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The buffering effects of perceived fitness on stress reactivity

Jayme Nichole Petaishiski

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THE BUFFERING EFFECTS OF PERCEIVED FITNESS
ON STRESS REACTIVITY

A Thesis
Presented to the
Faculty of
California State University,
San Bernardino

In Partial Fulfillment
of the Requirements for the Degree
Master of Science
in
Psychology:
Industrial/Organizational

by
Jayme Nichole Petaishifski

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Date
ABSTRACT

The effects of perceived physical fitness on stress reactivity were investigated. College students (N = 173) enrolled in kinesiology classes completed a questionnaire that measured perceived stress, stressors, perceived physical fitness, self-control, and exercise locus of control at week 2 (time 1) and again at week 8 (time 2). Results indicated that perceived physical fitness increased for students enrolled in the activity classes but not for the students enrolled in lecture classes. Perceived stress decreased for all participants over time. Perceived physical fitness significantly predicted perceived stress at time 2 when entered into a hierarchical multiple regression with perceived stress at time 1 and stressors. However, perceived physical fitness did not significantly predict perceived stress when entered into a hierarchical multiple regression after self-control and exercise locus of control had been entered in an earlier step. These results generally support earlier research that physical fitness can reduce perceived stress.
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CHAPTER ONE

INTRODUCTION

Approximately half of stress experienced by an individual is actually prompted by stressors encountered at work (Brandon & Loftin, 1991). Hence, there has been an increased concern regarding the amount of occupational stress employees are experiencing as members of the workforce (Cooper & Cartwright, 1994; Cox, Gotts, Boot, & Kerr, 1988; Koeske, Kirk, & Koeske, 1993; Leebov, 1990). Stress has been defined as "The pattern of specific and nonspecific responses an organism makes to stimulus events that disturb its equilibrium and tax or exceed its ability to cope" (Zimbardo & Gerrig, 1999). Research reveals the nature of stress can have a negative impact on employees as well as the overall functioning of the organization (Averill, 1973; Brandon & Loftin, 1991; Brown, 1991; Cooper & Cartwright, 1994; Koeske et al., 1993; Leebov, 1990; Weinberg & Gould, 1999; Tucker, 1990). One of the many strategies used to help employees buffer the effects of stress is regular exercise (Cooper & Cartwright, 1994; Cox et al., 1988; Fontane, 1996; Kerr & Vos, 1993). Exercise is defined as "...a form of leisure physical activity undertaken with a specific external objective,
such as improvement of fitness, physical performance, or health..." (Gauvin & Spence, 1995, p. 435).

This study addresses the effects of the changing workforce and the physiological and psychological benefits of fitness. The purpose of this experiment is to test the relationships between situational stressors, perceived fitness, exercise locus of control, self-control, and perceived stress.

Defining Stress

Stress can have both desirable and undesirable effects, depending on the type of stress, amount of stress, duration of the stress, and the individual characteristics of the person experiencing the stress (Leebov, 1990). After all, "...stress results from the interaction between stressors and the individual's perception and reaction to those stressors" (Ross, Bradley, & Heackert, 1999, p. 312). Stress caused by pleasant stressors is referred to as eustress, and stress resulting from unpleasant stressors is called distress (Fahey, Insel, & Roth, 1999).

Stress accompanied with excitement and delight can stimulate arousal (Leebov, 1990; Weinberg & Gould, 1999). Arousal created by stress can motivate people to achieve
desired goals and optimal performance. Once a person determines his or her optimal level of stress, he or she can use it to stay active and interested in life. So, stress can be helpful, as long as it is not having a negative impact on psychological and physiological well being (Leebov, 1990; Weinberg & Gould, 1999).

Conversely, when a person exceeds optimal arousal and he or she approaches the anxiety threshold, negative stress or distress is experienced (Leebov, 1990). Negative stress can be detrimental to a person’s functioning and well being, decreasing performance significantly. For the purpose of this study, stress is conceptualized as distress, the stress that is accompanied with negative physiological and psychological functioning (Leebov, 1990; Weinberg & Gould, 1999). The type of stress experienced in the workforce may be a reaction to an individual believing that he or she does not have the resources necessary to meet the situational demands or that he or she does not have the personal control to remedy the problem (Knight, 1987). It can result in anxiety, pressure, and worry (Leebov, 1990; Tucker, 1990). Unfortunately, when these negative emotions are experienced often, the body and mind are taxed, and physiological and psychological illnesses
can result (Gadzella, 1994; Leebov, 1990; Tucker, 1990; Weinberg & Gould, 1999).

**Stages**

A three-stage process called the General Adaptation Syndrome (GAS), also known as the "fight-or-flight" response, occurs when a person is exposed to a stressor (Leebov, 1990). The first stage is called alarm, and it occurs immediately following exposure to the source of the stress. The body prepares itself to fight or flee the situation by excreting hormones such as adrenaline and hydrocortisone into the blood. The hormones not only provide a person with extra energy, but they also conserve energy by shutting down the immune system. Symptoms such as raised blood sugar level, slowed digestion, tight stomach muscles, shallow breathing, clenched jaws, acid stomach, and anxiety may occur (Leebov, 1990). The second stage is resistance (Leebov, 1990; Gadzella, 1994). When the source of the stress is removed, the body tries to repair the damage caused in the alarm stage. However, when a person experiences the source of stress repeatedly, the symptoms that occur in the alarm stage continue and become regular in one's life. The third stage, exhaustion, occurs when the body is not able to protect itself from the
repeated exposure to the stressor or stressors. In this stage, the body has been depleted of many of its energy resources (Leebov, 1990; Gadzella, 1994). As the body tries to survive and tries to conserve energy, the parts of the body least needed for survival stop functioning first (Leebov, 1990). One of the first functions weakened by the body's continuous effort to repair the damage stress has done to the body is the immune system. Unfortunately, an ineffective immune system fails to protect the body from disease and illness. At this point, the physiological and psychological symptoms of disease and illness began to emerge (Leebov, 1990).

Psychological and Physiological Impact of Stress

Researchers have recognized stress as a major health threat due to the impact it can have on a person's physiological and psychological functioning (Cooper & Cartwright, 1994; Der-Karabetian & Gebharbp, 1986; Leebov, 1990; Tucker, 1990). In fact, 75 percent of all medical complaints are believed to be associated with stress, either induced by stress and/or aggravated by stress. Physiological illnesses and diseases, such as migraine headaches, irregular heartbeat, hypertension, asthma, high blood pressure, heart disease, infections, inflammatory
diseases, ulcers, certain types of cancers, stomach problems, back pain, skin problems, and diabetes, can be warning signs that a person is overly stressed (Cooper & Cartwright, 1994; Leebov, 1990; Tucker, 1990). Additionally, psychological symptoms can also occur. Changes in mood, thoughts, feelings, and behavior are often accompanied with prolonged periods of stress. Specifically, symptoms such as depression, anxiety, insomnia (Leebov, 1990; Tucker, 1990), nervousness, loneliness, excessive worry (Ross et al., 1999), burnout, and mental breakdown (Cooper & Cartwright, 1994) are related to stress. If the stress experienced is long lasting, people can eventually lose interest in their work, other people, as well as the environment. Furthermore, researchers have found that people who are under high levels of stress, for long periods of time, are more likely to engage in unhealthy behaviors to help cope with stressful situations (Cooper & Cartwright, 1994; Leebov, 1990). They may choose to engage in unhealthful habits such as drinking alcohol excessively, taking illegal drugs, smoking, and overeating. The adoption of these poor habits puts a stressed person at an even higher risk of illness/disease and premature death (Barnes, 1983;

Cost of Stress

Although the costs associated with stress are difficult to calculate, it is clear that they are substantial, especially for organizations (Brandon & Loftin, 1991; Cooper & Cartwright, 1994).

The direct and indirect costs of occupational stress can be measured in both humanistic and financial terms. Therefore, financially healthy organizations are likely to be those which are successful in maintaining and retaining a workforce characterized by good physical, psychological, and mental health. (Cooper & Cartwright, 1994, p. 455)

Approximately 19.4 billion dollars are lost by American industry annually because of premature employee death, and an additional $15.6 billion are lost to alcoholism (Leebov, 1990). An estimated $15 billion is lost annually due to stress-related employee absenteeism, and $700 million is spent on recruiting experienced replacements for employees with, or who die from, heart disease (Leebov, 1990).
Additionally, health care costs have increased at least 20 percent since the mid 1970s, and employers have increased their contribution to these costs by 140 percent over the last 27 years (Cooper & Cartwright, 1994). There is also an increase in employee legal claims made against employers regarding mental disorders resulting from job-related stress (Brandon & Loftin, 1991). "...The total cost of stress to American organizations assessed by absenteeism, reduced productivity, compensation claims, health insurance, and direct medical expenses now adds up to more than $150 billion a year" (Cooper & Cartwright, 1994, p. 456). Consequently, employers are starting to better understand the need for providing employees with the tools necessary to manage stress (Brandon & Loftin, 1991).

