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Using the protection motivation theory to examine the effects of obesity fear arousal on the physical activity of young adult female college students

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**USING THE PROTECTION MOTIVATION THEORY TO EXAMINE THE EFFECTS
OF OBESITY FEAR AROUSAL ON THE PHYSICAL ACTIVITY OF YOUNG ADULT
FEMALE COLLEGE STUDENTS**

by

BIBIA R. REDD

DISSERTATION

Submitted to the Graduate School

of Wayne State University,

Detroit, Michigan

in partial fulfillment of the requirements

for the degree of

DOCTOR OF PHILOSOPHY

2012

MAJOR: PSYCHOLOGY (Cognitive,
Developmental and Social)

Approved by:

Advisor

Date

DEDICATION

This work has been dedicated to God Almighty because He was faithful in showing me that I can do all things through Christ, who would and continuously strengthens me. I would also like to dedicate this work in honor of my parents, Simon and Arnetta Burks, and present it as a legacy to my children and their children.

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CHAPTER 1 - INTRODUCTION

The United States is recognized as a chief industrialized country mainly because of its major advances in industry and technology. Unfortunately, many of these industrial and technological advances have inadvertently facilitated significant declines in the nation's physical activity. Moreover, the national declines of physical activity have been observed over the past four decades (French, Story, & Jeffrey, 2001; Hill & Wyatt, 2005; Hill, Wyatt, Reed, & Peters, 2003; Spence, & Lee, 2002). The decline in physical activity is accompanied by a significant increase of obesity and has allowed obesity to become a major health concern in several industrialized countries (James, Leach, Kalamara, & Shayeghi, 2001; Vissher & Siedell, 2001). The growth of obesity is a major health concern because of obesity's association with numerous chronic illnesses (Malnick & Knobler, 2006; Ogden, et al., 2006). Consequently, declines in physical activity are problematic because they lead to the development of obesity, but more importantly, declines in physical activity lead to the development of obesity-related chronic illnesses. Thus, finding effective methods of increasing physical activity is a crucial component of efforts aimed at reducing obesity and obesity-related chronic illness.

The current study was guided by a series of questions regarding the applicability of the Protection Motivation Theory for increasing levels of physical activity in young overweight women. A brief intervention varying susceptibility, severity and intention implementation plans was evaluated over a one month period. The rationale for the study is provided in the following sections.

Exercise and physical activity are terms which are frequently used interchangeably throughout the health promotion literature. This is primarily because of their many shared similarities. One such similarity between exercise and physical activity is the provision of

various psychological and physical benefits (Bassey, 2000; Cash, Novy, & Grant, 1994; Christmas & Andersen, 2000; Kilpatrick, Hebert, & Bartholomew, 2005; USDHHS, 2000). For example, Paluska and Schwenk (2000) found that participants reported more feelings of elevated mood, and significant reductions in stress, anxiety and depression after engaging in regular physical activity. In addition, other studies report participants having increased lung capacity leading to aerobic fitness, healthy body weight maintenance and increased muscle mass as a result of engaging in regular physical activity or exercise (NHLB, 2000; USDHHS, 2000; 1996; Westerterp, 2010). Regular physical activity and/or exercise are both efficacious in the prevention of chronic disease and illnesses such as cancer, cardiovascular disease, stroke, hypertension, and Type II diabetes (Blair & Brodney, 1999; Blair, et al., 1989; Colditz, et al., 1996; Fang, Wylie-Rosett, Cohen, Kaplan, & Alderman, 2003; Gortmaker, Must, Perrin, Sobol, & Dietz, 1993; Kriska, et al., 2003; Mokdad, Ford, Bowman, et al., 2001; Must, et al., 1999; Nevelle, et al., 2002; Powell, Thompson, Caspersen, & Kendrick, 1987). Furthermore, because physical activity helps to maintain healthy body weight, its regular performance is an effective method for the prevention of obesity and obesity-related illness (Allender & Rayner, 2007; Ball, Owen, Salmon, Bauman, & Gore, 2001; Barbeau, et al., 2007; Dwyer, Coonan, Leitch, Hetzel, & Baghurst, 1983; Epstein, Valoski, Vara, McConley, & Wisniewski, 1995; Hill & Hyatt, 2005; Kain, et al., 2004; Klein, et al., 2007; Manios, Moschandreas, Hatzis, & Kafatos, 2002; Sallis, Prochaska, & Taylor, 1999).

Despite the numerous benefits associated with regular physical activity, performance not only remains low, but continues to decline among both genders and across several age and racial groups (CDC, 2008). The highest rates of physical activity declines are being observed in females between the ages of 9-19 (Kimm, et al., 2000) and in young adults between the ages of

18-29 (Caspersen, Pereira, & Curran, 2000). Therefore the decrease in physical activity among young adult females increases their risk for the development of obesity and obesity-related chronic illness.

Research examining physical activity trends of young adult college students concludes with the following important findings: 1) many young adults are sedentary (as indicated by the lack of performance of any type of regular physical activity), and 2) most non-sedentary young adults fail to perform physical activity at the minimum 30 minute daily requirement necessary for obtaining the health benefits associated with the performance of regular physical activity (Huang, et al., 2003; Krueger, Yore, Kohl, 2008; Nelson, Gortmaker, Subramanian, Cheung, & Weschler, 2007; Spees, Scott, & Taylor, 2012).

The decline in physical activity coincides with several inventions having the purpose of increasing productivity in the home and workplace, and improving overall quality of life (French, Story, & Jeffrey, 2001; Hill & Wyatt, 2005; Hill, Wyatt, Reed, & Peters, 2003; Spence, & Lee, 2002). For example, advances in technology like the inventions of household appliances such as washing machines, clothes dryers, vacuum cleaners, dishwashers, snow blowers and electric lawn mowers have considerably decreased, and in most cases eliminated several time-consuming, but more importantly, energy-consuming daily household activities from the current lifestyle. Moreover, increased computer and robotic usage has dramatically decreased the performance of physical activity in the home and workplace as well. Consequently, as these advances in technology increased productivity and improved overall quality of life, they also inadvertently facilitated the elimination of significant amounts of physical activity normally expended throughout the course of the day. Moreover, these same advances in technology made more time available for leisure and recreational activities. Unfortunately, the increase in

available time failed to translate into an increase in time spent in the performance of physical activity. Instead, increased leisure time became an additional factor having a negative effect on the performance of daily physical activity.

In the past, leisure time was spent in the performance of several outdoor activities, such as participation in sports, cycling and playground use. However, advances in electronic devices geared toward recreational and leisure time use like remote controlled televisions, computers, DVDs/VCRs players and gaming consoles have significantly diminished these types of recreational and leisure time usage (Hill & Peters, 1998; Sturm, 2004). To summarize, advances in electronic technology have influenced several domains of our daily life by facilitating physical inactivity in many areas previously considered active. Therefore, the unintentional declines in physical activity, combined with declining rates of purposeful physical activity (exercise) is considered to be a primary underlying cause for the high rates of obesity and obesity-related illnesses.

The maintenance of a stable body weight depends on the amount of energy consumed via food intake being equivalent to the amount of energy expended over time. Energy expenditure is generally achieved through the performance of physical activity, and or exercise. Consequently, as levels of physical activity decrease and amounts of food consumption remain constant or fail to decrease, the consumed energy that is not expended is stored. This stored energy or reserve creates a positive energy balance, more commonly referred to as “weight gain”.

There are several factors that lead to obesity; therefore the development of obesity cannot be attributed to the lack of physical activity alone. As previously demonstrated, the development of obesity is the direct result of an imbalance between food intake and physical activity. Therefore any review focusing on obesity would be remiss in its failure to at least recognize the

role diet plays in its development. For example, the nation's current eating patterns are rarely the result of food consumption for the purpose of nutritional acquisition. More specifically, much of nation's food consumption is the result of predetermined times such as breakfast, lunch, or dinner. An additional amount of food intake occurs from food consumption being the center of a social gathering such as a romantic date, lunch meeting, or birthday party to name a few. Still other bases of food consumption come from boredom, or social/ environmental cues (popcorn at the movies, snacks when watching TV). As a result, a significant increase in the consumption of high calorie foods has occurred. Consequently, this dietary pattern of consuming high calorie foods has played a significant role in the development of obesity as well (Caprio, et al., 2008).

Thus, the current obesity epidemic being suffered by many industrialized countries comes as the result of the following opposing factors: 1) advances in technology, 2) declining levels of physical activity and exercise, and 3) the increased consumption of high calorie foods (Hill, Catenucci, & Wyatt; 2005; Wilks, Besson, Lindroos, & Ekelund, 2010). Obesity and its predecessor, overweight, are body weight classifications that are determined by body mass indexes (BMI). These indexes are calculated by dividing a person's weight (kilograms) by their height (meters)². Therefore, BMIs ≥ 25 classify persons as overweight and persons with BMIs ≥ 30 are classified as obese. Obesity is further classified according to severity (NIH/NHLBI, 1998; WHO, 1998).

Prevalence and Consequences of Obesity

A consistent increase in obesity rates has been demonstrated across all age groups (Lewis, et al., 2000), although, more recently, a decline has been demonstrated among middle aged men between the ages of 40-59 (Flegal, Carroll, Ogden, & Curtin, 2010). Hence, for the overall adult population, with the exception of middle aged men, growing rates of obesity are a

major concern, with this being especially true for young females between the ages of 18-25 (McCracken, Jiles, & Blanck, 2007).

The growth of obesity among young adults was examined in 1993. This investigation revealed that the combined rate for overweight and obesity was 22%. Six years later, in 1999, the 22% rate had risen to 27%, indicating a 5% increase for the 6 year period. Moreover, by 2000, the 27% rate for 1999 had increased to 35%, indicating a dramatic increase in the growth of overweight and obesity among young adults (Lowrey, et al., 2000). Stated another way, the overall overweight and obesity rate among young adults of 22% in 1993 had increased to 27% by 1999. This increase demonstrated a 4.5% average annual growth rate for overweight and obesity. However, the average annual growth rate of overweight and obesity had increased from 4.5% in 1999 to 25.5% for 2000, demonstrating a significant increase in the annual obesity growth rate for young adults.

More recent reports (2007-2008) examining obesity growth rates show the obesity rate for all racial /ethnic groups between the ages of 20-39, according to gender is 27.5% (males) and 34.0 % (females). Furthermore, the combined rate of overweight and obesity for all racial and ethnic groups between the ages of 20-39 is 63.5% for males, and 59.5% for females (Flegal, et al., 2010). These findings indicate that over 50% of young adults between the ages of 20-39 are either overweight or obese, and therefore demonstrate an increased risk for the development of obesity and obesity-related chronic illness. Thus, these findings provide clear evidence indicating the need for the design and implementation of effective interventions targeting this particular group.

Beyond the effects of age on the development of obesity are race and gender. More specifically, African American and Hispanic females are more likely to be overweight

(78.2/76.1%) or obese (49.6/43.0%) as opposed to European American females (61.2/33.0%) (Nelson, Gortmaker, Subramian, Chueng, & Weschler, 2007). Although obesity is a potential concern for most, groups demonstrating increased risk appear to be African American and Hispanic females and young adults between the ages of 20-39 (Flegal, et al., 2010; Flegal, et al., 2002; Hill, et al., 2005). Identifying 'at risk' populations for obesity intervention is important due to the preventable adverse effects of obesity on quality of life, socio-economic status, health, and the nation's economy in terms of health care costs (DiLorenzo, et al., 1999; Katzmarzyk, Gledhill, & Shephard, 2000; Sothorn, Loftin, Suskind, Udall, & Blecker, 1999).

Because obesity is readily perceived, obesity sufferers are exposed to several adverse outcomes impacting their quality of life. More specifically, obese individuals are perceived as unattractive, not only to themselves, but especially to members of the opposite sex (Chen & Brown, 2005; Sitton & Blanchard, 1995). Unfortunately for persons suffering from obesity, the perceptions of unattractiveness held by members of the opposite sex translate into decreased mate attractions, fewer long-term romantic relationships, and decreased marital opportunities (Aruguete, Edman, & Yates, 2009; Harris, Harris, & Bochner, 1982). As a result, many of these adverse outcomes have long-term negative effects on the ability of obese individuals to pursue normal adult developmental roles like marriage and parenthood.

In addition to persistent singlehood, obese individuals are more physically inactive and suffer greater limitations in mobility and range of motion than normal weight individuals (Tudor-Locke, Brashear, Johnson, & Katzmarzyk, 2010; Westerterp, 2012). These limitations further impact persons suffering from obesity in their ability to perform simple daily tasks like getting dressed and the performance of household chores.

Finally, while laws exist prohibiting various forms of employment discrimination, these

laws fail to protect those suffering from obesity (Agerstrom & Roth, 2011). For example, obese individuals receive fewer opportunities for employment, are discriminated against much more by coworkers and receive fewer promotional opportunities as compared to individuals having BMIs in the normal range. And as mentioned previously, many of these adverse outcomes have long-term effects on the socio-economic status of obese individuals (Gortmaker, Must, Perrin, Sobol, & Dietz, 1993; Katzmarzyk, Gledhill, & Shephard, 2000; Roe & Eickwort, 1976; Sobel & Stunkard, 1989).

