occupationally, educationally, or socially (Pratt, Dey, & Cohen, 2007; Weissman, Pratt, Miller, & Parker, 2015;). Multiple studies have concluded that among persons with serious mental illness, cardiovascular disease is the number one cause of mortality (Brown, Kim, Mitchell, & Inskip, 2010; Ringen, Engh, Birkenaes, Dieset, & Andreassen, 2014). From 2007-2010, roughly eight percent of Americans 12 years or older reported suffering from depression (CDC, 2014). Further, in 2011, roughly a third of all college students surveyed stated they had suffered from mental distress (e.g., suicidal thoughts, anxiety, depression) within the last year (Eisenberg, Hunt, Speer, & Zivin, 2011).

As we try to adjust to this rise in mental-health diagnoses, we have begun to compensate with a surge of prescription drugs. According to the CDC, from 2005 to 2008, medications designed for the treatment of psychological disorders were prescribed

by doctors to 11% of Americans (Pratt, Brody, & Quiping, 2011). Although prescription drugs can be helpful in the long run, the side effects of mood disorder prescriptions commonly include weight gain and have a latency issue, meaning that the medications take 3-4 weeks to build up in the system before becoming effective (Knubben et al., 2007). Knubben et al. (2007) sought to test exercise as an alternative treatment during this latency period. Their results showed that among participants with severe depression, endurance training resulted in substantial improvement of mood. The inverse of the aforementioned problems caused by inactivity, is also true, as are a multitude of benefits in maintaining an active lifestyle. Multiple studies have shown decreases in the risk of developing heart disease, high blood pressure, type 2 diabetes, and osteoporosis and help with controlling body weight (Pate, Pratt, & Blair, 1995; Turner & Robling, 2004; Vuori, 2004, 2010).

Exercise increases blood flow, lung capacity, burns fat, builds endurance, improves sleep, reduces cholesterol, increases interest in sex, increases metabolic rates, builds strength and muscle, and so much more (Burton, Stokes, & Hall, 2004; Sharma, Madaan, & Petty, 2006). With exercise comes challenges that that make us grow as humans. As we train our bodies we learn to adapt and overcome in both social and mental aspects of our lives. This is not limited to the physical, but mirrored in our mental state as well. Ekeland, Heian, and Hagen (2005) reviewed over 25 randomized controlled experiments of individuals ages 3 to 20 and showed that exercise was related to improved self-esteem. Exercise also induces cortical capillary production in the brain, resulting in greater plasticity, efficiency, and one’s ability to adapt (Colcombe et al., 2004). Oppezzo

& Schwartz (2014) showed significant increases in creativity (around 60%) for their walking condition compared to their sitting condition.

In the current study, we begin with the assumption, based on prior research, that the mind and body are interdependent. When we are stressed mentally, we feel physically exhausted. When we suffer from physical pain, our mental reserves are depleted, we become easily agitated and angry. When we suffer from loss or a broken heart, we feel that pain in our muscles and bones. This Mobius Strip of physical and mental, this ebb and flow of mind and body, share a harmony not to be taken lightly.

Affecting Motivation

We define motivation as the internal drive to accomplish any given task. Although we are influenced by external factors, we choose to act or not act. This use of human will is what gets us out of our beds in the morning. It makes us go to work. The paycheck we get from going to work is an external factor, yet we can choose to sleep in or not show up. Knowing that external forces can influence our internal motivation, we aim to target participants' wishes for praise or their desire to "prove us wrong" when admonished.

Short message service (SMS) text-based communication is a common factor in our everyday lives. The concept of applying this technology to advertising, business solutions, emergency services, and even the classroom has not been overlooked. A 16-week study conducted by Patrick et al. (2009) using 2-5 texts a day resulted in greater weight loss for the experiment group compared to the control group. Donaldson, Fallows, and Morris (2014) used a SMS-based intervention for participants who had just completed a weight-loss program. Their finding showed that not only did the

experimental group keep the weight off, but those participants also continued to lose weight. Capozza et al. (2015) used a similar method it to keep patients with type 2 diabetes on target with self-care goals. Even in cases of smoking cessation, SMS-based intervention showed varying degrees of success (Mussener et al., 2016).