Coping Strategies

There are many ways to buffer the negative effects of stress, and there is not one strategy that works best for all situations or every person (Koeske et al., 1993). It is important to assess the source of the stressors to determine which strategies might prove most useful. Coping strategies can include anything a person enjoys doing (Stuart, 1981), but it is best if the strategy is healthy
and does not cause more distress. Sometimes combining different kinds of coping strategies will produce the best results (Koeske et al., 1993). Industrial/organizational psychologists can help an organization determine whether or not exercise is an appropriate and effective option based on a profession's source of stress (Cooper & Cartwright, 1994)

Evaluating Fitness Based on Occupational Stressors

The source of stress is assessed to determine the best possible intervention for the organization (Cooper & Cartwright, 1994). Once the source is determined, different techniques or solutions are considered. Some employers have invested in organizational fitness programs as a stress management technique (Brown, 1991; Cooper & Cartwright, 1994; Cox et al., 1988; Koeske et al., 1993). In short, exercise as a method of buffering the negative effects of stress might be thought of at best as a "band-aid" rather than a solution to some problems (Cooper & Cartwright, 1994). For instance, there are jobs that can be improved, made less stressful, by restructuring the job; therefore, a fitness program would not be helpful. However, there are professions that naturally exert more pressure upon the job incumbent (i.e. fireman, policeman,
medical staff, etc.) and therefore involve more stress. Employees in these professions cannot, for example, escape the inevitable sources of stress because restructuring the job is not possible, so they need ways to lessen the negative impact of it. A possible method of buffering the effects of stress, which is especially useful when an organization will not or cannot change the source of the stress, is an organizational fitness program (Brown, 1991; Cooper & Cartwright, 1994; Cox et al., 1988; Koeske et al., 1993). In these situations, exercise can be viewed as an outlet. Engaging in physical activity is thought to distract a person's attention away from the source of stress. This distraction provides a temporary escape, allowing a person to deal with stressful circumstances effectively (Brown, 1991). Physical exercise is a socially accepted way to expel some of the energy created when a person becomes stressed, rather than just obsessing about the stressor while being fueled with excess energy that is released in the alarm stage (Pargman, 1986). For years employers have been trying to educate their employees regarding the benefits, such as stress management, of getting regular exercise (Gebhardt & Crump, 1990).
Brief History of Organizational Fitness Programs

During the twentieth century employers discovered they could benefit from investing in their most valuable resource, their employees (Gebhardt & Crump, 1990). As early as the 1920s, employers documented the implementation of employee welfare programs on the job. Employers began by providing health education, health training, and safety training to their employees. By the 1950s, employers had improved the type of health and training available, but they still were not providing the support, the time, and the facilities necessary to get employees involved. The goals of these programs were to improve labor relations, increase disease prevention, as well as educate employees on the impact of poor health habits. Come the middle of the 1970s, once employers started to realize the impact employee fitness programs can have on organizations, they started approaching fitness programs in a more serious, comprehensive manner. Employers have done so by making fitness facilities and trained fitness professionals available to employees on or off the work site (Gebhardt & Crump, 1990).
Impact of Fitness Programs on Organizations

Businesses are realizing the impact the effects of fitness programs can have on employees as well as on the overall functioning of the organization (Der-Karabetian & Gebharbp, 1986). Fitness programs are known to increase productivity, job satisfaction, good health, disease prevention, and morale. They are known to decrease absenteeism, turnover, health care costs, injuries, and the impact of stress on employees (Barnes, 1983; Bernacki & Baun, 1984; Cooper & Cartwright, 1994; Cox, Shephard, & Corey, 1981; Cox et al., 1988; Der-Karabetian & Gebharbp, 1986; Gebhardt & Crump, 1990; Kerr & Vos, 1993). Fitness programs are also used to attract and recruit potential employees in addition to retaining current ones (Barnes, 1983; Der-Karabetian & Gebharbp, 1986).

Sedentary Lifestyle/Whole Person Approach

As the nature of the workforce changes, employees’ activity levels and perceived stress have also changed. Activity levels of employees have decreased over the years, due to the changes of the “technology age”. More employees are working on their computers, sitting at a desk, for most of their workday (Barnes, 1983; Bernacki &
Baun, 1984; Cooper & Cartwright, 1994; Der-Karabetian & Gebharbp, 1986; Gebhardt & Crump, 1990). Additionally, half of all employees claim their jobs are more stressful than they were three years ago (Greenberg & Baron, 2000). Consequently, people who are under high levels of stress and live sedentary lifestyles are more at risk for illness and premature death (Barnes, 1983; Bernacki & Baun, 1984; Cooper & Cartwright, 1994; Der-Karabetian & Gebharbp, 1986; Gebhardt & Crump, 1990). Fortunately, research suggests that many stress related sicknesses and deaths can be controlled through maintaining better health (Barnes, 1983; Bernacki & Baun, 1984; Der-Karabetian & Gebharbp, 1986; Gebhardt & Crump, 1990). For the purpose of this study, health is defined as "...a human condition with physical, social, and psychological dimensions, each characterized on a continuum with positive and negative poles" (Gauvin & Spence, 1995, p. 435). Employers are realizing the importance of providing their employees with the necessary tools to stay or become healthy and fit (Barnes, 1983; Bernacki & Baun, 1984; Der-Karabetian & Gebharbp, 1986; Gebhardt & Crump, 1990). In 1996, Der-Karabetain and Gebharbp wrote,

...physically fit individuals benefit not only themselves, but also their employers. When the
employees come to work, they bring more than just
skill, they bring their 'total person' and their
ability to function, which are partially determined
by their physical conditions. (p. 56)

Physiological Benefits of Fitness

Exercise can help control or prevent obesity, high
blood pressure, heart disease, cholesterol levels, immune
functioning, diabetes, and osteoporosis (Fahey et al.,
1999; ISSP, 1991). It can also help improve "...body
shape, bone strength, muscular strength, skeletal
flexibility, cardiopulmonary fitness, and metabolic
fitness" (Fontane, 1996). People who are physically fit
are less vulnerable to the negative impact stress can have
on physiological well-being (Brown, 1991; DeGeus &
VanDooren, 1993). Researchers have reported that people
who are physically fit have less physiological reactivity
to natural life stress and laboratory induced stress
compared to those people who are not as physically fit
(Brown, 1991). Likewise, there is a positive relationship
between deteriorating health and people who exercise
infrequently. But, there was little or no undesired impact
on the health of people who exercise on a regular basis.
These findings imply exercise protects the body from the harmful effects of stress (Brown, 1991).

There is also an additional preventative aspect involved in using exercise to help buffer the negative effects of stress. As a result of physical fitness, immune functioning improves, decreasing the chances of becoming ill (Leebov, 1990). Taking good care of one’s self could potentially prevent illness and the stress that is caused by becoming ill. Being diagnosed with an illness or a disease is likely to be viewed as stressful by a patient (Stuart & Brown, 1981). It is also likely that diagnosed patients will be asked to change their lifestyle in some way. These changes alone could be perceived as stressful, especially if they compromise the quality of the patient’s life (Stuart & Brown, 1981). Fortunately, regular exercise can improve a person’s physiological stress response as well as his or her psychological well-being (Brown, 1991; DeGeus & VanDooren, 1993).

**Psychological Benefits of Fitness**

There are several psychological benefits of exercising. It has been credited with alleviating depression, anxiety, anger, tension, frustration, and insomnia (Brandon & Loftin, 1991; Fontane, 1996; ISSP,
1991; Tucker, 1990), which are many of the same symptoms associated with stress (Leebov, 1990; Ross et al., 1999; Tucker, 1990). Regular exercisers tend to be more self-confident, emotionally stable, venturesome, intelligent, and practical, than those who do not exercise frequently (Tucker, 1990). In fact, some physical fitness activities can lead to greater perceived self-control and mastery, enhancing self-image (Brown, 1991; Fahey et al., 1999). Regular exercise can also help people feel more relaxed and more energized (Fahey et al., 1999).

Researchers have found that physically fit people report greater confidence in their ability to cope than those people who are not physically fit (Steptoe, Moses, Edwards, & Matthews, 1993). Exercise "...increases the efficiency and effectiveness of the biological organism to cope with its environment...so long as an exercise regimen is continued" (Fontane, 1996, p. 295).

Fortunately, almost any population can experience the physiological and psychological benefits that result from participating in regular exercise. Stressors can be encountered in many different environments, regardless of the role. Although the working population reports that approximately 50 percent of the stress experienced is a result of workplace stressors, the other proportion of...
stressors are being encountered elsewhere (Brandon & Loftin, 1991). For instance, college students usually work in addition to attending school. Working students are likely to experience similar stressors in both their work environment and their school environment. They also have the additional burden of balancing these roles. Therefore, students could potentially benefit from the stress buffering effects that accompany regular exercise.

**Perceived Fitness Versus Actual Fitness**

The psychological benefits resulting from physical fitness might not be due to actual fitness but to perceived physical fitness, or the belief about one’s own fitness level (Cox et al., 1988; Kerr & Vos, 1993; Plante, LeCaptain, & McLain, 2000). It is believed that that improved psychological functioning may be a result of both or either self-perception and/or endorphin secretions. Additionally, it has been argued that physical conditioning alone does not enhance psychological functioning, cognitive awareness of physical improvement is also necessary. Plante, LeCaptain, and McLain write, "It is possible that those who believe they are physically fit are both mentally and physically healthier than those who do not believe they are fit, regardless of the
objective health and fitness measures" (2000, p. 76). Specifically, it has been suggested that perceived physical fitness, rather than actual physical fitness, is a better predictor of how well an individual copes with stress (Plante et al., 2000).