In additions to obesity's social costs, obesity is an adverse health condition that facilitates the development of several chronic illnesses such as Type 2 diabetes, high blood cholesterol, hypertension, coronary heart disease, sleep apnea, nonalcoholic fatty liver disease, and cancer (Allender & Rayner, 2007; Ball, Owen, Salmon, Bauman, & Gore, 2001; Barbeau, et al., 2007; Dwyer, et al., 1983; Epstein, et al., 1995; Hill & Hyatt, 2005; Kain, et al., 2004; Klein, et al., 2007; Manios, et al., 2002; Sallis, et al., 1999). These illnesses have the potential to lead to serious medical complications and premature death in healthy weight individuals and increase the likelihood of obesity-related negative health outcomes. Thus, obesity not only increases the risk of development of chronic illness, but exacerbates the management of chronic illness as well (Allender & Rayner, 2007; Allison, Fontaine, Manson, Stevens, & VanItallie, 1999; Blair, Cheng, & Holder, 2001; Calle, Rodriguez, Walker-Thurmond, & Thun, 2003; Flegal, Graubard, Williamson, & Gail, 2007; Fogelholm, 2009; Hill, et al., 2005; Malnick, & Knobler, 2006; Klein, et al., 2007; McNamara, & Castelli, 1993; Mokdad, et al., 2001; Must, et al., 1999; Orpana, et al., 2009; Pi-Sunyer, 2002).

Similarly, an additional consequence of obesity can be attributed to the rising health care/medical costs associated with the treatment of obesity and obesity-related chronic illnesses.

For example, in 1995, the *direct* health care costs for the treatment of obesity and obesity-related illnesses were an estimated \$51 billion (Wolf & Colditz, 1998). In 2003, these same costs had increased in excess of \$75 billion translating into a 47% increase in the health care costs for the treatment of obesity and obesity-related health care costs (Wellman & Freidberg, 2002).

While the persistent relationship between physical activity and obesity appears to be clear, the full gamut of consequences associated with obesity may not be so apparent. Much focus has been placed on the relationship between physical activity declines and the subsequent weight gains leading to obesity and how over time obesity facilitates the development of chronic illness. Up until this point, obesity has been viewed as a major health risk, generally having direct implications for individuals suffering from obesity; however, as larger proportions of society become obese, obesity threatens to become a major social issue while remaining a major health concern as well. Fortunately, despite the various adverse social and physical outcomes associated with obesity, the development of obesity is preventable. In fact, research indicates that increasing the nation's level of physical activity by 10% would prevent obesity and translate into an annual savings of 150 million dollars in healthcare expenditures for the treatment of obesity and obesity-related diseases (Irwin, 2007; WHO, 2005).

To this end, the purpose of this dissertation was to evaluate the effectiveness of a theoretically-based intervention aimed at increasing physical activity among young adult female college students. The following chapter discusses the importance of physical activity among young adults and provides a theoretical overview of the Protection Motivation Theory which provides the rationale for the current study. Also included in this chapter is a brief critical review of the relevant Protection Motivation Theory literature and the hypotheses used to guide this investigation are provided in the conclusion of this chapter.

The Importance of Physical Activity for Young Adults

The single most important aspect of physical activity rests is its ability to maintain body weights that are considered healthy or normal (NHLB, 2000; USDHHS, 2000, 1996; Westerterp, 2010). Healthy body weight is determined by body mass indexes ranging from 19 to 25. Body mass indexes in this range are considered normal because they reflect a healthy balance between energy consumption and expenditure. As mentioned earlier, physical activity has been identified as the most effective method for expending the energy necessary for maintaining healthy body weights in normal weight populations and for the loss of weight in overweight and obese populations as well (Fogelholm & Kukkonen-Harjula, 2000; Owens, Matthews, Wing, & Kuller, 1992; Thune, Njolstad, Lochen, & Forde, 1998). Thus, the importance of physical activity for young adults is the ability of physical activity to maintain healthy or normal body weight ranges because healthy body weights are conducive to promoting and prolonging the healthy status of young adults (Dwyer, et al., 2007).

Young adult females have been identified as having increased risk for the development of obesity and obesity related chronic illnesses due to the presence of high rates of physical activity declines in both frequency and intensity within this group. The high rates of physical activity declines combined with the general tendencies of weight to increase with age and high caloric diets works to exacerbate the development of obesity, with this being especially true among sedentary young adults (Flegal, et al.; Hoffman, Policastro, Quick & Lee, 2006; Huang, et al., 2003; Lewis, et al., 2000; Mokdad, Serdula, Dietz, Marks, & Koplan, 1999; National Center for Health Statistics, 1999; Nelson, et al., 2007; Stephens, Jacobs & White, 1985; Wadden, Brownell, & Foster, 2002).

Fortunately, for the most part, young adults are healthy, despite their unhealthy

behaviors, primarily because they are free from chronic illnesses. As previously mentioned, obesity is related to several chronic illnesses, but due to the delayed onset of these illnesses; young adults generally do not perceive the risks associated with obesity (Deery, 1999; Healthy People, 2010).

Moreover, the development of obesity is gradual, however, once developed; obesity becomes extremely difficult to treat. For example, a previous examination of the relationship between physical activity and obesity indicated the recommended dose or amount of physical activity necessary for *preventing* the development of obesity to be 30-60 minutes for 3 times a week, totaling 90-180 minutes of weekly physical activity (Wing, 1999). However, more recently, as of 2009, the recommended physical activity requirement necessary to prevent weight gain requires the weekly performance of 150-250 minutes of physical activity. Similarly, in order to lose weight by the previous standard required the performance of 45 minutes per day for at least 3-5 days of the week (Wing, 1999). Again, the more recent recommendations require, in addition to strict caloric restrictions, the weekly performance of a minimum 150 minutes of moderate physical activity for the observance of moderate weight losses, and the weekly performance of 225-420 minutes of moderate physical activity to observe larger losses (Donnelly, et al., 2009, Vortruba, Horvitz, & Schoeller, 2000). Moreover, in order to maintain weight loss, one must perform at least 80 minutes of moderate intensity activity or 35 minutes of vigorous activity daily.

The current study focused on the modification of behavior for the purpose of promoting health. The Protection Motivation Theory (PMT) was chosen because of its ability to evaluate the threat process regarding the development of obesity and the coping appraisal process of young adults in relation to the performance of physical activity. In addition, the PMT allows for

the examination of the effects of obesity fear arousal on the intentions of young adult female college students to perform and subsequently adopt the recommended behavior for the purpose of preventing the development of obesity and obesity-related chronic illness.

Protection Motivation Theory

Health promotion typically focuses on the modification of two behavioral types: 1) unhealthy behaviors, and 2) health improving behaviors. For this reason, health promotion research has been driven by the design and evaluation of health models and theories aimed at explaining health promotion behaviors in relation to either the adoption of health promoting behaviors (e.g., breast and testicular exams) or the modification of behavior (e.g., condom and protective gear usage). The Health Belief Model was one of the earliest models used for the evaluation of health promotion behaviors. This widely used early model was later expanded into the Protection Motivation Theory (Rogers, 1975; 1983; Rogers & Maddux, 1983).

The Protection Motivation Theory (PMT) uses an individual's perception of *fear* in response to specific health threats. The introduction of fear is to motivate or persuade individuals to either engage in or adopt certain recommended behaviors. As seen in Figure 1, the efficacy or effectiveness of the recommended behavior is determined by the individual's belief in the recommended behavior's ability to decrease the fear aroused by the health threat. This cognitive process demonstrates the rationale for the selection of the Protection Motivation Theory in the current application. After the arousal of obesity fear, young adult females are expected to be more likely to demonstrate protection motivation toward obesity by increasing their performance of physical activity. Young adult female college students were targeted for several reasons: 1) their perceptions of invulnerability to health problems threatens their current healthy status, 2) their failure to perceive the significant health risks associated with obesity, and

3) their current levels of physical inactivity which serves to promote obesity and obesity-related chronic illnesses (Chandler, Abood, Lee, Cleveland, & Daly, 1994; Deery, 1999; Healthy People, 2010).

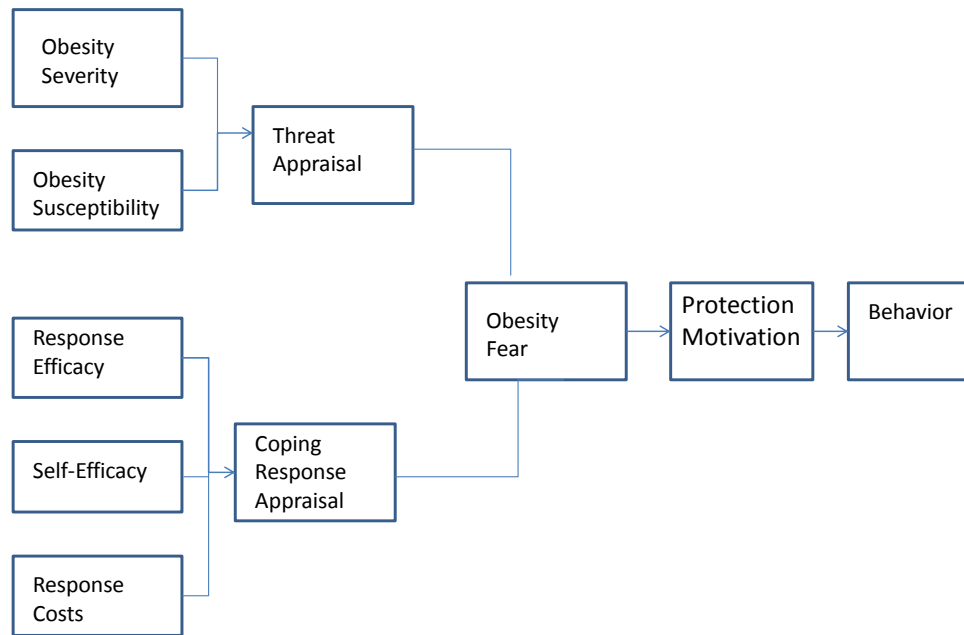


Figure 1. The Protection Motivation Theory adapted from Norman, Boer, & Seydel, 2005.

Initial applications of the Protection Motivation Theory (Rogers, 1975) were grounded in the belief that using fear arousal communications would initiate the cognitive decision-making process necessary for health improving behavioral changes. As a result, a primary focus of the earlier PMT applications was to measure the effects that fear arousal communications had on their recipients' attitudes and intent to perform the recommended behavior. The intention to perform the recommended behavior is theoretically referred to as 'protection motivation' (Norman, Seydel, & Boer, 2005; Rogers, 1975; 1983). As time elapsed, the emphasis on fear appeals diminished and applications began to place much more focus on the balance between the threat and coping response appraisal cognitive processes.

The Protection Motivation's theoretical framework consists of two key elements. These elements (threat appraisal and coping response appraisal) work together to form an evaluation of one's protection motivation in response to any given stimulus or adverse health condition. The process of how these two components contribute to the overall protection motivation process is discussed below.

The Protection Motivation Theory's threat appraisal process focuses primarily on what is perceived to be the source or cause of the health threat. Rogers (1975, 1983) identifies the source as being either a noxious or adverse event. The threat appraisal component combines the perceptions of the specific health threat's level of severity with that of personal perceptions of susceptibility. The combination of these perceptions establishes a person's level of threat as it relates to the identified adverse health event presented in the fear arousal communication. Because of its utility in application, several health threatening conditions including breast cancer (Rippitoe & Rogers, 1987), HIV (Kaljee, et al., 2005; Zhang, et. al., 2004; Li, et. al., 2004; Abraham, Sheeran, Abram, & Spears, 1994; Keyes, 1995) and various cardiovascular diseases (Fruin, Pratt, & Owen, 1991; Wurtele & Maddox, 1987) have been examined under the PMT paradigm.

The second key element of the PMT is the coping response appraisal process. This appraisal process focuses on evaluation of the recommended coping response. Several behaviors such as oral hygiene practices (Beck & Lund, 1981), sunscreen use (Jones & Leary, 1994; Wichstrom, 1994), adherence behaviors (Ashida, Heaney, Kmet, & Wilkins, 2011; Brewer, et al., 2003; Flynn, Lyman, & Prentice-Dunn, 1995) and condom use (Bengel, Belz-Mark, & Farin, 1996; Boer & Mashamba, 2005; Gong, et al., 2009) have been evaluated as adaptive coping responses. The evaluation of the coping response appraisal considers three aspects: response

efficacy, self-efficacy, and response costs. Response efficacy evaluates the effectiveness of the recommended response's ability to decrease or ultimately eliminate the health threat. Provided the recommended response has been determined efficacious, further evaluations involving the person's ability to perform the behavior (self-efficacy) and the costs associated with both performance and nonperformance of the recommended behavior are considered, thus completing the response cost appraisal process.