Here we fall into an age-old argument: the carrot or the stick. Understanding that intrinsic motivation is an internal process, how can we then illicit a response? We must appeal to our participants' internal wants and desires, an external push for admiration or toward fear of admonishment. Research conducted by Pauline (2013) showed significant difference in motivators for physical activity between men and women participants, finding that men were motivated by strength, competition, and challenge, as compared to women, who were motivated by positive health, weight management, and appearance. This reinforces previous research conducted by Egli (2011), who also found that men listed strength, competition, and challenge as motivators to exercise, and women listed weight management and appearance as motivators for physical fitness. Thus, it seems that what may be motivating for men is different than what motivates women.

The Current Study

The purpose of this study was to investigate whether we could use SMS messaging to motivate participants enrolled in college-level fitness courses to engage in regular exercise. Our goal was to show that with increased exercise, participants would also have decreased anxiety and depression over time. Expanding on the concept that men and women are motivated by different concepts, we designed a study with both positive and negative intervention conditions. Our positive condition, known as "Warm Fuzzy," consisted of positive uplifting messages akin to self-affirmation. These messages

elicited positive feelings of self-worth in relation to a given activity. Our negative condition, known as “Military,” was an intervention with a strong apathetic message akin to a challenge to the individual’s ability or willingness to complete the task. These messages were designed to elicit a fight response to rebuff its message and rise to the challenge. As a comparison group, one third of the participants received neutral messages with facts about the benefits of exercise (“Educational”). We hypothesized the following:

1. *Exercise and Mental Health.* Amount of exercise would correlate negatively with anxiety and depression at both pre-test and post-test.
2. *Motivation*. Whereas men in our study would be more motivated to exercise by the Military messages than the Warm Fuzzy or Educational messages, women in our study would be more motivated to exercise by the Warm Fuzzy messages than the Military or Educational messages.
3. *Action*. Using the same gender differences hypothesized above, change in amount of exercise would vary based on group assignment.
4. *Affecting Mental Health Outcomes.* If we were able to change either motivation or action, type of message would ultimately cause change in anxiety and depression.

Method

Participants

All 339 initial participants were undergraduate college students from Georgia Southern University’s Fitness Walking courses (1 summer class and 10 fall classes). All participants who completed pre, post, or all portions of the study were given extra credit as per a prior agreement with the Physical Activity and Healthful Living Director, as well

as entered into a drawing for a $50 gift card to the Georgia Southern Bookstore. Of the 339 initial participants, 149 participants were removed before analysis for failure to complete the second survey. The experiment population (N = 190) consisted of 147 women (77.4%) and 43 men (22.6%) ranging in age from 18 to 26 years old, (M = 19.10, SD = 1.41). Voluntary demographic information revealed the majority of the participants identified as white or Caucasian (n = 129, 67.9%), followed by African American or black (n = 49, 25.8%), with the remainder being Hispanic, Asian, mixed, or other ethnicity (n = 12, 5.9%). First-year students made up the largest group by year, (n = 80, 42.1%), followed by second years (n = 54, 28.4%), then third years (n = 35, 18.4%), and the least represented were students who have been in college four or more years (n = 20, 10.5%), with one student failing to identify year in school.

Materials

Basic Health Assessment (BHA; Appendix A). We created a measure of medical fitness for this study that included basic information needed to calculate body mass index (BMI), questions about whether the participant should not engage in exercise for health reasons, and current perception of physical fitness level (FIT). Self-perceived physical fitness level was gauged on a scale of 1-100 for internal fitness and then contrasted with the same scale for external fitness.