People who perceive themselves as physically fit, tend to perceive themselves as having high coping ability. Plante, LeCaptain, and McLain (2000) suggest that improved psychological functioning associated with fitness, might be the result of expectancy effects. When a person believes he or she is going to deal with stress better, because of high-perceived physical fitness, then the belief will lead to a more desirable, effective response to stress (Plante et al., 2000). Coping ability is partly a function of perception, which can be very influential (Tucker, 1990). In fact, in one study, perception of health was a better predictor of mortality than actual health. The lack of research in this area is an indication that perceived physical fitness should be investigated further. In the meantime, organizations might want to consider the effects of perceived fitness on perceived stress when developing fitness programs (Plante et al., 2000).
Perceived Control

It has been suggested that perceived control could impact the relationship between exercise/fitness and stress reactivity (Brown, 1991). If a person puts forth the effort to be or become physically fit, then he or she is exercising some level of self-control. The physical and psychological rewards of fitness may reinforce the self-control required for fitness, and once a person recognizes that he or she has the ability to control himself or herself, the reactions to certain stressors may be buffered. The buffering effect may be a function of clearer, more realistic evaluations of what is actually within the person’s control. It could also be a function of the decreased feelings of guilt and the increased feelings of empowerment that result from actually doing what is required to be or become physically fit. Due to the latest developments on the topic of perceived fitness, it might be argued that a person’s perceived fitness level, in addition to actual fitness level, could potentially impact a person’s feelings of control. In this study, it is suggested that higher levels of perceived control will result in lower levels of perceived stress. Exercise can be stress reducing for those employees who are lacking control in areas other than fitness, and
It can be especially helpful when lacking control over the source of the stress (Brown, 1991; Cox et al., 1988; Koeske et al., 1993). Employees involved in work situations in which they have little or no control, but high job demands, frequently report higher stress levels and many of symptoms associated with stress (Knight, 1987). Fitness can give an employee the perception of being in control of himself or herself; therefore, he or she might have a better, less adverse, response to stress (Brown, 1991; Koeske et al., 1993; Phares, 1976). This is especially important because employees are frequently limited to the amount of control they have over the cause of the stress (Koeske et al., 1993).

For some people, the feeling of not being in control can be threatening and/or stressful. Researchers have found that people who have perceived control exhibit fewer stress symptoms and lower levels of physiological arousal (Knight, 1987). Hence, perceived control is linked to improved reactions to stress (Brown, 1991). Averill (1973) quotes Lefcourt,

The perception of control would seem to be a common predictor of the response to aversive events regardless of the species. ...the sense of control, the illusion that one can exercise personal choice,
has a definite and a positive role in substantiating life. (p. 286)

It is believed that feelings of personal control can make aversive stressors appear less threatening, reducing the stress reaction overall. Additionally, it has been reported that personal control can be stress reducing in the long run and stress inducing in the short run, depending on the perception of the stressor (Averill, 1973). Stress is inevitable initially, but the type of stress (eustress or distress) induced should be considered (Leebov, 1990). Eustress is the stress that motivates people to take action. It is usually accompanied by pleasant consequences. Conversely, distress is not as pleasant (Leebov, 1990). It may be experienced when the consequences of the individual’s decisions are ambiguous or undesirable (Averill, 1973). In the short run, people have to decide how to handle the issue, and then they actually have to follow through. Once the initial action has been dealt with, probably the way the individual thought was best, the stressor does not appear as threatening as it did initially.
General Locus of Control

Locus of control has been defined as "the degree to which the reinforcement is dependent on either upon one's own behavior (internal locus of control) or upon luck, chance, fate, and other persons (external locus of control)" (Bezjak & Lee, 1990, p. 500). People with an internal locus of control, rather than an external locus of control, are more likely to develop health related habits and are more likely to be physically fit (Adame, Johnson, Cole, Matthiasson, & Abbas, 1990; Fontane, 1996). Also, people with an internal orientation tend to cope better with perceived stress. Although measures of locus of control allow researchers to make general statements about the relationships between locus of control, fitness, and stress, more specific measures should be used to predict specific behaviors.

Impact of Exercise on General Locus of Control

Research regarding the impact regular exercise has on a person's general locus of control does not appear to be consistent. In a review of locus of control studies, very few researchers were able to detect significant improvements in internal locus of control as a result of regular exercise (Bezjak & Lee, 1990; Plante, 1990).
Bezjak and Lee have questioned whether locus of control is too general and broad to be significantly impacted by exercise. Rotter, a popular locus of control scale developer and expert, "...endorses the role of generalized expectancies measured by locus of control scales, but acknowledges the need for specificity" (Bezjak & Lee, 1990, p. 500). The use of a more specific locus of control measure permits researchers to make more specific predictions about behavior in relation to physical fitness (Bezjak & Lee, 1990).

Health Locus of Control (Self-Control and Exercise Locus of Control)

Researchers have found that people who have developed a greater fitness capacity through exercise, tend to have a greater sense of self-responsibility, and therefore they demonstrate self-control (specific to health related behaviors) and internal health locus of control characteristics (Brandon & Loftin, 1991; Brandon, Oescher, & Loftin, 1990). Characteristics such as being more "alert, active, or directive in attempting to control and manipulate their environments" (Phares, 1976, p. 60). When people feel like they have control over themselves or a situation, they are more likely to put forth more effort to exercise their control (Brandon et al., 1990; Knight,
Internals seem to "possess a stronger generalized expectancy that reinforcements they encounter will be contingent upon their own behavior" (Phares, 1976, p. 62). Consequently, they have a greater appreciation that the sacrifice of short-term gratification is worth long-term gain (Brandon et al., 1990). Internals are also more willing to try to correct personal shortcomings than externals (Phares, 1976). Researchers have found that the more internal the orientation a person has toward health related behaviors, the more he or she is likely to participate in a physical training program (McCready & Long, 1985). Due to higher confidence in their fitness training, they are more likely to adhere to their fitness training (Carter, Lee, & Greenockle, 1987). Similarly, they tend to develop other health-related habits when participating in regular exercise (Adame et al., 1990; Fontane, 1996).

Exercising Self-Control (Specific to Health Related Behaviors)

Researchers claim healthful behaviors cluster together (Plante, 1990; Tucker, 1996). For instance, those people who are physically fit are more likely to eat healthy foods, get sufficient sleep, and seek medical attention when necessary. They are less likely to be
drinkers, smokers, or drug users (Plante, 1990; Tucker, 1996). Control may be a possible explanation for why healthful behaviors seem to cluster together. Once people get control of an area in their lives, such as physical fitness, they try to get a grasp on the other areas similar to it, such as nutrition. This phenomenon may be relevant to those who are or want to become physically fit. They feel so empowered and rewarded by actually being or becoming physically fit, that they want to extend that control or power to other areas of their lives, areas in which they have the ability to change. Fortunately, self-control can be learned (Brandon et al., 1990).

In summary, people who have self-control or an internal orientation are more likely to cope with stress effectively, and people who are physically fit tend to cope with stress effectively. By implementing a physical fitness program, employers can provide a healthful way to help employees tackle stress, and possibly increase feelings of control over self. Fortunately, once employees participate regularly in a fitness program, other healthful habits are likely to follow, and health related habits combined with feelings of control lead to a greater ability to cope with occupational stress.
Hypotheses

It is hypothesized that perceived physical fitness, perceived stress, exercise locus of control, and self-control will change from Time 1 to Time 2.

Hypothesis 1a: Participants will perceive themselves as more physically fit at Time 2 compared to Time 1.

Hypothesis 1b: Perceived stress will decrease from Time 1 to Time 2.

Hypothesis 1c: Exercise locus of control will be different from Time 1 to Time 2.

Hypothesis 1d: Participants will report higher self-control at Time 2 compared to Time 1.

Hypothesis 2: There will be differences in perceived physical fitness, perceived stress, exercise locus of control, self-control in the treatment group and the comparison group at Time 2.

Hypothesis 3: Stressors experienced, before and after participation in the physical fitness class, will significantly predict perceived stress at Time 2, after controlling for perceived stress at Time 1.

Hypothesis 4: Perceived physical fitness at Time 2 will significantly add to the prediction of perceived stress at Time 2 within the context of a model
containing perceived stress at Time 1, stressors at Time 1, and stressors at Time 2.

Hypothesis 5a: Self-control at Time 2 will significantly add to the prediction of perceived stress at Time 2 within the context of a model already containing perceived stress at Time 1, stressors at Time 1, and stressors at Time 2.

Hypothesis 5b: Exercise locus of control will significantly add to the prediction of perceived stress at Time 2, within the context of a model already containing perceived stress at Time 1, stressors at Time 1, stressors at Time 2, and self-control at Time 2.

Hypothesis 5c: Perceived physical fitness will significantly add to the prediction of perceived stress within the context of a model already containing perceived stress at Time 1, stressors at Time 1, stressors at Time 2, self-control at Time 2, and exercise locus of control at Time 2.

Hypothesis 6: Exercise locus of control at Time 2 will significantly predict perceived physical fitness at Time 2, after controlling for perceived physical fitness at Time 1.
CHAPTER TWO

METHOD

Participants

The participants in the study included students enrolled in kinesiology activity classes (treatment group) and students enrolled in a lower-division kinesiology lecture class (comparison group) at California State University, San Bernardino, during the 2002 Winter Quarter. The sample included both males (n = 32) and females (n = 141), and the participants were diverse in age (18-74). The participants received extra credit for their participation, and the class instructor determined the value of the extra credit based on the class type.