Literature Review

Many PMT applications have employed cross-sectional designs. These applications have focused on a variety of behaviors including condom use, HIV/AIDS testing and the prevention of risky behaviors such as smoking cessation (Abraham, et al., 1994; Bengel, Belz-Merk, & Farin, 1996; Lwin, Stanaland, & Chan, 2010; Umeh, 2003). Still, other applications have examined dental hygienic practices, adherence to medical treatments, reductions in dietary fat consumption, and the decision to use protective gear or obtain genetic testing (Eppright, Tanner, & Hunt, 1994; Flynn, Lyman, & Prentice-Dunn, 1995; Greening, 1997; Helmes, 2002; Henson, Cranfield, & Herath, 2010; Melamed, Rabinowitz, Feiner, Weisber, & Ribak, 1996; Plotnikoff, & Higginbotham, 1995; Ronis, Antonakos, & Lang, 1996; Sheeran & Orbell, 1996). In cross-sectional applications, participants are instructed to report on the PMT constructs of interest. A few strengths of cross-sectional applications are their ability to make group comparisons and their provision of construct validity. This validity can be built upon in future PMT applications. For example, Abraham, et al., (1994) conducted a cross-sectional study operationalizing the threat appraisal component of susceptibility by examining young adults' perceptions of susceptibility in terms of their personal risk or by the risk associated to their group affiliation. Since the primary aim of their study was to identify determinants of protection motivation

toward condom use, the absence of randomization regarding the susceptibility conditions was not necessary. Their operationalization techniques introduce a direction for future research focus on this health behavior.

Despite their strengths, cross-sectional designs are limited due to their inability to manipulate variables or establish the temporal order provided by longitudinal designs. As a result, the observance of any significant relationships supporting protection motivation cannot prove causation. Other applications of the Protection Motivation Theory have used longitudinal designs (Ben-Ahron, White, & Phillips, 1995; Murgraff, White, & Phillips, 1999; Plotnikoff, et al., 2010; Plotnikoff, Rhodes, & Trinh, 2009; Plotnikoff, Trinh, Courneya, Karunamuni, & Sigal, 2009; Tulloch, et al., 2009; Tulloch, et al., 2008; Wu, Stanton, Li, Galbraith, & Cole, 2005) to examine behaviors such as physical activity/exercise and drug trafficking. Unlike cross-sectional designs, the primary strength of longitudinal designs is the ability to accommodate within-subject analyses and establish temporal precedence. Longitudinal PMT applications examining physical activity have been used as the recommended response for health threats like diabetes (Type I and Type 2, Plotnikoff, et al., 2010; Plotnikoff, Trinh, Courneya, Karunamuni, & Sigal, 2009) and coronary artery disease (Tulloch, et al., 2009). In these types of applications, the PMT explains significant portions (23-56%) of the variance in participants' reports of protection motivation. In contrast, a significantly smaller portion (19 or 20%) of the respondents report adhering to their performance intentions at follow-up. These applications measured follow-up in 2-12 month intervals. Longitudinal studies, much like correlational designs do not determine causality, but they do provide evidence for the relationship between protection motivation and subsequent behavior.

Although the Protection Motivation Theory was designed for use in experimental

applications (Beck & Lund, 1981; Fruin, Pratt & Owen, 1991; Maddux & Rogers, 1983; Rippetoe & Rogers, 1987; Robberson & Rogers, 1988; Stanley & Maddux, 1986; Steffen, 1990; Wurtele, 1988; Wurtele & Maddux, 1987) there have been fewer applications of this nature as compared to correlational designs. The behaviors examined in the initial applications of the PMT are self breast exams, smoking cessation, and physical activity. More recent experimental applications of the Protection Motivation Theory have examined smoking (Penchman, Zhao, Goldberg, & Reibling, 2003) and healthy sun behavior (Prentice-Dunn, McMath, & Cramer, 2009),

In experimental applications, an intervention or fear arousal communication is required which manipulates the threat and/or coping response appraisal components. In 1981, Beck and Lund manipulated the threat appraisal components of severity and susceptibility without performing any manipulations of the coping appraisal components of self-efficacy, response efficacy and response costs regarding periodontal disease. Beck and Lund found that despite participants' reports of fear arousal, participants' perceptions of self-efficacy was more reflective of their improved oral hygienic practices. In 1987, Wurtele and Maddux manipulated several components of the Protection Motivation Theory: threat (severity and susceptibility) and coping appraisal processes (response efficacy and self-efficacy). Wurtele and Maddux found young adults' perceptions of self-efficacy and susceptibility more related to protection motivation (intentions to use condoms in the prevention of AIDS/HIV) when compared to their perceptions of severity or response efficacy. Additionally, Robberson and Rogers (1988) examined the differential effects of exposing participants to negative or positive fear appeals on their protection motivation to adopt healthy behaviors. Robberson and Rogers found participants receiving negative messages, focusing on the consequences (severity) associated with failing to

perform the recommended behavior, reported more intent to engage in health promoting behaviors. Each of these examinations demonstrates the efficacy of the Protection Motivation Theory to predict protection motivation, especially, when the focus has been on manipulation of its threat appraisal components.

Despite the strengths of experimental designs, the primary weakness of these applications is demonstrated in the inconsistent measurement of the behaviors associated with protection motivation. Since examinations of protection motivation do not require the assessment of any subsequent behavior performance, this weakness will be addressed further in the following section covering the gaps in the literature.

Gaps in the Literature

The current body of literature focusing on applications of Protection Motivation Theory covers a wide range of health threats, outcome behaviors and target populations. Several gaps have been left in the literature indicating the need for further investigation. For example, much of the more recent PMT literature examining physical activity as a dependent variable focuses primarily on high risk, clinical populations (Plotnikoff, et al., 2009, 2010; Tulloch, et al., 2009). These types of applications give the implication that the PMT is more efficacious in terms of promotion of healthy behavior among individuals with a health problem rather than primary prevention. Since the PMT uses the arousal of fear to initiate the cognitive processes necessary for behavior modification, determining its effectiveness in health prevention applications needs further examination.

In PMT applications evaluating low risk or nonclinical populations, such as adolescents, the emphasis has typically been on risky behaviors (e.g., smoking cessation, safe sex practices). Applications of the PMT of this nature have demonstrated the efficacy of the PMT to

predict the adoption of healthy behaviors among young adults. Therefore the ability to apply the Protection Motivation Theory to increase subsequent physical activity behavior in populations with low levels of physical activity would ultimately fill an important gap in the health promotion literature.

In general, an obstacle to health promotion/prevention among younger, currently healthy individuals comes as a result of their existing perceptions of *invulnerability* to adverse health conditions. Consequently, these perceptions make accurate threat appraisal among these populations difficult (Forsythe, 1997; Greening, 1997; Mallis, 2003; Weikunart, et al., 2003; Wurtele & Maddux, 1987). Fortunately, a solution to the issue of invulnerability may lie in the operationalization technique used by Abraham and colleagues (1994). Abraham, et al., evaluated the perceptions of susceptibility of the adverse health condition in terms of either a personal or group affiliation. In so doing, Abraham, and colleagues were able to demonstrate that young adults were able to adequately evaluate the severity of a health threat by determining that their peers, who were much like themselves, suffered a high risk of the adverse health event. Further evaluation of this type of operationalization may prove to be effective in the design and implementation of health promoting interventions. This may be especially true for populations once considered resilient or difficult, thus filling a very important gap in the health promotion literature.

In conclusion, the current study seeks to fill the previously mentioned gaps in the literature and to expand the current PMT literature by: 1) targeting a younger, nonclinical population and 2) making several improvements to previous experimental designs which are described in greater detail below.

One limitation of previous studies is attributed to construct operationalization. The

current study addressed this weakness by operationalizing severity in terms of long and short-term effects, and susceptibility in terms of personal or group affiliation (Abraham, et al., 1994). Abraham and colleagues found adolescents' having higher perceptions of HIV severity tended to report lower levels of personal susceptibility despite their higher assessments of group susceptibility as measured as by their perceptions of their peers' susceptibility. This finding suggests that adolescents and younger adults find the groups in which they belong to be more susceptible to health threats than they are personally. And as a result, may be more inclined to adopt the behavioral changes because of their high risk group membership.

In addition, the current study developed stimulus materials based on the perceptions held by the target group. The purpose for developing stimuli using the perceptions of young adults was to increase the salience of the stimuli to the target population. More specifically, since the severity associated with obesity is linked primarily to obesity's long-term health effects, (e.g., diabetes, hypertension, and cancer) young people do not feel threatened because they are not focused on long-term effects. The idea of making current lifestyle changes for the purpose of warding off the possibility of a later life occurrence has little salience to younger, healthy populations. Unfortunately, by the time the relevance of making earlier lifestyle changes for the purpose of decreasing associated risks for the development of chronic disease is recognized, their window of opportunity for health prevention has closed. This demonstrates the rationale for determining the specific perceptions that younger adults hold concerning obesity for guiding the development of the stimulus materials. Therefore, after perceptions were identified, they were used to design stimuli containing salient messages to young adults and fill an additional gap in the applications of the PMT.

Another gap in the current PMT literature rests in the longitudinal assessments of the

Protection Motivation Theory. Many longitudinal applications have used prolonged follow-up periods or post-testing time frames ranging from 3 months to 1 year (12 months). Literature reviews focusing on other health promotion theories (i.e. Theory of Reasoned Action and Planned Behavior) support using much shorter initial follow-up periods, especially in applications examining physical activity as the dependent variable. Moreover, a meta-analysis focusing on studies using physical activity as a dependent variable indicate that more optimal initial follow-up periods generally range from 2 weeks to 2 months (Blue, 1995). As a result, multiple shorter follow-up time frames were used in the current study. In addition, the use of shorter, initial follow-up time frames accomplished the primary goal of accurate evaluation of the intention behavior relationship under the Protection Motivation paradigm. Accomplishing this goal fills a substantial gap in the PMT literature.

Another gap which the current study aimed to fill existed in the measurement of the behaviors associated with protection motivation. The purpose of the Protection Motivation Theory is to predict people's intentions to engage in a recommended behavior, unfortunately, a weakness in the design of the Protection Motivation Theory lies in its failure to evaluate individuals' current behaviors (Rhodes & Plotnikoff, 2005). More specifically, evaluating protection motivation without evaluating current behavior limits one's ability to completely assess the protection motivation and behavior relationship. In addition, failure to measure subsequent and current behavior also limits the ability to determine what factors are impacting the behavior modification. The current study will address this gap by evaluating the intention behavior relationship by measuring: 1) intention (protection motivation), 2) current behavior, and 3) subsequent behavior. Measuring the behaviors at three time points (Time 1, Time 2, and Time 3) provides a clearer, more accurate indication of *protection motivation* and its strength in the

prediction in subsequent behavior.

And finally, the current study aimed to build upon the existing body of PMT literature by evaluating the effect of combining an intention implementation plan intervention with PMT on participants' ability to adhere to their behavior intentions. Previous research supports the use of intention implementation plans as an inexpensive and practical method of enhancing the intentions initiated by PMT (Andersson & Moss, 2010; Gollwitzer, 1993, Milne, Sheeran, & Orbell, 2002). The rationale underlying the effectiveness of developing intention implementation plans is provided by the following explanation. Gollwitzer (1983) found that participants developing intention implementation plans were implicitly relying upon environmental cues to remind them of their behavior intentions. In determining the specific details of where, when and what behavior would be performed, reminders (such as time of day) trigger an automatic behavior response (Orbell, et al., 1997; Sheeran & Orbell, 1999). Moreover, studies using the development of intention implementation plans in conjunction with the Protection Motivation Theory (Milne, Orbell & Sheeran, 2002), or with an alternate form of motivational component (Anderson & Moss, 2011; Gollwitzer, 1993; Jackson, et al., 2005) conclude the use of forming intention implementation plans significantly increases the recommended behavioral effects.

In summary, in an effort to advance the existing body of PMT literature, the current study utilizes the following design implementations: 1) operationalization of severity (long-term and short-term) and susceptibility (personal and group), 2) fear arousal communications manipulating the threat appraisal constructs (short-term severity, long-term severity, personal susceptibility, and group susceptibility), 3) the inclusion of an intention implementation plan intervention, and 4) measurement of protection motivation current and subsequent behavior relationships. Prior to conducting the primary study, stimuli development was guided by the use

of focus groups. Once the preliminary phases were completed, the primary study was guided by the following hypotheses.

Hypotheses

A main effect of severity is hypothesized such that messages focusing on short-term obesity consequences will have a larger impact than messages focusing on long-term obesity consequences. As compared to participants who are told about long-term obesity consequences, those who are told about short-term obesity consequences are hypothesized to feel increased severity, susceptibility, fear and protection motivation and decreased response costs at Time 1 (baseline), Time 2 (two-week follow-up) and Time 3 (four-week follow-up). In addition, participants exposed to short-term severity fear arousal messages will also report having engaged in more physical activity at Time 2 and Time 3 as compared to participants receiving long-term severity messages. There are no main effects expected for the manipulation of severity on reports of self-efficacy or response efficacy at Time 1, Time 2 or Time 3.

A main effect of susceptibility is hypothesized such that messages focusing on personal susceptibility will have a larger impact than messages focusing on group susceptibility. As compared to participants who are told about group susceptibility, participants who receive personal susceptibility messages are hypothesized to feel increased severity, susceptibility, fear and protection motivation and decreased response costs at Time 1, Time 2 and Time 3. In addition, participants receiving personal susceptibility messages are hypothesized to report having engaged in more physical activity at Time 2 and Time 3 as compared to participants receiving personal susceptibility messages. There are no main effects expected for the manipulation of susceptibility on reports of self-efficacy or response efficacy at Time 1, 2, or 3.