Godin Leisure-Time Physical Activity Questionnaire (GLTPAQ; Amireault & Godin, 2015; Appendix B). The GLTPAQ is a 4-item measure of exercise activity that has shown good reliability and validity in measuring exercise activity and separating individuals into active and inactive groups (Amireault & Godin, 2015). The researcher calculates a base number by multiplying strenuous, moderate, and light exercise by 9, 5,

and 3 respectively for an indication of weekly exercise. For the purpose of this study, we adapted the GLTPAQ(A) by assigning number values to the fourth question related to sweat production, where often, sometimes, and never equal 1, 2, and 3 respectively. The base number was then divided by the sweat production to account for quality of exercise.

Center for Epidemiological Studies Depression Scale (CES-D; Dozeman et al., 2011; Appendix C). This 20-question inventory of depression is commonly used in the practical and research arena and has proven accuracy in gaging depressive symptom amongst different cultures and age groups (Dozeman et al., 2011).

Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988; Appendix D). This 21-question inventory of anxiety has proven itself as both reliable and valid in assessing anxiety symptoms over time and is commonly found in both practice and research settings (Beck et al., 1988).

Demographics Survey (Appendix E). All participants were asked to complete a short demographics survey. This survey also included directions for participants to create a unique code that allowed us to anonymously track change in data over time.

Statements (Appendix F). A complete list of statements for each condition has been provided as an appendix. The Educational (E) condition used neutral information about health in general terms similar to information that one would receive from course material. The Warm Fuzzy (WF) condition consisted of positive information designed to give the reader affirmation about the self and exercise health. The Military (M) condition consisted of seemingly negative phrasing intended to illicit resistance to the messages and draw out a desire to overcome.

Procedure

The primary researcher attended the class on the last of the second week of the semester with the permission of the Department of Kinesiology. Students who wished to participate were told about the study and asked to sign an informed consent form. They then completed a measures packet consisting of the BHA, GLTPAQ, CES-D, BAI, and demographics survey. Each measures packet contained 1 of 3 sign-up sheets, determined randomly, for Remind®, an online website that allows for texting without exchanging cell phone numbers. Distribution in this fashion allowed for students to be randomly assigned to the E, WF, or M Remind text lists.

Participants were sent Remind messages at regular intervals throughout the semester, 10 minutes prior to the start of each class. At the end of the semester, the examiner returned to the classroom and distributed a packet that included the BHA, GLTPAQ, CES-D, BAI, and demographics survey for post examination.

Phase 1. The first phase of this experiment was conducted during the second short summer term of 2016, focused on one walking class, and served as a pilot for the for the following semester's experiment. This class was 100 minutes long, 4 times a week for 5 weeks.

Phase 2. The second phase of this experiment was a replica of Phase 1 that was conducted during the longer fall semester of 2016. It was expanded to 10 walking classes, each 50 minutes long, on a schedule of 2 times a week for 12 weeks.

Results

Preliminary Analysis

All variables were examined for outliers. One participant's data was removed from primary analysis because the GLTPQ(A) score (600) was more than four standard

deviations above the mean for that variable (M = 29.67, SD = 25.62). Descriptive statistics and t-test information for all continuous variables are shown in Table 1. Note that sample sizes differ as a result of participants skipping items. Anxiety (BAI) and reported exercise [GLTPAQ(A)] decreased significantly over time, and perceived fitness (FIT) increased significantly over time.

Primary Analysis

Hypothesis 1: Exercise and Mental Health. To determine whether amount of exercise was related to depression and anxiety, we used Pearson's correlation coefficient to analyze the data. At pre-test, amount of reported exercise on the GLTPAQ(A) was negatively correlated with depression, $r(188) = -.16$, $p = .027$, and anxiety, $r(188) = -.14$, $p = .048$. Post-test reported exercise was only negatively correlated to depression, $r(186) = -.14$, $p = .048$, and was not significantly related to post-test anxiety, $r(186) = -.12$, $p = .117$. Our hypothesis that exercise was related to depression was supported, and our hypothesis that exercise was related to anxiety was partially supported.