Measures

The paper and pencil self-report questionnaire consisted of five measures: Perceived Physical Fitness Scale (Abadie, 1988), Exercise Objectives Locus of Control Scales (McCready & Long, 1985), Student-Life Stress Inventory (Gadzella, 1994), Self-Control Questionnaire (Brandon et al., 1990), and the Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983). Each participant was also asked several demographic questions as well as questions regarding his or her physical fitness habits.
The Perceived Physical Fitness Scale was used to measure how each participant perceived his or her physical fitness (Abadie, 1988). Four factors of perceived fitness were measured: physical condition, muscular flexibility, muscular condition, and body composition. The scale consisted of 12 questions with a five-point scale ranging from strongly disagree to strongly agree. An item analysis confirmed internal consistency with a Cronbach’s alpha of .78 (Abadie, 1988). For this study, alpha was .83 at Time 1 and .86 at Time 2.

The Exercise Objectives Locus of Control Scales were used to assess each participant’s exercise locus of control (McCready & Long, 1985). They were multi-dimensional scales that allow a researcher to determine whether a participant credits self, chance, or powerful others for meeting his or her exercise objectives. The Cronbach’s alphas for the three dimensions were as follows: .79 for internal, .69 for powerful others, and .75 for the chance dimension (McCready & Long, 1985). For this study, alpha was .74 at Time 1 and .73 at Time 2. The alphas at Time 1 for the three subscales were as follows: .73 for internal, .84 for powerful others, and .81 for chance. At Time 2 the alphas for each of the subscales were as follows: .79 for internal, .86 for
powerful others, and .84 for chance. There were eighteen items with the scales ranging from strongly agree to strongly disagree. There was also a "do not understand" option for each item.

Part I of the Student-Life Stress Inventory was used to measure how often each participant was exposed to stressors that are typically associated with being a student (Gadzella, 1994). The sub scales for Part I include frustration, conflict, pressure, change, and self-imposed (Gadzella, 1998). The alpha for the Part I subscales was .92 (Gadzella & Baloglu, 2001). For this study, the alpha for the Part I subscales was .88 at Time 1 and .85 at Time 2. Part I of the scale had a total of 23 items, and the five-point scale ranges from never to all the time.

The Self-Control Questionnaire was designed to measure a participant’s level of self-control specific to five different health-related behaviors: weight control, time management, emotional control, financial planning, and social behavior. A Cronbach’s alpha of .80 was reported for the overall 16-item scale (Brandon et al, 1990). For this study, alpha was .76 at Time 1 and .74 at Time 2. Each of the 16 statements described a specific situation. Following each statement, the participant was
asked to use a five-point scale to indicate the extent to which the statement is typical of his or her behavior. The options ranged from strongly disagree to strongly agree.

The Perceived Stress Scale had 14 questions regarding how often the participant thought or felt after being exposed to stressors over the last month (Cohen et al., 1983). The participants had five alternatives, ranging from never to very often. This particular scale was selected because it took into account perceived stress, not just symptoms associated with stress. Perception of stress needed to be considered because a stressor can only induce stress if the individual perceives the stressor as stressful. Alpha coefficients, ranging from .84 to .86 over three samples, were obtained for this 14-item version of the scale (Cohen et al., 1983). For this study, alpha was .83 at Time 1 and .85 at Time 2.

Procedure

The questionnaires were administered to several kinesiology activity classes and one kinesiology lecture class during the second week of the Winter Quarter and the eighth week of the Winter Quarter. The first measure was taken at week 2, so that the participants enrolled in the activity class would have the opportunity to assess their
fitness levels. This assessment experience might have influenced perceptions of physical fitness to be more consistent with actual physical fitness. Perceived physical fitness and actual fitness are moderately correlated (Plante et al., 2000). Additionally, the six-week time lapse between Time 1 and Time 2 was based on literature that indicates that the starter phase, when starting a new exercise regimen, lasts approximately 2-6 weeks (Powers & Dodd, 1997). It was important to survey the participants for the second time after they had the opportunity to move into the maintenance phase (Powers & Dodd, 1997) [The goal of the maintenance phase is to maintain the physical fitness level that has been achieved through regular exercise]. Each questionnaire took approximately 20 minutes to complete, and each participant was asked to complete the same questionnaire twice, once at week two and once at week eight.

Participation was anonymous. However, for the purpose of matching the surveys at Time 1 and Time 2, three pieces of unidentifying information was requested: the first letter of the participant's mother's maiden name, the day of the month the participant was born, and the model of the car the participant drove most often. As the participants returned the survey, the legibility of the
pieces of information was monitored and clarified when needed. At Time 2, as the participants returned the surveys, the three pieces of information were matched. When there was a discrepancy between the information that was reported at Time 1 and Time 2, the participant was asked what else they might have reported at Time 1. For instance, some participants listed a different model of car at Time 1 than at Time 2. So, they were asked what other model of car they might have reported at Time 1. Due to this matching procedure, all three pieces of information were matched from Time 1 to Time 2. Therefore, zero participants were lost to inability to match Time 2 surveys with Time 1 surveys.

Analysis

Repeated measures analyses of variance (ANOVA) was used to assess the significance of the mean differences predicted for Hypothesis 1a-1d and Hypothesis 2. Hierarchical multiple regression was conducted to test whether linear relationships existed between the predictors and the criteria for hypotheses 3, 5a-5c, and 6. The assumptions of normality were met for both types of analysis. To test hypothesis 3, hierarchical multiple regression was conducted. Stressors experienced (T1 and
T2) were used as predictors of perceived stress (T2) after controlling for perceived stress (T1). Therefore, perceived stress (T1) was entered into the model first, and the predictors were entered next. In the hierarchical multiple regression that was used to test hypothesis 4, perceived stress (T1), stressors (T1 and T2) were entered into the model first and perceived physical fitness (T2) second. To test hypothesis 5a, hierarchical multiple regression was ran, entering self-control as the first predictor of perceived stress, after controlling for perceived stress (T1) and stressors (T1 and T2). To test hypothesis 5b, exercise locus of control was added as the second predictor, and to test hypothesis 5c, perceived physical fitness was the third predictor. A hierarchical multiple regression was used to test hypothesis 6, using exercise locus of control (T2) as a predictor of perceived physical fitness (T2), controlling for perceived physical fitness (T1). Therefore, perceived physical fitness (T1) was in the first step, and exercise locus of control was entered in the second step. Because participants were excluded from an analysis anytime there was missing data, the sample size for hypotheses specific to both the treatment and control conditions varied from 147 to 159. The sample size for the hypotheses specific to the
treatment conditions varied from 69 to 92. Additionally, there were nine students that were enrolled in an activity class as well as the lecture class, and they were also excluded from the analyses.

Results

It was hypothesized that perceived physical fitness, perceived stress, exercise locus of control, and self-control would change from Time 1 to Time 2.

Hypothesis 1a: Participants will perceive themselves more physically fit at Time 1 compared to Time 2.

The treatment group's perceptions of physical fitness significantly increased from Time 1 to Time 2; however, the comparison group did not show any evidence of increased perceived physical fitness from Time 1 to Time 2, \[ m_{time1} = 36.60, \ m_{time2} = 37.73, \ F(1, 154) = 8.839, \ p. = .003 \].

Hypothesis 1b: Perceived stress will decrease from Time 1 to Time 2.

There was a significant decrease in perceived stress from Time 1 to Time 2 \[ m_{time1} = 26.41, \ m_{time2} = 25.23, \ F(1, 145) = 6.422, \ p. = .042 \].

Hypothesis 1c: Exercise locus of control will be different from Time 1 to Time 2.
There was not a significant difference in exercise locus of control from Time 1 to Time 2 \([m_{time1} = 48.96, m_{time2} = 48.90, F(1, 157) = .051, p. = .822]\). However, there was a difference in the means of the three subscales, \(m_{internal} = 27.35, m_{chance} = 11.50, m_{powerful others} = 10.08, F(2, 314) = 1236.327, p. < .01\), indicating that participants rated themselves as more internal than either controlled by chance or powerful others in their exercise regimes.

Hypothesis 1d: Participants will report higher self-control at Time 2 compared to Time 1.

There was not a significant difference in self-control from Time 1 to Time 2 \([m_{time1} = 26.41, m_{time2} = 25.23, F(1, 151) = 1.048, p. = .308]\).

Hypothesis 2: It was hypothesized that there would be difference in perceived physical fitness, perceived stress, exercise locus of control, and self-control for the treatment and comparison groups at Time 2.

There was not a significant difference in perceived physical fitness for the treatment and comparison groups \([m_{treatment} = 37.94, m_{comparison} = 35.97, F(1, 154) = 2.780, p. = .097]\).

There was not a significant difference in perceived stress for the treatment and comparison groups
There was not a significant mean difference in exercise locus of control for the treatment and comparison groups \([treatment = 16.146, \text{m}_{\text{comparison}} = 16.561, F(1, 157) = 1.754, p. = .187]\).

There was a significant difference in self-control for the treatment and comparison groups \([treatment = 51.90, \text{m}_{\text{comparison}} = 48.08, F(1, 151) = 10.287, p. = .002]\).