A main effect of intention implementation plan is hypothesized such that messages

requesting participants to develop intention implementation plans will have a larger impact than messages not requiring participants to form intention implementation plans. As compared to participants not developing intention implementation plans (nonplanners), those developing intention implementation plans (planners) are hypothesized to feel increased fear, protection motivation, response efficacy, self-efficacy, and decreased response costs at Time 1, Time 2 and Time 3. In addition, planners are hypothesized to report having engaged in more physical activity at Time 2 and Time 3 as compared to nonplanners. There are no main effects expected for the manipulation of intention implementation plans on reports of severity or susceptibility at Time 1, Time 2 or Time 3.

There are two hypothesized interactions. The first interaction is between susceptibility and severity. It is hypothesized that participants receiving short-term obesity consequences group susceptibility messages will report a significant increase in protection motivation at Time 1, Time 2, and Time 3 as compared to all other groups. The second hypothesized interaction is between severity and ethnicity. It is hypothesized that African American and Hispanic females receiving short-term obesity consequences messages will report having engaged in less physical activity when compared to white, non-Hispanic females at Time 2 and Time 3. There were no other anticipated main effects or interactions for the secondary personal characteristics.

CHAPTER 2 - METHOD

The purpose of the current study was to examine the effects an obesity fear arousal communication would have on the protection motivation of young adult females in terms of increasing their levels of physical activity performance. The current study was conducted in 3 phases: 1) focus groups and stimulus material development, 2) piloting of full procedures and drafted measures, and 3) primary study. The purpose of the focus groups was to stimulate personal reflection from representatives of the target population and to identify common themes relating to the perceptions currently held by young adults regarding obesity and physical activity. The development of the stimulus materials was guided by the common themes identified in the focus group discussions.

Focus Groups

After receiving HIC approval (see Appendix A1) to conduct the focus groups, two sessions were conducted before discussions reached saturation. Participants were given two credits of research participation toward their enrolled Psychology course as incentive for participation.

Participants

Participants met in small groups ranging from 7-8 participants. A total of fifteen participants volunteered for the group discussions. One participant was excused from participating for being currently enrolled in the moderator's course. The majority ($n = 11$) of the participants were female and ranged in age from 18-28 years ($M = 21.8$, $SD = 3.1$). Forty-two percent ($n = 6$) were Caucasian, 28.6% ($n = 4$) were African American, and the remaining 28% were classified as Biracial ($n = 2$), Indian ($n = 1$) or other ($n = 1$). Thirty-five percent ($n = 5$) of the participants were class ranked as seniors, 28.6% ($n = 4$) were freshman, and the remaining

35% were either sophomores ($n = 3$) or juniors ($n = 2$). The weight, height and BMI characteristics for females in both groups combined were: 125-200 lbs ($M = 151.7$, $SD = 26.1$), 61-69 inches ($M = 65.1$, $SD = 2.9$), and 19.6-29.5/BMI ($M = 25.1$, $SD = 2.9$). The weight, height, and BMI for males in both groups combined were: 168-209 lbs ($M = 188.7$, $SD = 20.5$), 71-75 inches ($M = 73.7$, $SD = 2.3$), and 23.4-26.1/BMI ($M = 24.4$, $SD = 1.5$).

Recruitment

Participants for each focus group were recruited through the Psychology Department's participation pool (SONA). The Psychology department's SONA system is a database available to all undergraduate students enrolled in Psychology courses. SONA maintains an updated list of the currently approved and active research being conducted in Wayne State University's Psychology department. An advertisement briefly describing the current study as having the purpose of identifying the perceptions held by young adults toward obesity was posted on the SONA system's website (See Appendix A2). Young adults of either gender meeting the study's eligibility requirements (English speaking, Wayne State undergraduate students, between the ages of 18-30, and enrolled in SONA system) were invited to sign up for a session at the Psychology Department (Room 7203) for group discussions focusing on the perceptions of obesity held by young adults.

Procedure

Upon arrival, participants were greeted by the author and another graduate student, who acted as the moderator for the group discussions. The moderator distributed the IRB required information sheet (See Appendix A3). The information sheet provided information detailing the purpose of the focus group and the procedure to be followed. Additional items such as benefits and costs, associated risks, compensation for participation, and the procedure for maintaining

confidentiality were described.

Once participants completed the consent process and agreed to participate, permission to audiotape the session was granted. In an effort to capture as much variance in the responses as possible and also due to the potential bias of dominating participants in focus group discussions, each participant completed a brief demographic data sheet and preliminary PMT questionnaire (see Appendix B1/B2). The PMT questionnaire basically contained the same questions that were discussed in the focus group sessions. The purpose for administering the questionnaire in advance was twofold: 1) collect unbiased data, and 2) provide participants the opportunity to consider and formulate responses to the issues in advance. This process was followed in an effort to enhance participants' willingness to openly express their views once given the opportunity to consider them in advance.

Prior to the beginning of any recorded group discussion, the moderator read a set of instructions to the participants that were to be followed during the discussion process. During the instructional segment, participants were advised to exercise extreme caution in concealing all personal identities. Participants were instructed that the questions they would be asked would be framed in terms of "how people like you" or "young adults"... Participants were further instructed to respond to each question in like manner by answering "people like me" or "young adults". A copy of the instructional sheet is located in Appendix B3. After the instructions were read, and any questions arising from their reading were answered, the recorder equipment was turned on and the actual focus group discussion began. After the group discussions were completed, participants were asked to share any additional information prompted by the group discussions. Once this final effort to gain any additional information was completed, participants were thanked for their participation and permitted to leave. The complete focus group process

beginning with participants' arrival until the point participants were thanked and permitted to leave lasted approximately 45-60 minutes.

Following each focus group session, the data from the audiotape was transcribed without including any indentifying information and the audiotape was destroyed. The transcripts from both focus groups sessions were coded thematically and the emerging themes were used to develop the stimulus materials.

Stimulus items designed to investigate the issues of obesity and physical activity needed to be developed because there has been so little focus on obesity prevention among young adults. And as a result, the availability of efficacious measures for addressing obesity prevention in this particular target group is limited. In addition, given that young adults face different issues than individuals in other developmental stages, the creation of stimulus items tailored to the specific population is appropriate and desirable.

Stimulus Material Development

Physical Activity. Physical activity is the primary behavior of interest in this study. Several measures including: the 7-day activity recall (Blair, Haskell, Ho, Paffenbarger, Vranizan, Farquhar, & Wood, 1985), the Baecke Habitual Physical Activity Scale (Baecke, Burema, & Frijters, 1982), and the Godin Leisure Time Scale (Godin & Shephard, 1985) were considered to measure physical activity. This study operationalized physical activity as moderate intensity activity; therefore, each measure was evaluated based on its ability to measure physical activity in this manner. As a result, given that the Godin Leisure Time Scale (Godin, et al) measures leisure time activities, this scale was eliminated from any further consideration. Blair's 7-day activity recall (Blair, et al.) and the Baecke Habitual Physical Activity Scale

(Baecke, et al.) were considered impractical for use in an online study; therefore both measures were eliminated from further consideration as well.

Milne, Sheeran and Orbell (2002) examined physical activity among college students using the Protection Motivation Theory which assessed physical activity by providing participants with a brief definition of physical activity. This definition was then followed by an instruction to their participants to report their performance of physical activity according to the definition provided. Milne, et al., defined physical activity as an exercise session at least 20 minutes in length and intense enough to cause a noticeable increase in heart rate, i.e. a pounding sensation. The method of measurement used by Milne, et al., seemed practical for online study use and as a result was modified by use in the current study in the following manner: “Physical activity is defined as 30 minutes of moderate intensity activity. Moderate intensity activities are those activities where you experience an increase in heart rate and breathing, but find it possible to speak comfortably.” Participants were then instructed to report the number of days they had engaged in physical activity according to this description within the past 30 days at Time 1 and within the past 14 days at Time 2 and Time 3. As a result, physical activity was measured by the 1-item self-report response given based on the instructions provided.

Obesity Fear Arousal. A stimulus item with the purpose of arousing obesity fear was developed. Research in the area of fear arousal communication suggests that effective communications include both the introduction of a threat and a means of reducing the threat (Witte & Allen, 2000). In the event the fear arousal communication is being delivered via written communication, then these important guidelines should be followed: 1) the length of the text should remain consistent across manipulations, 2) the level of reading should be the same in each manipulation, and 3) the wording style should remain constant among manipulations as well.

Therefore, the aforementioned guidelines were used to develop the initial set of fear arousal communications (See Appendix C1).

As a result of the focus groups, it was established that young adults had received the health messages and had a keen awareness of the long-term negative effects of obesity. Yet, despite this awareness, levels of physical activity among this group were continuing to decline, providing support for the need for more salient messages for this particular age group. This being the case, the initial fear arousal communications developed for this study focusing on providing information regarding the long-term health consequences of obesity offered minimal salience to young adults rendering them ineffective. Young adults were quite clear in stating the various social consequences of obesity, such as unattractiveness to the opposite sex, employment discrimination, and ostracism in social settings. In their responses, young adults were very clear in communicating their fear to these consequences in respect to the long-term health consequences associated with obesity. Given that the social consequences associated with obesity were indicated as arousing more obesity fear among young adults, the fear arousal communications were revised accordingly (see Appendix C2). After the fear arousal communications were revised to be more reflective of the perceptions held by the target population, the development of the protection motivation theory measure began.

Protection Motivation. The current study focused on using the PMT theoretical framework. Therefore, preliminary questionnaires with the purpose of evaluating the current obesity perceptions of young adults in terms of threat and coping response appraisals were designed. The initial design process begin by basically defining the constructs of the Protection Motivation Theory (severity, susceptibility, fear, response efficacy, self-efficacy, response costs, and protection motivation) as set forth in its theoretical framework (Rogers, 1975; 1983) (see

Appendix C3). After defining the constructs, a preliminary 45 item pool was generated. This item pool was generated through an informal verbal probing process that came from having informal conversations focusing on the perceptions of obesity and physical activity with representative members of the target population. Once the final item pool was developed, the items were categorized according to the PMT constructs they were designed to measure (Milne, Sheeran, & Orbell, 2002). This final revision resulted in an 87 item pool measuring severity (30 items), susceptibility (30 items), obesity fear (frightening, anxious, worried, scared, tense, nauseous or uncomfortable) (7 items), response efficacy (8 items), self-efficacy (10 items) and behavior intentions/protection motivation (2 items) (see Appendix C4).

Intention Implementation Plan. The primary goal behind developing the intention implementation plan stimulus item was to create a communication that focused on conveying the message that the formulation of a plan detailing the process one intends to follow to facilitate adhering to an intended behavior generally helps to ensure the subsequent performance of the behavior. Once the intention implementation plan stimulus item was completed, a paragraph using the same principles regarding fear arousal communications in terms of word length and style, but with a focus completely nonspecific to obesity and physical activity was developed to act as the control condition (see Appendix C5). After the stimulus materials were developed, a pilot of the study's procedure using the drafted measures was conducted.

Pilot

After receiving HIC approval (see Appendix A4), the following procedure was followed. Participants were recruited through an advertisement in the SONA system briefly describing the study and its eligibility requirements (see Appendix A5). The purpose of this advertisement was to notify participants enrolled in the participant pool that the study entitled "Women's Exercise

Plans” Part 1 study was active. Individuals expressing an interest viewed an information sheet (see Appendix A6) explaining their rights as participants in the current study, including the right to withdraw their participation at any time during the process. In addition, the information sheet also stated that participants could refuse to respond to any or all questions. Consent was given by beginning the online study. Participants were given .5 course credits for completing each of the three time points in the study, for 1.5 total possible credits.

Design

This study employed a 2 x 2 x 2 factorial design to assess the effects of 3 between-subject variables: Severity (short vs. long-term), Susceptibility (personal vs. group), and Intention Implementation Plan (yes vs. no). The factorial manipulation was accomplished by the presentation of eight different fear arousal communications.

Procedure

After receiving the information sheet, participants were randomized into one of the eight conditions according to the version of the study available at their time of participation. After randomization, each participant completed the baseline information which consisted of a demographic sheet, a self-report of the number of days of physical activity performance during the past 30 days, and a 6 item-Likert-scale generalized fear assessment (see Appendix D1/D2).

Each of the eight experimental conditions consisted of reading a short obesity fear arousal essay, containing manipulations of obesity severity (short-term or long-term), susceptibility (personal or group) and intention implementation plan (yes or no). Treatment conditions with short-term severity focused on the short-term consequences of obesity including fewer dates, limited mobility, and fewer employment opportunities (see Appendix D3). Treatment conditions, with long-term obesity consequences focused on fewer marriage

opportunities, chronic illness, and lower socioeconomic status. In addition, personal susceptibility messages focused on the participant's personal appraisal of their susceptibility to developing obesity and group susceptibility messages focused on the target group's (e.g. college women) susceptibility to the development of obesity. Finally, the intention implementation plan condition encouraged participants to formulate their plan. Once participants completed reading the essays, those required to complete intention implementation plans were instructed to do so.

After reading the scenario, each participant was instructed to complete the PMT questionnaire (see Appendix D4). After completing the study, participants were sent a reminder email using their SONA system login information asking them to return to the SONA system in 2 weeks to complete Part 2 of the study. This process was repeated at Time 2. At the end of Time 3, all participants were sent a debriefing statement (see Appendix D5) and data collection was closed.