Hypothesis 2: Motivation. To determine if motivation to exercise differed across type of message based on gender, we analyzed these data using a 2 (Motivation: Motivating or Not Motivating) x 3 (Type of Message: Educational, Warm Fuzzy, Military) x 2 (Gender: Male, Female) χ^2. The three-way χ^2 was significant, $\chi^2(2, n = 190) = 13.66$, $p = .001$, $C = .26$, though this significance seemed to be driven by the data from women. For women, type of message affected motivation, $\chi^2(2, n = 147) = 12.63$, $p = .002$, $C = .28$. Among women who reported being motivated, 32.5% were in the Educational group, 41.9% were in the Warm Fuzzy group, and 25.6% were in the Military group. Of women who reported not being motivated, 30.0% were in the Educational group, 13.3% were in the Warm Fuzzy group, and 56.7% were in the

Military group. For men, type of message did not affect motivation, $\chi^2(2, n = 43) = 2.36$, $p = .314$, $C = .23$. Among men who reported being motivated, 37.9% were in the Educational group, 41.4% were in the Warm Fuzzy group, and 20.7% were in the Military group. Of men who reported not being motivated, 28.6% were in the Educational group, 28.6% were in the Warm Fuzzy group, and 42.9% were in the Military group.

Hypothesis 3: Action. To determine if reported levels of exercise changed over time based on type of message and gender, we used a 2 (Gender: Male, Female) x 3 (Type of Message: Educational, Warm Fuzzy, Military) between-groups ANOVA with change score for reported exercise [GLTPAQ(A)] over time used as the DV. As noted above in the Preliminary Analysis section, reported exercise, as measured by the GLTPAQ(A), significantly decreased across time. However, this was not due to type of message, $F(2, 182) = 1.66$, $p = .195$, gender, $F(1, 182) = .08$, $p = .772$, or an interaction between type of message and gender, $F(2, 182) = 1.26$, $p = .288$.

Hypothesis 4: Affecting Mental Health Outcomes. Although we did not find that type of message led to action (hypothesis 3), we did find that exercise was related to mental health (hypothesis 1), and that women felt more motivated by the Warm Fuzzy messages (hypothesis 2). Because we did not find support for our messages differentially motivating men to exercise, we did not include men in the analysis for hypothesis 4. To determine if type of message affected mental health over time for women, we analyzed these data using two mixed ANOVAs, one for anxiety and one for depression. The main effect of type of message on change mental health over time was not significant for either anxiety, Wilks' Lambda = .99, $F(2, 144) = .92$, $p = .400$, or depression, Wilks' Lambda =

.97, $F(2, 144) = 1.94$, $p = .148$. Means and standard deviations by group can be found in Table 2.

Discussion

The methodology of this study was based on physical and mental health research connecting physical activity with positive physical and mental health factors. This being true, we set out to test various external motivation to elicit greater effort in fixed, low intensity exercise, believing this would decrease problematic mental health factors like depression and anxiety. Following along previous research into the differences in motivational factors for men and women (Egli, 2011; Pauline, 2013), we designed two experimental groups, positive and negative motivation, and added a third, educational, for control. In an effort to obtain as realistic data as possible, we designed the experiment around the pre-existing college-level physical education courses mandated by the state of Georgia. This allowed us to conduct a naturalistic experiment with as little researcher influence or deviation from the regular life of college students as possible.

Our first hypothesis, that scores for exercise would negatively correlate with their depression and anxiety was only partially correct. Exercise negatively correlated with pre and posttest depression as well as with pretest anxiety, though effect sizes were minimal at best. This served as a check of the prior research and a lynchpin to our study design. Although our first hypothesis was not strongly supported, we continued with the subsequent analyses.

Our second hypothesis, that differences in motivation to exercise between men and women based on the negative or positive nature of the messages received, was based on the work of Pauline (2013) and Egli (2011). We believed that men would respond

better to the Military messages and women to the Warm Fuzzy messages. For women, it did appear that the Warm Fuzzy messages were the most motivating. For men, there appeared to be no difference in motivation by group, though this is likely due to the lack of male participants.