Hypothesis 3: Stressors experienced, before and after participation in the physical fitness class, will significantly predict perceived stress at Time 2, after controlling for perceived stress at Time 1.

Stressors experienced before and after participation in the physical fitness class, significantly predicted perceived stress at Time 2, after controlling for perceived stress at Time 1 (\(\beta = .752, R^2 = .566, R^2_{\text{change}} = .084, F_{\text{inc}}(2, 76) = 7.338, p. = .001\)).

Hypothesis 4: Perceived physical fitness at Time 2 will significantly add to the prediction of perceived stress at Time 2 within the context of a model that already contained perceived stress at Time 1, stressors at Time 1, and stressors at Time 2.
Perceived physical fitness at Time 2 significantly added to the prediction perceived stress at Time 2 within the context of a model that already contained perceived stress at Time 1, stressors at Time 1, and stressors at Time 2 [MR = .768, \( R^2 = .589 \), \( R^2_{\text{change}} = .023 \), \( F_{\text{inc}} (1, 75) = 4.277 \), p. = .042].

Hypothesis 5a: Self-control at Time 2 will significantly add to the prediction of perceived stress at Time 2 within the context of a model that already contained perceived stress at Time 1, stressors at Time 1, and stressors at Time 2.

Self-control at Time 2 did significantly add to the prediction of perceived stress at Time 2 within the context of a model already containing perceived stress at Time 1, stressors at Time 1, and stressors at Time 2 [MR = .819, \( R^2 = .671 \), \( R^2_{\text{change}} = .115 \), \( F_{\text{inc}} (1, 73) = 25.521 \), p. < .01].

Hypothesis 5b: Exercise locus of control will significantly add to prediction of perceived stress at Time 2, within the context of a model already containing perceived stress at Time 1, stressors at Time 1, stressors at Time 2, and self-control at Time 2.
Exercise locus of control did significantly add to prediction of perceived stress at Time 2, within the context of a model already containing perceived stress at Time 1, stressors at Time 1, stressors at Time 2, and self-control at Time 2 [MR = .842, R^2 = .710, R^2_{change} = .046, F_{inc} (3, 69) = 3.680, p. = .016].

Hypothesis 5c: Perceived physical fitness will significantly add to the prediction of perceived stress within the context of a model already containing perceived stress at Time 1, stressors at Time 1, stressors at Time 2, self-control at Time 2, and exercise locus of control at Time 2. Perceived physical fitness did not significantly add to the prediction of perceived stress within the context of a model already containing perceived stress at Time 1, stressors at Time 1, stressors at Time 2, self-control at Time 2, and exercise locus of control at Time 2 [MR = .844, R^2 = .713, R^2_{change} = .003, F_{inc} (1, 68) = .756, p. = .388].

Hypothesis 6: Exercise locus of control at Time 2 will significantly predict perceived physical fitness at Time 2, after controlling for perceived physical fitness at Time 1.
Exercise locus of control at Time 2 did not significantly predict perceived physical fitness at Time 2, after controlling for perceived physical fitness at Time 1 \( [MR = .859, R^2 = .738, R^2_{\text{change}} = .022, F_{\text{inc}} (3, 88) = 2.431, p. = .070] \).

Discussion

The purpose of this experiment was to measure and determine the strength of the relationships between situational stressors, perceived fitness, exercise locus of control, self-control, and perceived stress. It was predicted that perceived physical fitness would be a predictor of perceived stress. It was expected that participants enrolled in the kinesiology activity classes would report higher levels of perceived physical fitness, lower levels of perceived stress, changes in exercise locus of control, and higher levels of self-control compared to the participants who were enrolled in a kinesiology lecture class. Additionally, it was anticipated that higher levels of perceived physical fitness, and higher level of self-control, would result in lower levels of perceived stress.
Perceived Fitness

The psychological benefits resulting from physical fitness might not be due to actual fitness but to perceived physical fitness (Cox et al., 1988; Kerr & Vos, 1993; Plante et al., 2000). Although actual physical fitness and perceived physical fitness are only moderately related (Plante et al., 2000), it was hypothesized that the students enrolled in kinesiology activity classes would report higher levels of perceived physical fitness, especially after participating in a physical fitness class for eight consecutive weeks. Data collection was intentionally scheduled for the end of the second week, as opposed to the beginning of the first week, so that the participants in the activity classes would have the opportunity to assess their fitness levels prior to being surveyed. As hypothesized, the students enrolled in the activity classes reported higher levels of perceived fitness than the lecture class at Time 1

\[ m_{\text{time1/treatment}} = 37.00 > m_{\text{time1/control}} = 35.98 \]

and at Time 2

\[ m_{\text{time2/treatment}} = 38.87 > m_{\text{time2/control}} = 35.95 \].

Furthermore, the participants in the activity classes reported significantly higher levels of perceived physical fitness from Time 1 to Time 2

\[ m_{\text{time1/treatment}} = 37.00 < m_{\text{time2/treatment}} = 38.87 \]. The
participants enrolled in the lecture class did not report significantly higher levels of perceived physical fitness from Time 1 to Time 2
\( (m_{\text{time1/comparison}} = 35.98 > m_{\text{time2/comparison}} = 35.95) \). Therefore, it can be concluded that consistent exercise can increase perceptions of physical fitness.

Perceived Stress

Stress is a result of someone perceiving a situation or an incident as threatening, therefore, stressful. Perceived stress is truly influenced by individual's perceptions and his or her reactions to those perceptions. What one person perceives as a stressor, another person may not (Ross, Bradley, & Heackert, 1999). This is why a scale measuring perceived stress, rather than a scale measuring symptoms associated with stress, was used to measure the participants' perceived stress. As hypothesized, there was a decrease in perceived stress from Time 1 to Time 2. Interestingly, participants from the lecture class
\( (m_{\text{time1/comparison}} = 27.02 > m_{\text{time2/comparison}} = 25.78) \) as well as from the activity classes
\( (m_{\text{time1/treatment}} = 26.00 > m_{\text{time2/treatment}} = 24.86) \) reported lower levels of perceived stress from Time 1 to Time 2. Lower
levels of perceived stress for the lecture class cannot, however, be attributed to participation in the activity class.

It is likely that the information disseminated in the lecture class, and therefore the knowledge obtained, was responsible for the lower perceptions of stress. The professor often lectured about how healthful behaviors can lead to better physical and psychological health and a better quality of life. She explained how certain diseases are hereditary, but for the most part, lifestyle is a better predictor of good health. Lifestyle tends to be within a person’s control, and perceptions of control can potentially result in a decrease of perceived stress (Averill, 1973). So, there seems to be practical significance for perceived stress as a result of health education. Perhaps the lecture classes’ reports of perceived fitness at Time 1 was influenced by the ambiguity of a new class. When the lecture class was surveyed at Time 1, it was their second-class meeting. The students might have been concerned that their grade was determined by only two exams. This stress was likely to decease after taking exam one, which was before Time 2. Conversely, the decrease in perceived stress reported by the participants in the activity classes may be due the
empowering positive reinforcers that often accompany physical exercise (Brown, 1991; Fahey et al., 1999).

Moreover, there was not a significant difference in perceived stress between the treatment and comparison conditions. Perceived stress for both groups dropped approximately the same amount from Time 1 to Time 2 \((m_{\text{difference/treatment}} = -1.13, m_{\text{difference/comparison}} = -1.24)\). So, even though the participants in the activity classes reported lower levels of perceived stress overall \((m_{\text{treatment}} = 25.43 < m_{\text{comparison}} = 26.40)\), the difference was not sufficient to yield statistical significance. The consistent change in perceived stress from Time 1 to Time 2 for both groups had more influence than the differences between the groups.

Furthermore, it is important to acknowledge that even at Time 1, participants enrolled in the activity classes reported significantly lower levels of perceived stress \((m_{\text{t1/treatment}} = 26.00)\) than participants enrolled in the lecture class \((m_{\text{t1/comparison}} = 27.02)\). Also, as noted previously, opposite results emerged for perceived physical fitness. Participants enrolled in activity classes reported significantly higher levels of perceived physical fitness \((m_{\text{t1/treatment}} = 37.00)\) at Time 1 than
participants enrolled in the lecture class (M_{time/comparison} = 35.98).

Exercise Locus of Control

As indicated in the introduction, very few researchers were able to detect significant improvements in internal locus of control as a result of regular exercise (Bezjak & Lee, 1990; Plante, 1990). It has been questioned whether the locus of control construct is too general to be significantly impacted by exercise. Rotter expressed that there is a "...need for specificity" in the development of locus of control scales (Bezjak & Lee, 1990, p. 500). In this study, a locus of control scale specific to exercise objectives was used to test the question as to whether a specific locus of control would permit researchers to make more specific predictions about behavior in relation to physical fitness (Bezjak & Lee, 1990).

After reviewing the past literature and considering researchers' suggestions regarding the need for specific locus of control measures, a directional hypothesis was avoided. It was anticipated that by using a more specific measure of locus of control, there was a possibility that significant differences, if any, could be detected.
Therefore, it was hypothesized that exercise locus of control would be different from Time 1 to Time 2. The analysis indicated that there was not a significant difference in exercise locus of control from Time 1 to Time 2 (m\text{time1} = 48.96, m\text{time2} = 48.90). These results are consistent with the research that reads researchers have not been able to find improvements in internal locus of control as a result of regular exercise (Bezjak & Lee, 1990; Plante, 1990).