Primary Study

The procedure for the primary study followed the same procedure outlined in the pilot study.

Data Analyses

At the end of the data collection period, the data for each time point were downloaded from the SONA system and exported into an EXCEL file. After the 8 versions of part 1 were linked, three datasets were created representing each collection point (Time 1, Time 2, and Time 3). After the datasets were created according to time point, the data were linked into 2 sets linking Time 1 with Time 2, and an additional data set linking all three time points. After datasets were linked, all identifying variables were removed and the data were cleaned by checking for missing values, outliers and normality. Once data were cleaned, scales were

developed to measure the dependent variables, and the independent variables were coded from the version number. Time 1 data was analyzed using a series of 2 (severity) x 2 (susceptibility) x 2 (intention implementation plan) between subjects ANOVA, $p \leq .05$. At each subsequent time point (Time 2 and Time 3) the same process was repeated. At Time 1 and Time 2, and again for Time 1, Time 2 and Time 3, data were analyzed using a series of 2 (severity) x 2 (susceptibility) x 2 (intention implementation plan) x 2 (time) and 2 (severity) x 2 (susceptibility) x 2 (intention implementation plan) x 3 (time) within-subjects repeated measures ANOVA, $p \leq .05$. The secondary data analysis consisted of performing multiple linear and stepwise regression analyses, $p \leq .05$.

CHAPTER 3 - RESULTS

There were fourteen participants in the focus group discussions. These discussions resulted in the identification of several obesity and physical activity perceptions that were categorized into themes focusing on either obesity (susceptibility, severity, health risks) or physical activity (benefits and barriers) (see Table 1, Appendix E).

Several themes regarding obesity and physical activity emerged from the focus group discussions. Therefore it is concluded that young adults are very perceptive in terms of both obesity and physical activity and have a keen awareness regarding the relationships between them. More specifically, the focus group discussions revealed that young adults tend to agree that obesity is a major concern having both health and social consequences and that physical activity is a viable method for the prevention of obesity.

The focus groups also revealed that young adults tend to have accurate perceptions regarding the factors responsible for increasing obesity risk. For example, when young adults were asked to identify the risks for developing obesity, several identified factors such as family history and unhealthy diets and lifestyles. Others identified factors such as the lack of nutritional information, or obesity information pertaining to risks, lower socio-economic status and peer involvement, especially in relation to meal choice determinations. Although young adults' perceptions tended to vary on which factors increase obesity risk, they were all in agreement when it came to the role significant decreases in physical activity played in increasing obesity risk.

Further, when were asked to identify the consequences associated with obesity, many young adults identified several health consequences, but the majority of them placed special emphasis on the social consequences associated with obesity such as the difficulties in pursuing

both short and long-term romantic relationships, lack of employment opportunities, and involvement in an active social life.

Moreover, when young adults were asked to identify methods for the prevention of obesity, many feel that aside from increased physical activity, the responsibility for the prevention of obesity rests primarily with parents and should begin during early childhood. Several young adults feel that parents should assume more responsibility in determining both dietary and physical activity habits of children during early childhood and adolescence, and that a more active role should be taken by parents in the maintenance of these habits.

In addition, these young adults stated that motivation to modify current unhealthy lifestyle behaviors occurred for either one of two reasons. The first reason, endorsed by young adult females in particular, is due to the awareness of weight gain. Unfortunately, many young adults agree, that when attempts to lose weight fail, many young adults tend to accept the weight gain. Consequently, once this acceptance takes place, young adults find that it becomes increasingly difficult to initiate any subsequent weight loss attempts. The second reason young adults decide to modify current unhealthy lifestyle habits are due to the experience of severe direct or indirect adverse events. For example, one young adult female stated how she personally became motivated to lose weight after witnessing the death of an overweight family member and observing the difficulties the emergency response team had in removing the body from the home. The lessons revealed during these focus group discussions are important because they not only give insight to the perceptions young adults hold regarding obesity but they provide insight into the methods they perceive as being efficacious in the prevention of obesity as well.

Pilot Study

The rationale for conducting a pilot was to detect and correct any methodological issues prior to conducting the primary study. As a result several issues were identified. A total of 88 participants completed the pilot study. The first issue identified was the inability of the SONA system to randomize participants. The current study had 8 experimental conditions (Short-term Severity, Personal Susceptibility, Intention Implementation Plan (yes), Long-term Severity, Personal Susceptibility, Intention Implementation Plan (yes), Short-term Severity, Group Susceptibility, Intention Implementation Plan (yes), Intention, Implementation Plan (yes), Short-term Severity, Personal Susceptibility, Intention Implementation Plan (no), Long-term Severity, Personal Susceptibility, Intention Implementation Plan (no), Short-term Severity, Group Susceptibility, Intention Long-term, Group Susceptibility, Implementation Plan (no), Long-term, Group Susceptibility, Intention, Implementation Plan (no)). Randomization was accomplished by the development of 8 versions of part 1 of the study, with each version representing 1 of the 8 treatment conditions.

After uploading each of the 8 versions, and participation began, problems with counterbalancing occurred. Thus in the primary study, the problem of counterbalancing was resolved by closely monitoring the number of slots open for participation across conditions. Given that the goal was to have 20 participants in each condition, an initial 5 slots were made available for each version. Participation was reviewed daily and slots available for participation were adjusted accordingly. For example, upon the end of the day review (6:00PM), conditions 3, 6, 7, had fewer participants, than conditions (1, 2, 4, 5, and 8) conditions, 3, 6, 7 would remain open, and the remaining conditions would be closed. Participation status was checked daily and this process of monitoring was continued until each condition had 20 participants.

After the data collection period closed for Part 1, hereafter referred to as Time 1, the data

was retrieved from the SONA system and reviewed. The data review uncovered two additional procedural concerns: 1) the data sets could not be properly linked due to a problem of incongruency, and 2) there was a lack of clarity in several items on the Protection Motivation Questionnaire. The issue of incongruency was resolved by the addition of a filler question (“How many Tuesdays will there be in the next two weeks?”) for participants in the Intention Implementation Plan (no) treatment condition. The inclusion of this filler question added an additional data field to the data collected from participants not required to develop an Intention Implementation Plan.

The problem of ambiguity in several items on the Protection Motivation Questionnaire was resolved by revising the Protection Motivation Questionnaire. The overall design of the Protection Motivation Questionnaire lacked clarity because many of the questions were framed in the following manner: “Performing regular physical activity by engaging in at least 30 minutes of moderate activity at least once a week and doing so for at least 3-5 times a week is a good way of reducing the risk of developing obesity.” To decrease the ambiguity within this question, it was divided into 2 questions with one question focused on the frequency of the performance of physical activity at least once a week, and the second question focused on the performance of physical activity for 3-5 times a week. The participants answered each question twice with the only difference being the frequency of physical activity (once a week or 3-5 times a week). The revised Protection Motivation Questionnaire (see Appendix D6) was submitted to the Human Investigations Committee for review. After approval from the Internal Review Board (see Appendix A7), the appropriate revisions to the study were made and the study was reactivated for data collection.

Primary Study

Once datasets were linked, 3 variables were reverse coded (Sev2, SE1low and SE1high). Data were checked for normality. There were 24 variables, each having a range of either 3 or 4. The means and standard deviations of the variables ranged from 1.85 - 4.5 (.64 - 1.24). One variable (RE1) had a skew >2 . After combining this variable to form the Response Efficacy Scale, the skew for the scale was -1.09. After evaluating the measures of central tendency and variability, data were determined to be normally distributed.

Missing Data

For Time 1, Time 2 and Time 3, missing data were handled in the following manner. For items used in the development of scales having 3 or more items, missing values was replaced by the participant's average score as calculated by the available responses. For missing values on scales having fewer than 3 items, missing values were replaced with the average score for the particular item. Finally, in cases where 20% or more of the data were missing, these cases were deleted from any further analyses. This resulted in the deletion 6 cases (1 at Time 1, 4 at Time 2, and 1 at Time 3).

Response Rate

A total of 256 young adult female college students completed part 1 of the study. As noted above, one case was deleted for having more than 20% of the data missing. An additional six (2%) cases were deleted for exceeding the 18-30 year age range eligibility requirement, and an additional 78 (30%) cases were deleted for failure to meet the minimum BMI requirement ($BMI \geq 25$). The remaining 171 participants were eligible for participation at Time 1 for a response rate of 66.8%.

Sample Demographics (Pre-Attrition, $N=171$)

The age range for participants completing Time 1 was between 18 and 30 ($M = 21.4$, SD

= 2.7). The average BMI for participants was 31.00 ($SD = 6.68$) with a range of 25.0 – 63.8. Approximately 47% of participants were Caucasian ($n = 80$), 32.2% ($n = 55$) were African American and an additional 12.3% ($n = 21$) were Asian. The remaining 9% of participants were either Hispanic ($n = 2$) or classified themselves as other ($n = 13$). Thirty-one percent of the participants were seniors ($n = 53$), an additional 26.3% were freshman ($n = 45$), 21.6% were juniors ($n = 37$), and the remaining 21% were either sophomores ($n = 31$) or responded as other ($n = 5$).

One hundred and seventy one eligible participants completed Time 1. A total of 137 participants completed Time 2 for an attrition rate of 20%. At Time 3, a total 87 participants completed all three data collection periods for an overall attrition rate of 49%. Paired Samples-*t*-tests were conducted to determine the differences in participants completing the study and those failing to return at each time points. Results indicate there were no significant differences between participants completing Time 1 and 2 and participants completing Time 1 only (see Table 2, Appendix E) or between participants completing Times 1, 2 and 3, and participants completing Time 2 only (see Table 3, Appendix E).

Final Sample Demographics (Post Attrition, $N = 87$)

Participants were on average 21 years of age ($M = 21.38$, $SD = 2.6$). The average BMI for participants was 31.64 ($SD = 6.77$) with a range of 25.0 – 56.89. Approximately thirty-seven percent of participants were Caucasian ($n = 32$), 34.5% ($n = 30$) were African American and an additional 18.4% ($n = 16$) were Asian. The remaining 10.3% of participants classified themselves as other ($n = 9$). Thirty-two percent of the participants were seniors ($n = 28$), an additional 27.6% were freshman ($n = 24$), 17.2% were juniors ($n = 15$), and the remaining 22.9% were either sophomores ($n = 17$) or other ($n = 3$).

Scale Development

Obesity Severity. Two items on the Protection Motivation Questionnaire were used to evaluate participants' perceptions of obesity severity. Participants reported their level of agreement to the following items: 1) "If I were to develop obesity, I would suffer a lot of discomfort", and 2) "Developing obesity would be unlikely to cause me to die prematurely". Each item on the Protection Motivation Questionnaire used the following scale for scoring unless otherwise indicated: 1=strongly disagree, 2=disagree, 3=neutral (neither disagree/nor agree), 4=agree, and 5=strongly agree. After item 2 was reverse coded, a Pearson r Correlation coefficient was computed to determine the strength of the relationship between the two variables. The items designed to measure obesity severity were not significantly correlated at Time 1, $r(171) = .133, p = .09$, Time 2, $r(137) = .07, p = .40$ or Time 3, $r(87) = .148, p = .17$. Since the two items were not measuring the same trait (obesity severity), no scale was formed, and obesity severity was assessed using the single item: "If I were to develop obesity, I would suffer a lot of discomfort". This item was selected because it was phrased more clearly and was significantly correlated with the Fear Scale (See Table 4, Appendix E).

Obesity Susceptibility Scale. Two items on the Protection Motivation Questionnaire were used to evaluate participants' perceptions of obesity susceptibility: 1) "If I continue to perform physical activity at the level I do now, my chances of developing obesity in the future are low" (SUS1), and 2) "If I continue to perform physical activity at the level I do now, I am unlikely to develop obesity in the future" (SUS2). Both of these items were scored using the same Likert scale described above. These items were significantly related at the $p < .01$ level at Time 1, $r(85) = .67$, Time 2, $r(85) = .86$, and Time 3, $r(85) = .58$, indicating a consistent relationship between variables across time. The Obesity Susceptibility scale was formed by averaging the

participants' scores for these 2 items. The internal consistency for the Susceptibility Scale at Time 1 was .81. The test-retest reliability of the Obesity Susceptibility scale was moderately high, $r(85) = .62, p < .01$ at Time 2 and $r(85) = .53, p < .01$ at Time 3.

Fear Scale. Four items on the Protection Motivation Questionnaire were used to assess obesity fear. Participants were instructed to respond to the statement: 1) "The thought of developing obesity makes me feel: 1) frightened, 2) anxious, 3) worried, and 4) scared". The four items were significantly correlated at Time 1, Time 2 and Time 3 (see Table 5, Appendix E) and were combined to form the Fear Scale. The internal consistency of the Fear scale was .88 for Time 1. The test-retest reliability for the Fear Scale was high, $r(85) = .81, p < .01$ at Time 2 and $r(85) = .51, p < .01$ at Time 3.