Our third hypothesis, that amount of exercise would differ based on assigned condition, was not supported. Although the data from our second hypothesis showed that female participants were motivated by the Warm Fuzzy messages, this motivation did not lead to a significant difference in reported exercise. It is worth noting, however, that the measure for self-perceived physical fitness (FIT) indicated a significant increase in the preliminary analysis (Table 1). Participants were motivated and felt better about themselves, but failed to act on that per the measures used in this study.

Our fourth hypothesis, that type of message might affect mental health, also proved to be false. Because of the small number of men in the study and because we did not find differences in either motivation or action for men, we only examined women for this last hypothesis. Women did not show significant differences in depression or anxiety based on type of message received.

Limitations

Because we used a more naturalistic design, we lost some internal validity in terms of being able to control how much our participants exercised and whether they read the messages when they were sent. Additionally, we would have preferred to collect more concrete data, such as blood work, resting heart rate, breath count, and those of physical ability, rather than relying on self-report data. However, what we lost in internal validity we gained in external validity, which was something we chose when designing the study.

The population for men across the study (n = 43) was low, accounting for only 22.6% of the total population. Thus, we did not have the power to detect differences, particularly in analyses with smaller effect sizes, such as those found with hypothesis 2. One theory for the lack of male participation in the study is in the nature of the course itself: Fitness Walking. Although our study spanned across 10 classes, Georgia Southern University, in conjunction with East Georgia State College, offers upward of 100 classes a semester ranging from Archery to weightlifting which one could earn the mandatory credit. We cannot speculate as to why women are more likely than men to choose Fitness Walking, but we do know that the issue was not differential attrition by gender.

Our study was conducted on a college campus, so the mean participant age was 19 years old and our attrition rate was roughly 41%. Additionally, all prior service military members are exempt from taking physical fitness courses. Thus, the results of this study therefore should only be applied to similar populations of individuals.

Future Research

We believe, for this line of research to continue, more concrete measures of physical health and mental state must be implemented. We believe that given the chance to conduct tests that include blood pressure, heart rate, and respiration at pre and post testing we might get clearer answers to our questions about motivation's effect on physical and, ultimately, mental health. Additionally, we feel that if messages were not only received but participant had to process the message in some way (e.g., retype it) and take ownership of it prior to activity that the effect of the message might be increased.

Summary

Although some limitations exist, the results of this study provide support that warrants further research into the effects of external motivation for changing mentalities about physical exercise and its relationship to mental health. We believe the design a solid foundation to build upon and expand given our findings and lessons learned.

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Table 1

Descriptive Statistics for Dependent Variables and Covariates

		Time of Assessment							
		Pretest			Post Test				
Measure	*N*	Mean	(*SD*)	Range	Mean	(*SD*)	Range	*t* for Time Contrast	*p*-value
CES-D	190	14.86	(9.79)	0-57	15.26	(11.57)	0-59	-.68	.500
BAI	190	10.88	(10.26)	0-47	9.38	(11.32)	0-51	2.24	.026
GLTPAQ(A)	188	33.37	(26.61)	0-113	29.67	(29.67)	0-165	2.38	.018
BMI	187	25.03	(5.58)	16.13-45.76	25.05	(5.40)	16.44-47.75	-.23	.820
FIT	187	56.24	(23.41)	1-100	61.37	(21.88)	1-100	-3.84	.000

Note. CES-D = *Center for Epidemiological Studies Depression Scale;* BAI = *Beck Anxiety Inventory;* GLTPAQ(A) = *Godin Leisure Time Activity Questionnaire (Adapted);* BMI = *Body Mass Index;* FIT = *Self-Perceived Physical Fitness.*

Table 2

Descriptive Statistics for Anxiety and Depression over Time by Group (Women Only)

	Anxiety (BAI)		Depression (CES-D)	
Group	Pre Mean (SD)	Post Mean (*SD*)	Pre Mean (SD)	Post Mean (*SD*)
Educational (*n* = 47)	13.83 (10.42)	11.45 (11.57)	18.19 (10.57)	18.23 (12.05)
Warm Fuzzy (*n* = 53)	8.68 (8.54)	8.28 (11.79)	14.43 (9.37)	12.25 (11.07)
Military (*n* = 47)	14.74 (12.63)	11.91 (12.33)	15.64 (10.82)	17.61 (11.61)

Note. BAI = *Beck Anxiety Inventory;* CES-D = *Center for Epidemiological Studies Depression Scale.*

Appendix A

BASIC HEALTH ASSESSMENT

Height: _____

Weight: _____

Biological Sex: _____

Do you have any illnesses or injuries that would be worsened by ***light*** physical exercise?