As a result of the present study’s findings, it might be suggested that the need for specific measures was not responsible for the lack of significant results. Locus of control is not significantly influenced by exercise. However, internal orientation seems to be associated with whether a person chooses to enroll in an exercise class (McCready & Long, 1985). Perhaps the internal orientation rather than external orientation (m\text{internal/treatment} = 27.72, m\text{chance/treatment} = 11.10, m\text{powerful others/treatment} = 9.61) reported by participants in the treatment condition was partially responsible for the enrollment of and adherence to the activity class. After all, researchers have found that the more internal the orientation a person has toward health related behaviors, the more likely he or she is to participate in a physical training program (McCready &
Long, 1985). Internals are also more likely to adhere to their fitness training because they have higher confidence in their fitness training (Carter, Lee, & Greenockle, 1987).

Additionally, there was a significant difference in the means of the three subscales of exercise locus of control (\textit{mt1} time1\text{internal} = 27.35, \textit{mt1} time2\text{chance} = 11.50, \textit{mt1} and time2\text{powerful others} = 10.08). Participants from both the treatment condition and the comparison reported relatively high internal control beliefs. It is possible that because their internal beliefs were already so high, there was less of an opportunity to increase those beliefs either with regular exercise or health education.

Furthermore, there was not a significant difference in exercise locus of control between the participants in the activity classes and the participants in the lecture class. The participants' reports of locus of control in the activity classes and in the lecture class were significantly different from each other. However, their reports of locus of control were not significantly different from Time 1 to Time 2. Therefore, after reviewing the within subjects analysis, it was not a surprise that there was not a significant between subject effect.
Self-Control

Researchers have found that people who have developed a greater fitness capacity through exercise tend to have a greater sense of self-responsibility, and therefore, they demonstrate self-control specific to health related behaviors (Brandon & Loftin, 1991; Brandon, Oescher, & Loftin, 1990). Moreover, researchers claim healthful behaviors cluster together. For example, those people who are physically fit are more likely to eat healthy foods, get sufficient sleep, and seek medical attention when necessary. They are less likely to be drinkers, smokers, or drug users (Plante, 1990; Tucker, 1996). Therefore, it was hypothesized that participants would report higher self-control at Time 2 compared to Time 1.

The analyses indicated that there was not a significant mean difference between Time 1 and Time 2 ($m_{\text{time1}} = 50.15 < m_{\text{time2}} = 50.57$). Self-control was not significantly influenced by enrollment in the activity class ($m_{\text{time1/treatment}} = 51.65 < m_{\text{time2/treatment}} = 52.03$) or by enrollment in the lecture class ($m_{\text{time1/comparison}} = 47.83 < m_{\text{time2/comparison}} = 48.32$). One might consider self-control (specific to health behaviors) a stable personality attribute, one that cannot be influenced heavily by situational factors.
The between subjects analysis indicated that there was a significant difference in perceived physical fitness between the activity classes and the lecture class. Although self-control did not significantly improve for either the activity classes or the lecture class, the difference in self-control between groups had a heavy influence on the analysis. Participants in the activity classes reported that they engaged in significantly more self-control behaviors than the participants in the lecture class reported at Time 1
(m_{time1/treatment} = 51.65 < m_{time1/comparison} = 47.83) and at Time 2
(m_{time2/treatment} = 52.03 < m_{time2/comparison} = 48.32). In hindsight, maybe the directionality between enrollment in an activity and self-control behaviors should be reconsidered. Perhaps self-control is a personality attribute that influences whether a person chooses to participate in an activity class, rather than a characteristic that can be developed through participation in an activity class. After all, those who choose to participate in the activity class reported higher levels of self-control overall
(m_{treatment} = 51.84 > m_{comparison} = 48.08).
Stressors as a Predictor of Perceived Stress

"Stressors" was an important construct to measure, for not including them in the study would have resulted in a potential confound. The purpose of this study was to determine whether perceived physical fitness can significantly predict perceived stress. Stressors experienced by participants could have potentially resulted in Type II error and thus inaccurate inferences. For this reason, hypothesis 3 was tested and confirmed. Stressors, experienced before and after participation in the physical fitness class, significantly predicted perceived stress at Time 2, after controlling for perceived stress at Time 1. Just as anticipated, stressors would have to be controlled for when testing further hypotheses. It was best to give the initial variance to stressors, and then determine whether additional measures could significantly predict.

Perceived Physical Fitness as a Predictor of Perceived Stress

The main purpose of this study was to determine whether perceived physical fitness could significantly predict perceived stress. In the literature, it had been reported that perceived physical fitness, rather than
actual physical fitness, was a better predictor of how well an individual copes with stress (Plante et al., 2000). Therefore, people who had perceived themselves as physically fit also reported higher coping ability. Rather than using a coping scale or a checklist of the physical symptoms of stress, a measure of perceived stress was used to measure the buffering effects of stress. Stress is experienced in response to a stressor. The determination of a stressor is contingent on the person perceiving it. If a person is not as sensitive to stressors as before, then his or her perceived stress level will not be as high. So, the perceived stress measure was likely to account for both the prevention of stress as well as the coping of stress, rather than just coping or the physical manifestations of stress.

In the current study, perceived physical fitness at Time 2 significantly predicted perceived stress at Time 2, within the context of a model already containing perceived stress at Time 1, stressors at Time 1, and stressors at Time 2. Therefore, after controlling for past perceived stress and situational stressors, participants' perceived physical fitness, after eight weeks of controlled physical training, could significantly predict their perceived stress. Moreover, the zero order correlation of perceived

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physical fitness and perceived stress further indicated the direction of their relationship. As perceived physical fitness increased, perceived stress decreased. Therefore, there was a negative correlation between perceived physical fitness and perceived stress, \( r = -0.291, \) \( p = 0.004. \)

Self-Control, Exercise Locus of Control, and Perceived Physical Fitness as Predictors of Perceived Stress

In the introduction, it was suggested that higher levels of self-control would result in lower levels of perceived stress. In this study, self-control at Time 2 did significantly add to the prediction of perceived stress at Time 2 within the context of a model already containing perceived stress at Time 1, stressors at Time 1, and stressors at Time 2. As self-control increased, perceived stress decreased. Specifically the two variables were negatively correlated, \( r = -0.619, \) \( p < 0.01. \) These results are consistent with the literature that perceived control is linked to improved reactions to stress (Brown, 1991). For some people, the feeling of not being in control can be threatening and/or stressful. Researchers have found that people who have higher levels of perceived control, tend to exhibit fewer stress symptoms and lower
levels of physiological arousal (Knight, 1987). Hence, perceived control is linked to improved reactions to stress (Brown, 1991).

Exercise locus of control significantly added to prediction of perceived stress at Time 2, within the context of a model already containing perceived stress at Time 1, stressors at Time 1, stressors at Time 2, and self-control at Time 2. The relationship between the subscales with perceived stress were as follows:

\[ r_{\text{internal}} = -0.287, \ p = 0.006, \ r_{\text{chance}} = 0.356, \ p = 0.001, \]
\[ r_{\text{powerful others}} = 0.239, \ p = 0.018. \]

In this study, as internal locus of control increased, perceived stress decreased. Conversely, when the external orientation (chance and powerful others) increased, perceived stress increased. These results are consistent with the research that indicates that people with an internal orientation tend to cope better with perceived stress than people with an external orientation.

Perceived physical fitness did not significantly add to the prediction of perceived stress within the context of a model already containing perceived stress at Time 1, stressors at Time 1, stressors at Time 2, self-control at Time 2, and exercise locus of control at Time 2. These results are likely to be a result of the lack of variance.
left in the model. As addressed previously, in a model that included the control variables, perceived stress at Time 1, stressors at Time 1, and stressors at Time 2, perceived physical fitness did significantly predict perceived stress at Time 2. However, perceived stress at Time 2 and perceived physical fitness at Time 2 were negatively correlated ($r = -0.309$, $p = 0.003$). Therefore, it is likely that perceived physical fitness did not significantly improve prediction because self-control, exercise locus of control, and the control variables explained most of the initial variance. Had perceived physical fitness been entered earlier in the model, perhaps different results would have emerged.