Response Efficacy. Eight Likert-scale items were used to measure participants' perceptions of response efficacy on the Protection Motivation Questionnaire: 1) "Performing regular physical activity by engaging in at least 30 minutes of moderate activity at least once a week is a good way of reducing the risk of obesity", 2) "Engaging in at least one 30 minute session of moderate exercise at least once a week could lessen one's chances of developing obesity", 3) "Taking at least one 30 minute session of moderate physical activity for the next week would be easy for me", 4) "The benefits of taking at least one 30 minute session of moderate physical activity would outweigh the costs", 5) "Performing regular physical activity by engaging in at least 30 minutes of moderate activity for at least 3-5 times a week is a good way of reducing the risk of obesity", 6) "Engaging in at least one 30 minute session of moderate exercise at least 3-5 times a week could lessen one's chances of developing obesity", 7) "Taking at least one 30 minute session of moderate physical activity at least 3-5 times for the next week would be easy for me", and 8) "The benefits of taking at least one 30 minute session of moderate

physical activity for at least 3-5 times a week would outweigh the costs.” Each question was answered using the previously mentioned response scale. As can be seen in Table 6 (Appendix E), two of the items were not significantly correlated with the others. As a result, the Response Efficacy Scale was developed by averaging the participant scores across the 6 significantly correlated items, yielding a Cronbach’s $\alpha = .83$ for Time 1. The 2 items that were not included in the development of scale were RE4low and RE4High. The test-retest reliability of the Response Efficacy Scale was moderately high, $r(85) = .64, p < .01$ at Time 2 and $r(85) = .67, p < .01$ at Time 3.

Self-efficacy. Self-efficacy was measured using 4 items on the Protection Motivation Questionnaire: 1) “I am discouraged from taking at least one 30-minute session of moderate physical activity during the next week because I feel unable to do so”, 2) “I feel confident in my ability to partake in at least one 30-minute session of moderate physical activity during the next week, 3) “I am discouraged from taking at least one 30-minute session of moderate physical activity for 3-5 times during the next week because I feel unable to do so”, 4) “I feel confident in my ability to partake in at least 30-minute session of moderate physical activity for 3-5 times during the next week”. Items 1 and 3 were reverse coded. The correlations between the 4 items were significant across all 3 time points; therefore, the self-efficacy scale was developed by combining all 4 variables, and taking the average score (see table 7, Appendix E). The test-retest reliability of the Self-Efficacy Scale was high, $r(85) = .74, p < .01$ at Time 2 and $r(85) = .72, p < .01$ at Time 3.

Response Costs. Response Costs were measured using 6 items on the Protection Motivation Questionnaire: 1) “Taking at least one 30-minute session of moderate physical activity at least once during next week would cause me too many problems”, 2) “I would be

discouraged from taking at least one 30-minute session of moderate physical activity at least once a week would take too much time”, 3) “I would be discouraged from taking at least one session of moderate physical activity at least once a week during the next week because I feel silly doing so”, 4) “Taking at least one 30-minute session of moderate physical activity 3-5 times a week during next week would cause me too many problems”, 5) “I would be discouraged from taking at least one 30-minute session of moderate physical activity at least 3-5 times a week would take too much time”, 6) “I would be discouraged from taking at least one session of moderate physical activity at least 3-5 times during the next week because I feel silly doing so”. All 6 items were significantly related (see table 8, Appendix E) and were combined to form the Response Costs Scale. The Cronbach’s $\alpha = .93$ for the Response Costs Scale at Time 1. The test-retest reliability of the Response Cost Scale was high, $r(85) = .76, p < .01$ at Time 2 and $r(85) = .78, p < .01$ at Time 3.

Protection Motivation Scale. Protection Motivation was measured using 2 items on the Protection Motivation Questionnaire: 1) “I intend to partake in at least one 30- minute session of moderate physical activity (e.g. sport, swimming, aerobics, dancing, running or walking briskly) and doing for at least once a week during the next 2 weeks”, and 2) “I intend to partake in at least one 30-minute session of moderate physical activity (e.g. sport, swimming, aerobics, dancing, running or walking briskly) and doing so for at least 3-5 times a week during the next 2 weeks”. Both items were significantly related at Time 1, $r(85) = .60, p < .01$, Time 2, $r(85) = .73, p < .01$, and Time 3, $r(85) = .71, p < .01$ and were combined forming the Protection Motivation Scale. The Cronbach’s $\alpha = .74$ for the Protection Motivation Scale at Time 1. The test-retest reliability of the Response Cost Scale was moderately high at Time 2, $r(85) = .76, p < .01$ and Time 3, $r(85) = .54, p < .01$.

Physical Activity (PMT). The actual amount of physical activity participants intended to perform over the next 2 weeks was measured by the use of a single open ended item (“I intend to engage in 30 minutes of moderate physical activity _____ days during the next 2 weeks”). Participants were instructed to respond with a number from 0-14.

Results

A 2 x 2 x 2 ANOVA (Severity x Susceptibility x Intention Implementation Plan) was performed for each dependent variable (severity, susceptibility, fear, response efficacy, self-efficacy, response costs, protection motivation, and physical activity intentions/protection motivation) at Time 1, Time 2, and Time 3. A later section discusses the within-subject analyses including time as an independent variable.

Severity Main Effects

There was a marginally significant main effect of Severity on participants’ perceptions of susceptibility, $F(1, 79) = 3.66, p = .06, \text{partial } \eta^2 = .04$, such that participants receiving obesity fear arousal communications with Short-term Severity messages ($M = 3.35, SD = 1.08$) reported feeling more susceptible to developing obesity than participants receiving Long-term Severity messages ($M = 2.90, SD = 1.15$) at Time 1. There were no other significant main effects of Severity on any of the remaining dependent variables for Time 1, Time 2 or Time 3 (see Tables 9 and 10, Appendix E).

Susceptibility Main Effects

There were no significant main effects of the Personal or Group conditions of Susceptibility on any of the dependent variables at Time 1, Time 2 or Time 3 (see Tables 11 and 12, Appendix E).

Intention Implementation Plan Main Effects

There was a significant main effect of Intention Implementation Plan on participants' reports of susceptibility, $F(1, 79) = 5.01, p = .03, \text{partial } \eta^2 = .06$ at Time 2, such that participants forming Intention Implementation Plans (planners) ($M = 3.59, SD = 1.10$) reported feeling more risk for the development of obesity than participants who did not develop Intention Implementation Plans (nonplanners) ($M = 3.04, SD = 1.13$).

There was a significant main effect for Intention Implementation Plan for participants' reports of protection motivation, $F(1, 79) = 6.37, p = .01, \text{partial } \eta^2 = .08$ at Time 2. This main effect is discussed below in the context of a related interaction effect. There were no other significant main effects of Intention Implementation Plan on any other dependent variables at Time 1, Time 2 or Time 3 (see Tables 13 and 14, Appendix E).

Interactions between Severity, Susceptibility, and Intention Implementation Plans

There was a significant 2-way interaction of Severity x Susceptibility on self-efficacy at Time 2, $F(1, 79) = 4.75, p = .03, \eta^2 = .06$. Figure 2 (Appendix F) demonstrates that participants receiving Group Susceptibility and Short-term Severity messages reported significantly more self-efficacy at Time 2 ($M = 4.43, SD = .26$) than participants receiving Personal Susceptibility messages ($M = 3.69, SD = .31$). There were no other significant interactions for Susceptibility x Severity on any other dependent variables at Time 1, Time 2 or Time 3 (see Tables 15 and 16, Appendix E).

There were no significant 2-way interactions of Severity x Intention Implementation Plan on any of the protection motivation outcomes at Time 1, Time 2, or Time 3 (see Tables 17 and 18, Appendix E).

There was a significant 2-way interaction of Susceptibility x Intention Implementation Plan on protection motivation at Time 2, $F(1, 79) = 3.92, p = .05, \eta^2 = .05$. Figure 3 (Appendix

F) demonstrates that planners receiving Personal Susceptibility messages reported significantly more protection motivation ($M = 4.44$, $SD = .48$) than nonplanners receiving Personal Susceptibility messages ($M = 3.67$, $SD = 1.14$). There were no other significant interactions for Susceptibility x Intention Implementation Plans on any other dependent variables at Time 1, Time 2 or Time 3 (see Tables 19 and 20, Appendix E).

There was a significant 3 way-interaction of Severity x Susceptibility x Intention Implementation Plans on participants' reports of self-efficacy, $F(1, 79) = 5.37$, $p = .02$, partial $\eta^2 = .06$ at Time 1. Simple effects for the interaction were determined by performing a series of one-way ANOVAs comparing the effects of each factor while holding one level of the factor constant. In this manner, a significant simple effect was observed such that planners ($M = 4.32$, $SD = .63$) receiving Short-term Severity and Group Susceptibility messages reported significantly more self-efficacy, $F(1, 22) = 8.82$, $p = .01$, when compared to nonplanners ($M = 3.65$, $SD = .62$) receiving Short-term Severity and Group Susceptibility messages (See figures 4 and 5 in Appendix F). There were no other significant interactions of Severity x Susceptibility x Intention Implementation Plans on any of the remaining dependent variables at Time 1, Time 2 or Time 3 (see Tables 21 and 22 in Appendix E).

Time Effects

A series of $2 \times 2 \times 2 \times 2$ and $2 \times 2 \times 2 \times 3$ repeated measures within subject ANOVAs (Severity x Susceptibility x Intention Implementation Plan x Time) were performed for each dependent variable (severity, susceptibility, fear, response efficacy, self-efficacy, response costs, protection motivation, and physical activity intentions/protection motivation).

There was a significant main effect of Time on participants' perceptions of susceptibility, such that participants' perceptions of susceptibility were significantly different across time, $F(1,$

79) = 8.69, $p = .01$, partial $\eta^2 = .10$. Dependent samples t - tests were conducted to determine which time period differed from the others. The results indicate that participants' perceptions of susceptibility to the development of obesity were significantly higher at Time 3 ($M = 3.52$, $SD = 1.03$), $t(86) = -3.50$, $p < .01$, when compared to Time 1 ($M = 3.13$, $SD = 1.13$) (see figure 6 in Appendix F).

There was a significant main effect of Time for participants' reports of response costs, $F(1, 79) = 4.12$, $p = .02$, partial $\eta^2 = .05$, such that participants' perceptions of response costs toward the performance of physical activity was significantly lower at Time 3 ($M = 1.89$, $SD = .88$), $t(86) = 2.42$, $p < .02$ and Time 1, ($M = 2.07$, $SD = 1.03$), $t(86) = -3.50$, $p < .01$. There were no significant main effects of Time on the perceptions of response costs toward the performance of physical activity at Time 1 and Time 2, $t(86) = -.21$, $p < .84$ (see figure 7 in Appendix F).

There was a significant main effect of Time on participants' reports of physical activity intentions/protection motivation, $F(1,79) = 3.45$, $p = .03$, partial $\eta^2 = .04$ at Time 3, such that participants' protection motivation toward the performance of physical activity was significantly higher at Time 3 ($M = 7.58$, $SD = 3.85$), $t(86) = -2.34$, $p = .02$ and Time 1 ($M = 6.71$, $SD = 3.75$). There were no significant main effects of Time on the physical activity intentions/protection motivation at Time 1 and Time 2 ($M = 7.14$, $SD = 3.79$), $t(86) = -1.51$, $p = .14$, and Time 2 and Time 3, $t(86) = -1.53$, $p = .13$ (see Figure 8, Appendix F). There were no other significant main effects of Time on any other dependent variables at Time 1, Time 2 or Time 3 (see Table 23, Appendix E).

As can be seen in Tables 24 and 25 (Appendix E), there were no significant 2-way interaction effects of Time x Severity or Time x Susceptibility on any of the protection motivation outcomes at Time 1, Time 2, or Time 3.

There was a significant 2-way interaction effect of Time x Intention Implementation Plan for participants' reports of protection motivation at Time 2, $F(1, 79) = 5.19, p = .03$, partial $\eta^2 = .062$ at Time 2. Planners reported higher levels of protection motivation at Time 2 ($M = 4.35$, $SEM = .13$) when compared to planners' reports of protection motivation at Time 1 ($M = 4.30$, $SEM = .12$). The pattern of planners reporting higher levels of protection motivation was consistent over time in this sample (see Figure 9, Appendix F). There were no other significant interaction effects of Time x Intention Implementation Plan on any of the remaining dependent variables at Time 2 or Time 3 (see Table 26 in Appendix E).

There was a significant 3-way interaction effect of Time x Severity x Susceptibility on participants' perceptions of self-efficacy, $F(1, 79) = 6.28, p = .01$, partial $\eta^2 = .07$ at Time 2 and $F(1, 79) = 5.07, p = .01$, partial $\eta^2 = .06$ at Time 3 (see Figures 2 and 10, Appendix F). There were no other significant interaction effects of Time x Severity x Susceptibility on any of the remaining dependent variables at Time 2 or Time 3 (see Table 27 in Appendix E).

There was a 3-way interaction for Time x Severity x Intention Implementation Plan on participants' perceptions of susceptibility, $F(1,79) = 3.93, p = .02, \eta^2 = .047$. Simple effects analyses revealed a significant simple effect for susceptibility, $F(1,44) = 6.10, p = .01$, such that non-planners reported feeling more susceptibility at Time 1, (see figure 11, Appendix F). There were no other significant interaction effects for Time x Susceptibility x Intention Implementation Plan at Time 2 or Time 3 (see Table 28 in Appendix E).