Mark One: ___No. ___Yes. If yes, please explain:

Do you have any illnesses or injuries that would be worsened by ***moderate*** physical exercise?

Mark One: ___No. ___Yes. If yes, please explain:

Do you have any illnesses or injuries that would be worsened by ***strenuous*** physical exercise?

Mark One: ___No. ___Yes. If yes, please explain:

On a scale of 1-100, how physically fit do you think you are, with 1 being *not at all fit* and 100 being *very fit*?

Using the same scale of 1-100, how physically fit would a stranger rate you based on your physical appearance?

Appendix B

GODIN LEISURE-TIME PHYSICAL ACTIVITY QUESTIONNAIRE

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
STRENUOUS EXERCISE **(HEART BEATS RAPIDLY)** (e.g., running, jogging, hockey, football, soccer, squash, basketball, cross country skiing, judo, roller skating, vigorous swimming, vigorous long distance bicycling)	_____
MODERATE EXERCISE **(NOT EXHAUSTING)** (e.g., fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing, popular and folk dancing)	_____
MILD EXERCISE **(MINIMAL EFFORT)** (e.g., yoga, archery, fishing from river bank, bowling, horseshoes, golf, snow-mobiling, easy walking)	_____

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

Appendix C

CENTER FOR EPIDEMIOLOGICAL STUDIES DEPRESSION SCALE

Please circle the number that corresponds with how often you have experienced each of the following during the past week:

	Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	Most or all of the time (5-7 days)
1. You were bothered by things that usually don't bother you.	0	1	2	3
2. You did not feel like eating; your appetite was poor.	0	1	2	3
3. You felt that you could not shake off the blues even with help from you family or friends.	0	1	2	3
4. You felt that you were just as good as other people.	3	2	1	0
5. You had trouble keeping your mind on what you were doing.	0	1	2	3
6. You felt depressed.	0	1	2	3
7. You felt that everything you did was an effort.	0	1	2	3
8. You felt hopeful about the future.	3	2	1	0
9. You thought your life had been a failure.	0	1	2	3
10. You felt fearful.	0	1	2	3
11. Your sleep was restless.	0	1	2	3
12. You were happy.	3	2	1	0
13. You talked less than usual.	0	1	2	3
14. You felt lonely.	0	1	2	3
15. People were unfriendly.	0	1	2	3
16. You enjoyed life.	3	2	1	0
17. You had crying spells.	0	1	2	3
18. You felt sad.	0	1	2	3
19. You felt that people disliked you.	0	1	2	3
20. You could not get "going".	0	1	2	3

APPENDIX D

BECK ANXIETY INVENTORY

Below is a list of common symptoms of anxiety. Please carefully read each item in the list. Indicate how much you have been bothered by that symptom during the past month, including today, by circling the number in the corresponding space in the column next to each symptom.

	Not At All	Mildly but it didn't bother me much.	Moderately - it wasn't pleasant at times	Severely – it bothered me a lot
Numbness or tingling	0	1	2	3
Feeling hot	0	1	2	3
Wobbliness in legs	0	1	2	3
Unable to relax	0	1	2	3
Fear of worst happening	0	1	2	3
Dizzy or lightheaded	0	1	2	3
Heart pounding/racing	0	1	2	3
Unsteady	0	1	2	3
Terrified or afraid	0	1	2	3
Nervous	0	1	2	3
Feeling of choking	0	1	2	3
Hands trembling	0	1	2	3
Shaky / unsteady	0	1	2	3
Fear of losing control	0	1	2	3
Difficulty in breathing	0	1	2	3
Fear of dying	0	1	2	3
Scared	0	1	2	3
Indigestion	0	1	2	3
Faint / lightheaded	0	1	2	3
Face flushed	0	1	2	3
Hot/cold sweats	0	1	2	3

Appendix E

DEMOGRAPHICS SURVEY

What is your Age? _____

What sex were you assigned at birth?