**Exercise Locus of Control as a Predictor of Perceived Physical Fitness**

As noted previously, research regarding the impact regular exercise has on a person's general locus of control does not appear to be consistent. Researchers have found that those people, who engage in regular exercise, tend to have an internal exercise locus of control orientation. However, in this study and in previous study's, locus of control did not significantly change after engaging in regular exercise. After researchers
found similar results to the results found in this study, they suggested the use of a specific locus of control measure. They reasoned that, through the use of a more specific locus of control measure, researchers could make more specific predictions about behavior in relation to physical fitness and locus of control (Bezjak & Lee, 1990). For this reason, a locus of control measure specific to exercise was used. Despite the specificity of the scale, exercise locus of control at Time 2 did not significantly predict perceived physical fitness at Time 2, after controlling for perceived physical fitness at Time 1. This hypothesis and analysis were in response to the suggestion that further research in this area was needed; therefore, this hypothesis was exploratory in nature. Furthermore, it can be concluded that regardless of the measure used, exercise locus of control could not significantly add to the prediction of perceived physical fitness. Beliefs about who is in control of attaining fitness objectives cannot significantly predict perceived physical fitness, even after participating in an exercise class for eight consecutive weeks.
Conclusions
In review of the repeated measures analyses, perceptions of physical fitness significantly increased after participation in an eight-week physical fitness activity class. Moreover, perceived stress significantly decreased after being enrolled in either the activity class or the lifetime fitness lecture class for eight weeks. Education may or may not have long lasting effects in the future. It is suggested that continued exposure to either condition is likely to decrease stress. However, it may be difficult to get employees to participate in a lifetime fitness lecture class, as opposed to a continued exercise regimen, for long periods of time. There is a limit to how much a person can learn about his or her health, so boredom is likely to discourage continued attendance in a lifetime fitness lecture class. Additionally, exercise locus of control did not increase as a function of either the activity or lecture class. However, both groups scored significantly higher on the internal orientation, rather than the external orientation. Also, self-control did not increase after participation in the activity class or the lecture class. Interestingly, the participants in the activity class, as opposed to the lecture class, reported that they engaged
in significantly more self-control behaviors which is probably why they were enrolled in an activity class. They exercised self-control by committing to and attending an activity class that requires an initial investment for the long lasting reward of improved physiological and psychological well-being.

In review of the multiple regression analyses, stressors and previous perceived stress significantly predicted perceived stress after being enrolled in the 8-week activity class. Perceived physical fitness significantly predicted perceived stress after participating in eight weeks of a physical fitness class. After the initial variance was given to the control variable, self-control significantly added to the prediction perceived stress. Next, exercise locus of control was added to the model. It significantly added to the prediction of perceived stress. And last, perceived physical fitness was added to the model. It did not significantly improve the prediction of perceived stress. Finally, participants' reports of exercise locus of control were not able to significantly predict their perceived physical fitness at week 8.

Based on the previous research, the physiological and psychological benefits of an organizational fitness
program can benefit the organization monetarily. Lower perceptions of stress could result in increased productivity, reduced absenteeism, fewer compensation claims, and fewer medical claims (Cooper & Cartwright, 1994). After participating for eight weeks in an activity class, participants reported higher levels of perceived physical fitness and lower levels of perceived stress. Additionally, it is likely that those employees who choose to participate in organizational fitness program will demonstrate self-control behaviors and will possess an internal orientation, specific to exercise locus of control. Perhaps, the self-control behaviors and internal orientation will be partially responsible for getting employees to attend and adhere to the fitness program offered by the organization.
CHAPTER THREE
IMPLICATIONS AND RECOMMENDATIONS

By implementing a physical fitness program, employers have the opportunity to provide their employees with a healthful way to tackle stress. Fortunately, healthy behaviors cluster together; if employees participate regularly in a fitness program, they are also likely to engage in other healthful behaviors. Health related habits combined with feelings of control are likely to lead to a greater ability to prevent and/or cope with occupational stress. In this study, both perceived physical fitness and self-control were negatively correlated with perceived stress.

Exercise can be stress reducing for those employees who are lacking control in areas other than fitness, and it can be especially helpful when lacking control over the source of the stress (Brown, 1991; Cox et al., 1988; Koeske et al., 1993). Employees involved in work situations in which they have little or no control, but high job demands, frequently report higher levels of stress and many of the physiological and psychological symptoms associated with stress (Knight, 1987). Regular exercise allows a person to exercise his or her
self-control (health related behaviors). Additionally, perceived physical fitness and perceptions of control can lead to better, less adverse, responses to stress. This is especially important because employees are frequently limited to the amount of control they have over the stressors that cause stress (Koeske et al., 1993).

Possible Implications

Additional Benefits for Participants and Non-Participants

In addition to all of the other benefits of fitness programs, employee attitudes also tend to improve after the implementation of an organizational fitness program (Cox et al., 1988; Gebhardt & Crump, 1990; Kerr & Vos, 1993). Interestingly, more than just exercise enthusiasts benefit when a company invests in an on-site fitness facility. Research indicates that there is a direct impact on employees who choose to use the fitness facilities as well as an indirect impact on those employees who choose not to make use of the fitness facilities (Cox et al., 1988; Gebhardt & Crump, 1990; Kerr & Vos, 1993). Employees feel cared about when an organization invests in them. They feel as though they are a part of an organization that cares about the welfare of its members (Rudman, 1987). As a result, regardless of fitness facility usage,
employees report and demonstrate better attitudes about their jobs and the organization (Cox et al., 1988; Gebhardt & Crump, 1990; DeGeus & VanDooren, 1993; Kerr & Vos, 1997).

Practical Suggestions

Support of Organization

Support from the organization is imperative if organizations want their fitness programs utilized (Barnes, 1983). It is crucial to get the support of upper management, immediate supervisors, as well as support from all of the departments of the organization (Barnes, 1983; Gebhardt & Crump, 1990). Supervisors can provide support by sacrificing time during the workday for fitness training (Kerr & Vos, 1993). When the organization cannot afford to provide that level of support, it can at least make sure fitness training, in addition to regular work hours, fits into the employees' schedules (Kerr & Vos, 1993). Luckily, the students enrolled in the activity classes had the opportunity to select how and when their activity classes would fit into their schedules. It is important that the organization fitness program does not cause stress by expecting participation without providing support (Gebhardt & Crump, 1990).
Support from fitness specialists is also very important to the success of the fitness program. Perhaps in this study, significant results emerged in only eight weeks because kinesiology professionals consistently guided the participants through their exercise routines. This principle can be found at a high quality fitness facility. There should always be well-trained fitness specialist available on-site to assist employees with their fitness training (Gebhardt & Crump, 1990). Gebhardt and Crump write, "Incentives can be used to initiate participation, but it is the quality of the staff that promotes adherence to a fitness program" (1990, p. 269). In addition to having well trained professionals as instructors, participants in this study were rewarded with two-quarter units and a grade.

Fitness specialists, found in on-site facilities, are responsible for coming up with new creative fitness ideas to maintain the interest of the employee, thus encouraging continued employee participation (Gebhardt & Crump, 1990). The professors in this study modeled these behaviors, for the treatment group was introduced to new routines periodically. Also, the professors spent a portion of their classes teaching students how to maintain their health out of the classroom. Similar to the professors in
this study, fitness professionals are responsible for providing accurate information regarding the benefits of fitness training and other healthy behaviors (Gebhardt & Crump, 1990). This type of knowledge tends to motivate people to engage in healthful behaviors.
APPENDIX A

SURVEY
Demographic

Please circle the selection that best describes you.

Gender:   Male   Female

Education Level: Freshman  Sophomore  Junior  Senior  Graduate

Marital Status: Single  Married  Divorced  Separated

How many units are you currently enrolled in?  1-4  5-7  8-11  12-12+

What is the main reason you enrolled in your Kinesiology class(es)?

Graduation requirement  Interested in specific activity (sport)  Physical Fitness

Other-please specify __________________________________________________________

Please fill in the following blanks

Age ______

What Kinesiology class(es) are you currently enrolled in? __________________________

On average, approximately how many hours a week do you engage in physical exercise? _____

On average, approximately how many hours a week do you work? ______

On average, approximately how many hours a week do you spend studying out of class? ______

How many Kinesiology activity classes have you completed? _____
The following statements are designed to assess your perception of your physical fitness. Please read each statement carefully, and then select one of the five alternatives by circling your choice.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Undecided</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I am in good physical condition</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. I need to alter (lose or gain) my weight in order to improve my physical health</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. I am better able to walk briskly for twenty minutes than most individuals my age</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. I am as physically strong as I need to be</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. An object that I can lift once with slight difficulty soon becomes strenuous when I attempt to lift it repeatedly</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. I possess greater muscular flexibility than most individuals my age</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. I am more overweight than most individuals my age</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8. When I exercise I tire easily</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9. I am more physically fit than most individuals my age</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10. I am a very limber (flexible) individual</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>11. I possess less muscular strength than most individuals my age</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>12. I need to improve my present over-all physical condition</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
The questions in this scale ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate how often you felt or thought a certain way. Although some of the questions are similar, there are differences between them and you should treat each one as a separate question. The best approach is to answer each question fairly quickly. That is, don’t try to count up the number of times you felt a particular way, but rather indicate the alternative that seems like a reasonable estimate. For each question choose one of the following alternatives: Never, Almost Never, Sometimes, Fairly Often, or Very Often.

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Almost Never</th>
<th>Sometimes</th>
<th>Fairly Often</th>
<th>Very Often</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. In the last month, how often have you been upset because of something that happened unexpectedly?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2. In the last month, how often have you felt that you were unable to control the important things in your life?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3. In the last month, how often have you felt nervous or “stressed”?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4. In the last month, how often have you dealt successfully with irritating life hassles?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5. In the last month, how often have you felt you were effectively coping with important changes that were occurring in your life?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6. In the last month, how often have you felt confident about your ability to handle your personal problems?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7. In the last month, how often have you felt that things were going your way?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8. In the last month, how often have you found that you could not cope with all the things you had to do?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Question</td>
<td>Scale</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>--------------------------------------------------------------------------</td>
<td>-------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>In the last month, how often have you been able to control the irritations in your life?</td>
<td>0 1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>In the last month, how often have you felt that you were on top of things?</td>
<td>0 1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>In the last month, how often have you been angered because of things that happened that were outside of your control?</td>
<td>0 1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>In the last month, how often have you found yourself thinking about things that you have to accomplish?</td>
<td>0 1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>In the last month, how often have you been able to control the way you spend your time?</td>
<td>0 1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?</td>
<td>0 1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The statements listed below are commonly held opinions. You are being asked to indicate the extent to which you agree or disagree with these statements. There are no right or wrong answers. First impressions are best. Read each statement carefully, decide the extent to which you agree or disagree, and then place circle around the appropriate number. *Give your opinion on every statement.* If you find that the headings do not adequately reflect your opinion, use the one that is closest to the way you feel. If you do not understand the statement, place a circle around “6” for “Do Not Understand.”