There was a 3-way interaction for Time x Susceptibility x Intention Implementation Plan on participants' perceptions of susceptibility, $F(1, 79) = 4.12, p = .02, \eta^2 = .05$. Simple effects analyses revealed a significant simple effect for susceptibility, $F(1, 47) = 6.44, p = .01$, for planners ($M = 3.80, SD = 1.03$) receiving Group Susceptibility messages at Time 2 reported

more perceptions of susceptibility, when compared to nonplanners ($M = 3.00$, $SD = 1.15$), (see figure 12, Appendix F). There were no other significant interaction effects for Time x Susceptibility x Intention Implementation Plan at Time 2 or Time 3 (see Table 29 in Appendix E).

There was a significant 4-way interaction of Time x Severity x Susceptibility x Intention Implementation Plan on fear, $F(1, 79) = 5.19$, $p = .03$, partial $\eta^2 = .062$. The simple effects analysis revealed a significant simple effect with planners receiving Long-term Severity reporting more obesity fear if they were in the Personal Susceptibility condition ($M = 4.85$, $SD = .32$) when compared to participants in the Group Susceptibility condition ($M = 4.44$, $SD = .52$) at Time 2 (see figures 13 and 14, Appendix F). There were no other significant interaction effects of Time x Severity x Susceptibility x Intention Implementation Plan on any other dependent variables at Time 2 or Time 3 (see Table 30 in Appendix E).

Summary of Results

The measure used to assess protection motivation was composed of 7 scales ranging from 1-6 items in length. Cronbach's coefficient alpha for the 6 multi-item scales ranged from .74 to .93. Given the commonly minimum acceptable scale criterion of $> .70$ (Nunnally, 1978), the measures used in this study had acceptable levels of internal consistency, with the exception of the single item used to measure obesity severity.

Test-retest reliability from Time 1 to Time 2 ranged from .62 - .81 for the 6 multi-item scales. The test-retest reliability ranged from .51 - .78 for Time 2 to Time 3. Each test-retest period was approximately 2 weeks apart, and these reliability coefficients suggest moderately high reliability.

There were main effects expected for each independent variable. More specifically, it

was hypothesized there would be a main effect of Severity such that messages focusing on Short-term obesity consequences would have a larger impact than messages focusing on Long-term obesity consequences. As compared to participants who were told about Long-term obesity consequences, those who were told about Short-term obesity consequences were hypothesized to feel increased severity, susceptibility, fear and protection motivation and decreased response costs at Time 1 (baseline), Time 2 (two-week follow-up) and Time 3 (2nd two week follow-up).

At Time 1, there was a marginally significant main effect of Severity on participants' perceptions of susceptibility, such that participants receiving Short-term messages reported feeling more susceptible to the development of obesity when compared to participants receiving Long-term messages indicating partial support for this hypothesis. It was further hypothesized that participants who were exposed to Short-term Severity fear arousal messages would also report having engaged in more physical activity at Time 2 and Time 3. This hypothesis was not supported.

It was hypothesized there would be a main effect for Susceptibility such that messages focusing on Personal Susceptibility would have a larger impact than messages focusing on Group Susceptibility. As compared to participants who were told about Group Susceptibility, those who were told about Personal Susceptibility were hypothesized to feel increased severity, susceptibility, fear and protection motivation and decreased response costs at Time 1, Time 2 and Time 3 and to report having engaged in more physical activity at Time 2 and Time 3. This hypothesis was not supported.

A main effect of Intention Implementation Plan was hypothesized such that messages requesting participants to develop an Intention Implementation Plan would have a larger impact than messages not requiring participants to form an Intention Implementation Plan. As

compared to participants not developing an Intention Implementation Plan, those developing an Intention Implementation Plan were hypothesized to feel increased fear, protection motivation, response efficacy, self-efficacy, and decreased response costs at Time 1, Time 2 and Time 3 and to report having engaged in more physical activity at Time 2 and Time 3. A main effect for Intention Implementation Plan was observed at Time 2 such that participants developing an Intention Implementation Plan reported more protection motivation at Time 2. This finding partially supports this hypothesis.

There were two anticipated interactions. Significant increases in physical activity intentions at Time 1 and physical activity at Time 2 and Time 3 were hypothesized for participants exposed to group susceptibility and short-term severity messages as compared to all other groups. This interaction was not supported.

The final hypothesis anticipated the interaction effect of Severity x Ethnicity, such that African American and Hispanic females receiving Short-term Severity messages will feel decreased severity, fear and protection motivation at Time 1 and Time 2, and report having engaged in less physical activity when compared to white, non-Hispanic females at Time 2 and Time 3. This hypothesis was not supported (see Table 31, Appendix E).

Secondary Regression Analyses

Secondary data analyses were conducted to identify which variables would be most predictive of protection motivation at Time 2. A linear multiple regression was performed using the independent variables for Time 1 (severity, susceptibility, fear, self-efficacy, response cost, and response efficacy). The overall regression was significant $F(6,86) = 3.24, p < .01, R^2 = .20$. Of the predictors investigated, only susceptibility was significant ($\beta = .23, t(86) = 2.09, p < .05$). The final analysis in the secondary data analysis was a stepwise regression examining the ability

of the dependent variables (severity, susceptibility, fear, response efficacy, self-efficacy, response costs and current physical activity) to predict protection motivation. The overall regression was significant, $F(1, 85) = 48.96, p < .01, R^2 = .37$. Of the predictors investigated, only current physical activity was significant ($\beta = .61, t(85) = 6.99, p < .01$).

CHAPTER 4 - DISCUSSION

The primary aim of this study was to increase the levels of physical activity within young adult females with high BMIs. This study found that over time, the average number of days young adult females performed physical activity increased significantly from baseline to the final 2-week follow-up period. Prior to baseline, young adult females were performing physical activity an average of 9 days over a 30 day period, which translates into approximately 2-3 days a week. After treatment, young adult females were performing approximately 6-7 days of physical activity over a 2-week period, or an average of 3-3.5 days a week. At the end of the 2nd follow-up period, young adult females were performing an average of 7-8 days of physical activity for 2 weeks or 3.5-4 days weekly. As a result, the finding for the influence of Time for physical activity was the most interesting finding of this study. Unfortunately, this finding was not influenced by any of the experimental manipulations undertaken in the study and diverges with previous published results (Milne, & Orbell, 2002; Wurtele & Maddux, 1987).

Wurtele and Maddux (1987) examined the use of fear appeals in the context of condom use for the prevention of AIDS/HIV. In this study, the failure to use condoms was considered a maladaptive coping response that would lead to several adverse effects. As a result, Wurtele and Maddux found that by focusing on the consequences attributed to adopting the maladaptive behavior, their respondents were more inclined to report intentions toward subsequent condom use. The current application failed to present any adverse effects for failure to perform physical activity. The current application implied that physical activity could be used to prevent the development of obesity, and the development of obesity was responsible for several adverse effects. Moreover, the connection between adopting a maladaptive response and its association with negative behaviors was not made explicit in the current application.

Another explanation for the divergent results may be provided by Milne, Sheeran and Orbell (2002). Since the current application was very similar to Milne, et al., the divergent results must be attributed to the differences in applications. Both applications used the Protection Motivation paradigm enhanced by the addition of an intention implementation plan experimental design. There were 2 important differences in the two applications: 1) sample size and 2) delivery of the intention implementation plan. Milne, et al., had approximately 248 participants and 3 treatment conditions; in contrast, the current application had 87 participants for 8 treatment conditions at the 4 week follow up. On the contrary, the smaller sample size might have compromised the ability to observe an effect supporting the PMT.

An additional factor responsible for this divergent result may be attributed to the time point at which the development of the intention implementation plan was developed. Milne, et al., (2002) applied the development of the intention implementation plan intervention at the 2nd data collection point after observing the effects of the Protection Motivation Theory. In contrast, in the current study the intention implementation plan intervention was applied at baseline.

The fact that despite these differences, levels of physical activity in this application still increased has several implications. The most important implication of this finding is that young adult females with above normal BMIs perceive increases in physical activity to be an effective coping response for the prevention and treatment of obesity. In addition, for some young adult females with above normal BMIs, the perception of having to report their level of physical activity may be the type of motivation necessary to encourage overweight young adult females to engage in more physical activity. And finally, levels of physical activity can be potentially increased with minimal efforts in certain populations.

An additional interesting finding is the interaction effect associated with the development

of an intention implementation plan and susceptibility for protection motivation demonstrated at first follow-up. Participants having high risk messages (personal susceptibility) and developing intention implementation plans have higher perceptions of protection motivation than participants receiving group susceptibility or low risk messages. This finding may be explained by the fact that young adult females who have developed intention implementation plans also have increased feelings of self-efficacy and response efficacy as a result of becoming invested in the performance of the recommended behavior. Protection motivation is achieved through the combination of threat and coping response appraisals, thus, for participants exposed to high fear arousing conditions, the development of the intention implementation plan provides participants the opportunity to immediately decrease the level of aroused fear, while simultaneously increasing their feelings of protection motivation and the likelihood of adopting the recommended coping response (Milne, Sheeran and Orbell, 2002). This finding implies that for behavioral applications targeting high risk populations, the combination of a motivational treatment, such as the PMT with a volitional treatment (development of an intention implementation plan) is beneficial.

The finding of the influence of time on the development of intention implementation plan and low risk (group susceptibility) for participants' perceptions of susceptibility is noteworthy. At baseline, planners receiving low risk obesity messages (group susceptibility) reported higher levels of obesity risk as compared to nonplanners. At the first 2 week follow-up period, perceptions of obesity risk had increased within both planning/nonplanning groups. At the final follow-up, the reports of obesity risk had increased significantly among the nonplanning group bridging the gap in feelings of susceptibility between low risk planners and nonplanners.

This counterintuitive result may be explained by the cognitive process involved in the

Protection Motivation Theory. Since planners developed a plan with the purpose of preventing obesity, they have stronger perceptions regarding the efficacy of physical activity. On the contrary, their failure to adhere to their developed plans may indicate cognitive dissonance. Young adults feel as though when the time presents itself, and the consequences of obesity are facing them, they will be able to make the necessary lifestyle adjustments. As a result of this perception, many young adult females have strong perceptions regarding their ability to perform physical activity (self-efficacy), and the ability of physical activity to lower the risks of developing obesity (response efficacy). In combination, these young adult females' high self-efficacy, high response efficacy perceptions, and intention implementation plan should yield decreased susceptibility perceptions. The fact that this cognitive process was not demonstrated in planners at follow-up suggests an inability among young adults' to adhere to their intention implementation plans. This finding suggests that in low risk treatments, past performance tends to be more predictive of subsequent behavior, thereby diminishing the effects of the development of an intention implementation plan. This process of developing a plan and subsequently finding the plan difficult to follow may have induced cognitive dissonance in the current population.

Moreover, by the end of the study, nonplanners in the low risk treatment perceived similar amounts of obesity risk as demonstrated by planners. This finding demonstrates that over time, young adult females recognize risk even in the absence of an intention implementation plan. This finding suggests that the development of intention implementation plans is beneficial in increasing levels of protection motivation in low risk groups.

The final interesting finding is the effect of Time on the development of the intention implementation plan for protection motivation at follow-up. More specifically, participants' perceptions of protection motivation at baseline were similarly high regardless of the

development of an intention implementation plan. At follow-up, the perceptions of protection motivation remained high for planners, but had decreased significantly for nonplanners. This is interesting because it suggest that in the absence of a plan, there is little motivation remaining to perform the behavior, and as a result attempts toward future behavior performance are diminished.

The aim of the current study was to examine the complex behaviors of obesity and physical activity under a theoretical framework which was enhanced by the use of an intervention aimed at encouraging performance of the behavior over a 4 week period. As a result, it was determined that the current level of physical activity performance can be increased in females with higher than normal BMIs. In addition, the data also support the benefits for the addition of an intention implementation plan in maintaining the intentions for the performance of behavior.

Limitations

There were several methodological limitations to the current study. More specifically, the application of the fear arousal was mild. The literature states that fear arousal communications containing vivid presentations are much more effective than written arguments. The current study was conducted online and employed an intervention strategy conducive for this mode of delivery. As a result, the ability to arouse fear was reduced considerably. An additional limitation in methodology was measurement error. This study focused on manipulations of the PMT's threat appraisal components (severity and susceptibility). In developing the stimulus materials to examine effects based on the manipulations of severity and susceptibility, the measures used to evaluate these qualities were inadequate. For example, obesity severity should have been examined in the multidimensional means in which it was

presented in the fear arousals. An additional limitation in methodology was revealed in the items/scales measuring obesity severity and susceptibility. These items/scales were 1 and 2 items respectively. The use of a single item measures does not provide a reliability index. Since the focus of this study was to examine the effects the manipulations of these variables would have on physical activity, the number of items used to evaluate both should have been increased considerably.

Further limitations were the results of self-reported data. For example, participants were instructed to provide their demographic information at baseline, and this data was used to calculate their BMI. There were no measures taken to ensure that the data provided were accurate, and because each participant provided their own data, there was no consistency in the measurement of these data items. Additionally, participants' reports of physical activity were self-reported as well. Even though self-reported data is widely used, it is subject to recall and social desirability issues.