Mark One: _____ Male _____ Female

What gender do identify with? _____

What ethnic group do you identify with? _____

What is your current year in school:

Mark one: _____ First Year _____ Sophomore _____ Junior _____ Senior

Please create a code that consists of the **first 3 letters of your mother's maiden name** and the **last 4 digits of your Eagle ID number**:

Appendix F

STATEMENTS

EDUCATIONAL CONDITION (E):

Regular workouts can lengthen life span.
A slower resting heart rate equals longer life.
Physical activity lowers the risk of developing colon cancer.
Regular exercise can improve attention span.
Physical activity improves mood.
Working out boosts brain chemicals associated with memory and learning.
Exercise will improve strength and endurance over time.
Physical activity can aid in preventing stroke.
Exercise can help prevent arthritis.
Exercise can help reboot the body clock, helping individuals go to sleep and stay asleep
during appropriate times.
Regular exercise improves mental health.
Regular exercise helps maintain body weight.
Blood flow is increased with cardiovascular exercise.
Regular exercise can support and improve memory.
Exercise can lessen the effects of attention-deficit hyperactivity disorder.
Exercise can delay cognitive decline as one ages.
Exercise allows the brain to produce more of a protein called BDNF, which encourages brain cells to grow.
Aerobic exercise pumps more blood, and therefore oxygen, to the brain which leads to better-nourished brain tissue.
There is a positive relationship between academic performance and physical activity.
Exercise can help prevent weight gain and can maintain weight loss.
Exercise combats health conditions and diseases, such as heart disease.
Exercise helps prevent high blood pressure.
Exercise boosts high-density lipoprotein (HDL), or good cholesterol.

WARM FUZZY CONDITION (WF):

You do not have to be great to start, but you have to start to be great.
Remember, no matter how slow you go, you’re lapping everyone on the couch.
Actions speak louder than words.
Be proud of yourself.
Don’t let your head give up or your legs give out.
It always seems impossible until you’ve done it.
Be the change you want to see.
No one can make you feel inferior without your permission.
Be so good they can’t ignore you.
Don’t set out to build a wall, but instead lay one brick each day.
Transformation is not a future event; it is a present activity.

Today, do what others won't so that tomorrow you can do what others can't.
Limitations only exist if you let them.
The only bad workout is the one that doesn't happen.
Believe that success is your only option.
If it is important to you, you will find a way. If not, you will find an excuse.
If you do your best, you're doing more than most.
It doesn't matter who is faster or stronger than you. All that matters is that you are better than you were yesterday.
Only you can make your dreams come true.
Don't talk about it; Be about it.
Fitness isn't a destination, it's a way of life.
Sweat, smile, repeat.
Your body deserves to be taken care of by you.

MILITARY CONDITION (M):

To succeed, you have to actually try.
If you're tired of starting over, stop giving up.
How many excuses have you come up with today to not try?
If you think you can…you probably can't.
Suck it up and just push yourself!
You are only as weak as you choose to be.
You won't start tomorrow, so quite lying to yourself.
Why not put off your workout one more day? You always do.
Why try when you can just complain?
Type II diabetes is coming; too bad you can't out run it.
Never try to impress anyone, but yourself. You'll fail anyway.
It's called a work out, not an easy out.
Your couch is more comfortable anyway.
You might as well sleep in since that you can actually do.
There's no use in working out today. It won't help you any.
You're the only one that has any faith in you, and it is misplaced.
Losers quit when they are tired; Winners quit when they've won.
Suffer the pain of discipline, or the anguish of regret.
Excuses won't burn calories.
Ask your doctor if getting off the couch is right for you.
Every time you quit, someone else gets faster.
It is called a work out, not an easy out.
Shut up and train.