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Undecided</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>Do Not Understand</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>My own actions will determine whether or not I achieve my exercise objectives.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2.</td>
<td>If it’s meant to be, I will reach my exercise objectives.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3.</td>
<td>Whether or not I obtain my exercise objectives depends mostly on my own behavior.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4.</td>
<td>Whether or not I achieve my exercise objectives is largely a matter of good or bad fortune.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5.</td>
<td>The encouragement I give myself will greatly affect whether or not I reach my exercise objectives.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6.</td>
<td>If I do not attain my exercise goals, other people will be to blame.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7.</td>
<td>For the most part, other people are in control over whether or not I attain my exercise goals.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8.</td>
<td>Whether or not I achieve my exercise objectives is largely a matter of fate.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Undecided</td>
<td>Agree</td>
<td>Strongly Agree</td>
<td>Do Not Understand</td>
</tr>
<tr>
<td>---</td>
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<td>----------</td>
<td>-----------</td>
<td>-------</td>
<td>----------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>9.</td>
<td>It is entirely up to other people whether or not I accomplish my exercise goals.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10.</td>
<td>Whether or not I achieve my exercise goals depends on how lucky I am.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>11.</td>
<td>I am directly responsible for whether or not I reach my exercise goals.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>12.</td>
<td>Achieving my exercise goals will depend on how fortunate I am.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>13.</td>
<td>Whether or not I accomplish my exercise goals is entirely up to me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>14.</td>
<td>Whether or not I reach my exercise objectives depends on the actions of certain other people.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>15.</td>
<td>Other people have the power to make certain that I accomplish my exercise objectives.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>16.</td>
<td>Not achieving my exercise objectives will be a matter of bad fortune.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>17.</td>
<td>The behavior of other people will greatly influence whether or not I reach my exercise objectives.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>18.</td>
<td>I am primarily in control of whether or not I reach my exercise objectives.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
This is a questionnaire designed to measure your level of self-control. You are asked to respond to sixteen statements. Each statement describes a specific situation. You are to decide the extent to which you agree that the statement is typical of your behavior. To do so, circle one of the five descriptors beneath the statement. Here is a practice statement. "I have disciplined work habits." You must decide the degree to which you agree that this statement is typical of your behavior. If you feel you almost always exhibit disciplined work habits, you would circle "Strongly Agree". If you feel you almost never exhibit disciplined work habits, you would circle "Strongly Disagree". A response of "Agree" would indicate you often exhibit disciplined work habits, and a response of "Disagree" would indicate you seldom do so. A response of "Neutral" should be selected only if you truly feel ambivalent about your behavior. This is not a test. There are no "right" or "wrong" responses to any of the statements. Please answer each question as honestly as you can. Please work carefully and quickly. Do not spend a long time on any one statement. Please respond to each statement, circle only one response to each.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Undecided</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I manage my personal or family budget well.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. I manage my time carefully.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. I snack between meals.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. I control my anger in interpersonal conflicts.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. I make major purchases on impulse.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. I exercise regularly.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. I procrastinate on work/study assignments.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8. I find it difficult to assert my own needs and desires.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9. I control the size of the portions of the food I eat.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10. I avoid eating high-caloric, fatty, or sweet foods.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Statement</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Undecided</td>
<td>Agree</td>
</tr>
<tr>
<td>---</td>
<td>---------------------------------------------------------------------------</td>
<td>-------------------</td>
<td>----------</td>
<td>-----------</td>
<td>-------</td>
</tr>
<tr>
<td>11.</td>
<td>I schedule leisure activities regularly.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>12.</td>
<td>I have nervous habits like nail-biting, smoking, or grinding my teeth.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>13.</td>
<td>I lose my temper regularly.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>14.</td>
<td>I have difficulty saying “no” to others.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>15.</td>
<td>I eat a balanced diet.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>16.</td>
<td>I prioritize activities and work on the most important ones first.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
Student-Life Stress Inventory  
Bernadette M. Gadzella, Ph.D., 1991 Copyright  
East Texas State University  
Rate your overall level of stress (please select one)

Mild _______   Moderate _______   Severe _______

This inventory contains statements dealing with student-life stress. Read it carefully and respond to each statement as it has related or is relating to you as a student. Respond to each statement in the Student-Life Stress Inventory by recording the level of your experience on the 5-point scale with 1=Never, 2=Seldom, 3=Occasionally, 4=Often, and 5=Most of the Time.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Never</th>
<th>Seldom</th>
<th>Occasionally</th>
<th>Often</th>
<th>Most of the Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I have experienced frustrations due to <em>delays</em> in reaching my goals.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. I have experienced <em>daily hassles</em> which affected me in reaching my goals.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. I have experienced <em>lack of sources</em> (money for auto, books, etc.).</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. I have experienced <em>failures</em> in accomplishing the goals that I set.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. I have <em>not been</em> accepted socially (became a social outcast).</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. I have experienced <em>dating</em> frustrations.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. I feel I was <em>denied</em> opportunities in spite of my qualifications.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td><strong>I have experienced conflicts which were:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Produced by two or more <em>desirable</em> alternatives.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9. Produced by two or more <em>undesirable</em> alternatives.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10. Produced when a goal had both <em>positive and negative</em> alternatives.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
I experienced pressures:

11. As a result of competition (on grades, work, relationships with spouse and/or friends).  
   Never Seldom Occasionally Often Most of the Time
   1 2 3 4 5

12. Due to deadlines (papers due, payments to be made, etc.).  
   1 2 3 4 5

13. Due to an overload (attempting too many things at one time).  
   1 2 3 4 5

14. Due to interpersonal relationships (family and/or friends, expectations, work responsibilities).  
   1 2 3 4 5

I have experienced:

15. Rapid unpleasant changes.  
   1 2 3 4 5

16. Too many changes occurring at the same time.  
   1 2 3 4 5

17. Change which disrupted my life and/or goals.  
   1 2 3 4 5

As a person:

18. I like to compete and win.  
   1 2 3 4 5

19. I like be noticed and loved by all.  
   1 2 3 4 5

20. I worry a lot about everything and everybody.  
   1 2 3 4 5

21. I have a tendency to procrastinate (put off things that have to be done).  
   1 2 3 4 5

22. I feel I must find a perfect solution to the problems I undertake.  
   1 2 3 4 5

23. I worry and get anxious about taking tests.  
   1 2 3 4 5
APPENDIX B

INFORMED CONSENT
PARTICIPANT INFORMED CONSENT FORM

The research you are about to participate in is designed to investigate the relationship between physical fitness and stress. Jayme Petaishiski is conducting this study under the supervision of Dr. Janet Kottke, Professor of Psychology. This study has been approved by the Psychology Department Human Subjects Review Board, California State University San Bernardino. The University requires that you give your consent before participating in a research study.

In this study, you will answer a series of questions about your perceived physical fitness, perceived control, and perceived stress. Later in the quarter, you will be asked some additional questions. The questionnaire will take approximately 20 minutes to complete. At instructors' discretion, you may receive extra credit for your participation.

Your anonymity will be maintained at all times. Please be assured that any information you provide will be held in strict confidence by the researcher. At no time will your name be reported along with your responses. At the study's conclusion, you may receive a report of the results. All data will be reported in group form only.

Your participation in this study is completely voluntary. There are not any foreseeable risks associated with participation in this study, and withdrawal from this study is possible at any time without any penalty. Additional questions concerning this study should be directed to Dr. Kottke at (909) 880-5585. If you have any questions about any research subjects' rights, contact the University's Institutional Review Board at (909) 880-5027.

By placing a mark in the space provided below, I acknowledge that I have been informed of, and understand, the nature and purpose of this study, and I freely consent to participate. By this mark I further acknowledge that I am at least 18 years of age.

Give your consent to participate by making a check or 'X' mark here: ______

Today's date is _________________
APPENDIX C

DEBRIEFING STATEMENT
Debriefing Statement

The main purpose of the current study was to investigate the influence perceived fitness has on perceived stress. Your responses to the questionnaires are anonymous, and at no time was your name requested along with your responses. Please be assured that any information you provided will be held in strict confidence by the researcher, and all data will be reported in group form only. If you have any questions or concerns about this study, or you would like to discuss the results, please feel free to contact Dr. Kottke at (909) 880-5585. Results of the study will be available June 1, 2002. It is not anticipated that participants will experience negative emotional or psychological symptoms as a result of completing this questionnaire. However, if you should feel a need to seek counseling service, you may contact the CSUSB Counseling Center at (909) 880-5040. To ensure the integrity of this study, I ask that you do not reveal information about this study to other prospective participants.

Thank you very much for your participation.
REFERENCES


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