An additional limitation was small sample size. There were several variables in this study, and as a result, a certain number of effects were expected simply due to chance. Since only minimal effects were observed, one could argue that a larger sample size would have provided more statistical power. The original estimate for sample size was 20 per cell for a total of 160 participants, and the current study was slightly over half that size after accounting for attrition, leaving it underpowered. Moreover, an additional limitation of the current study is in the failure to evaluate the causes for attrition. While there were no differences in any of the variables of interest among participants electing to complete and not complete each phase, there were apparently differences among the two groups. Failure to investigate these differences resulted in the loss of relevant information.

The final limitation of this study was revealed in the design of the stimulus material. Even though the stimulus material was guided by the information gained from the focus groups, assuming generalizability may have limited the ability of the fear arousals to initiate fear. For example, one of the perceived social consequences of obesity is fewer employment opportunities; however, the completion of a college education increases employment opportunities. Therefore, the negative effects of this particular consequence are diminished in the current target population. Similarly, an assumption of human development suggests that normal development includes the acquisition of certain roles such as spouse and parent. While the acceptance of these roles is considered normal development, it is not abnormal for others to veer in opposite directions by electing to remain single or childless. Therefore, the assumption that fewer marriage opportunities would be considered a negative consequence of obesity to young adults may have been presumptuous, as marriage and parenthood may be a choice that is made just as consciously in obese individuals as it is in normal weight individuals.

Future Directions

Despite the numerous limitations, the current study did possess some very important findings. Future directions should begin with replicating the current study with and include these important changes in methodology: 1) more intensive fear arousal method, 2) design and piloting of reliable scales for the measurement of obesity severity and susceptibility. Initially, to apply a more intensive fear arousal method, the study should be conducted off-line. An example of a more intensive fear arousal could entail students viewing documentaries of people in the same age range as the target population suffering from obesity and obesity-related chronic illness. These documentaries should chronicle the life of the obese persons and explicitly demonstrate how obesity has affected their life physically and socially. In the same way, young

adults, with lower BMIs (24.0-26.0) may be required to wear fat-suits for an extended period. And during this extended period participants would undergo a program simulating weight loss based on their level of physical activity. A simulated program such as this would provide young adult females direct experience regarding the difficulties encountered in weight loss attempts prior to an actual weight gain.

The second future direction emphasizes the design and piloting of stimulus materials and measurement items measuring obesity severity and susceptibility with more accuracy and reliability.

Additional future directions include placing focus on the proper physical activity performance and the introduction of activities according to young adults' lifestyle and current weight status. As it stands, the BMI range in the current study was 25.0-63.8. With that being said, one could conceive that participants in the upper limits of this BMI range experiencing great difficulty in performing physical activity at the level prescribed. For females such as these, exposure to types of physical activity that would decrease injury and increase their aerobic ability would be beneficial. Interventions of this nature would increase self-efficacy in relation to the performance of physical activity and hopefully increase their perceptions of protection motivation.

An incorporation including an evaluation of a person's stage of change regarding the performance of physical activity would be a final future direction. The determination of a person's stage of change status can help tailor interventions that will be more suitable for their current status. For example, a person in the preparation stage would benefit more from an intervention that helps them move from this stage to the action stage. This can be accomplished by having participants develop an intention implementation plan. However, for participants in

the precontemplation stage, more emphasis would need to be placed on decreasing the target group's resistance to change. This may be a prime opportunity for the use of more intense fear arousal presentations mentioned earlier.

In summary, this study used a theoretical model of behavior to change to develop interventions intended to increase young college women's physical activity. Given the alarmingly high rates of obesity in youth, the development of effective interventions is crucial to maintain health and reduce health care costs. Although the intervention used in the study had minimal effects, the findings provide useful directions for developing stronger interventions in future research.

APPENDIX A: HIC

A1: HIC Approval (Focus Groups)

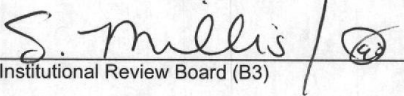
WAYNE STATE
UNIVERSITY

HUMAN INVESTIGATION COMMITTEE
87 East Canfield, Second Floor
Detroit, Michigan 48201
Phone: (313) 577-1628
FAX: (313) 993-7122
http://hic.wayne.edu



NOTICE OF EXPEDITED APPROVAL

To: Bibia Redd
Psychology
3310 Suffolk Court

From: Dr. Scott Millis *S. Millis* / 
Chairperson, Behavioral Institutional Review Board (B3)

Date: March 25, 2011

RE: HIC #: 0211211B3E
Protocol Title: Focus Groups on Young Adults Perceptions of Obesity: A Pilot Study
Funding Source:
Protocol #: 1103009487

Expiration Date: March 24, 2012

Risk Level / Category: Research not involving greater than minimal risk

The above-referenced protocol and items listed below (if applicable) were **APPROVED** following *Expedited Review* Category (#7)* by the Chairperson/designee for the Wayne State University Institutional Review Board (B3) for the period of 03/25/2011 through 03/24/2012. This approval does not replace any departmental or other approvals that may be required.

- Protocol Summary Form, received on 3-22-11
- SONA-System Advertisement
- Information Sheet, dated 3/22/11
- Receipt of a research protocol

- Federal regulations require that all research be reviewed at least annually. You may receive a "Continuation Renewal Reminder" approximately two months prior to the expiration date; however, it is the Principal Investigator's responsibility to obtain review and continued approval **before** the expiration date. Data collected during a period of lapsed approval is unapproved research and can **never** be reported or published as research data.
- All changes or amendments to the above-referenced protocol require review and approval by the HIC **BEFORE** implementation.
- Adverse Reactions/Unexpected Events (AR/UE) must be submitted on the appropriate form within the timeframe specified in the HIC Policy (<http://www.hic.wayne.edu/hicpol.html>).

NOTE:

1. Upon notification of an impending regulatory site visit, hold notification, and/or external audit the HIC office must be contacted immediately.
2. Forms should be downloaded from the HIC website at **each** use.

*Based on the Expedited Review List, revised November 1998

A2: SONA Informational Sheet (Focus Groups)

Study Information

Study Name	Focus Groups on Young Adults Perceptions of Obesity: A Pilot Study
Description	This is a focus group designed to gain an understanding of the current thoughts young adults have pertaining to obesity. The study will focus primarily on gaining information about what young adults think about obesity by answering questions related to the seriousness, young adults' susceptibility and methods of prevention.
Eligibility	Participants must: 1) be between the ages of 18 and 30 years old, 2) enrolled in an undergraduate Psychology course, and 3) have English as their primary language.
Duration	120 minutes
Credits	2 Credits
Researchers	Bibia Redd Email: bibia@wayne.edu
Participant Sign-Up Deadline	24 hours before the study is to occur
Participant Cancellation Deadline	1 hour before the study is to occur
Study Status	Visible to participants Active study (appears on list of available studies) Online (web) study administered by the system
HIC Approval Code	0211211B3E

A3: HIC Informational Sheet (Focus Groups)

Focus Groups on Young Adults Perceptions of Obesity: A Pilot Study Submission/Revision

Date: 3/22/11 Page 1 of 2 Protocol Version #: 1103009487 HIC Date: 5/08

Research Information Sheet

Title of Study: Focus Groups on Young Adults Perceptions of Obesity: A Pilot Study

Principal Investigator (PI): Bibia Redd

Psychology

313-685-7353

Purpose

You are being asked to participate in a research study examining the perceptions of obesity held by young adults. Because you are between the ages of 18-30, English is your primary language, enrolled in an undergraduate Psychology class, and considered healthy; you meet the minimum eligibility requirements to participate in this study. This study is being conducted at Wayne State University and the estimated number of study participants is about 24-30. **Please read this form and ask any questions you may have before agreeing to be in the study.**

Study Procedures

If you agree to take part in this research study, your decision to participate will entail a onetime session, during which you will be asked to provide general demographic information and to respond to questions geared toward examining the beliefs and attitudes toward obesity young adults much like yourself have. Completing the questionnaire in advance helps you to consider the topic before the discussion takes place.

In addition, you will be asked to take part in a discussion with several other young adults (7-11) about issues concerning obesity. This session will be audio taped and will last approximately no more than 60 minutes. If you prefer not to be audio taped, the session will be recorded by manually. The types of questions you will be asked to answer will be very similar to those you answered in the initial questionnaire. The following is an example, obesity may cause several problems, name some of them. Answering any or all of the questions is totally voluntary and you may withdraw your participation at any point during the process. You will not be asked to identify yourself in any way and your responses will be kept strictly confidential.

In addition, the audiotape will be kept in a locked secure cabinet in the office of the PI (Bibia Redd) and will be destroyed upon transcription. In addition, you will be permitted to add any additional information to your completed questionnaire that you may have wanted to share during the discussion, but that time did not allow. If you consent to participate, the complete process should not exceed 2 hours, and your consent form will be kept separate from any other study materials so that there will be no way to link any identifying information to your survey or focus group responses.

Benefits

As a participant in this research study, there will be no direct benefit for you; however, information from this study may benefit other people now or in the future.

Focus Groups on Young Adults Perceptions of Obesity: A Pilot Study Submission/Revision
Date: 3/22/11 Page 2 of 2 Protocol Version #: 1103009487 HIC Date: 5/08

Risks

There are no known risks at this time to participation in this study.

Costs

There will be no costs to you for participation in this research study.

Compensation

You will not be paid for taking part in this study.

Confidentiality

You will be identified in the research records by a code name or number. There will be no list that links your identity with this code.

Voluntary Participation /Withdrawal

Taking part in this study is voluntary. You may choose not to take part in this study, or if you decide to take part, you can change your mind later and withdraw from the study. You are free to not answer any questions or withdraw at any time. Your decision will not change any present or future relationships with Wayne State University or its affiliates.

Questions

If you have any questions about this study now or in the future, you may contact Bibia Redd (PI) at (313) 685-7353. If you have questions or concerns about your rights as a research participant, the Chair of the Human Investigation Committee can be contacted at (313) 577-1628. If you are unable to contact the research staff, or if you want to talk to someone other than the research staff, you may also call (313) 577-1628 to ask questions or voice concerns or complaints.

Participation

By completing the questionnaire and/or focus group participation you are agreeing to participate in this study.

**WAYNE STATE
UNIVERSITY**

IRB Administration Office
87 East Canfield, Second Floor
Detroit, Michigan 48201
Phone: (313) 577-1628
FAX: (313) 993-7122
<http://irb.wayne.edu>

NOTICE OF EXPEDITED APPROVAL

To: Bibia Redd
Psychology
3310 Suffolk Court

From: Dr. Scott Millis *H. Campbell-Voght*
Chairperson, Behavioral Institutional Review Board (B3)

Date: November 10, 2011

RE: IRB #: 109011B3E
Protocol Title: Women's Exercise Plans
Funding Source:
Protocol #: 1110010267

Expiration Date: November 09, 2012

Risk Level / Category: Research not involving greater than minimal risk

The above-referenced protocol and items listed below (if applicable) were **APPROVED** following *Expedited Review* Category (#7)* by the Chairperson/designee for the Wayne State University Institutional Review Board (B3) for the period of 11/10/2011 through 11/09/2012. This approval does not replace any departmental or other approvals that may be required.

- Revised Protocol Summary Form (received in the IRB Office 11/10/2011)
- Protocol (received in the IRB Office 10/14/2011)
- The request for a waiver of the requirement for written documentation of informed consent has been granted according to 45 CFR 46.117(1)(2). Justification for this request has been provided by the PI in the Protocol Summary Form. The waiver satisfies the following criteria: (i) the research involves no more than minimal risk to participants, (ii) the research involves no procedures for which written consent is normally required outside of the research context, (iii) the consent process is appropriate, and (iv) an information sheet disclosing the required and appropriate additional elements of consent disclosure will be provided to participants.
- Research Information Sheet (dated 11/10/2011)
- SONA Advertisement
- Debriefing Sheet
- Data collection tools: Preliminary Screening Questionnaire, Demographic Questionnaire, College Questionnaire, Appendix C (Versions 1-8), and Appendix D Questionnaire.

- Federal regulations require that all research be reviewed at least annually. You may receive a "Continuation Renewal Reminder" approximately two months prior to the expiration date; however, it is the Principal Investigator's responsibility to obtain review and continued approval **before** the expiration date. Data collected during a period of lapsed approval is unapproved research and can never be reported or published as research data.
- All changes or amendments to the above-referenced protocol require review and approval by the IRB **BEFORE** implementation.
- Adverse Reactions/Unexpected Events (AR/UE) must be submitted on the appropriate form within the timeframe specified in the IRB Administration Office Policy (<http://www.irb.wayne.edu/policies-human-research.php>).

NOTE:

1. Upon notification of an impending regulatory site visit, hold notification, and/or external audit the IRB Administration Office must be contacted immediately.
2. Forms should be downloaded from the IRB website at **each** use.

A5: SONA Informational Sheet (Pilot/Primary Study)**Study Information**

Study Name	Women's Exercise Plans
Description	This study is designed to gain an understanding of how young women develop exercise plans and how well they adhere to these plans.
Eligibility	Participants must: 1) female, 2) between the ages of 18-30, 3) think that you may be at least 10-15 lbs overweight, as indicated by a BMI>25.0, 4) enrolled in an undergraduate Psychology class, 5) healthy, 6) medically able to perform physical activity, 7) exercise fewer than 2 days a week or less, and 8) speak English.
Duration	105 minutes
Credits	1.5 Credits
Researchers	Bibia Redd Email: bibia@wayne.edu
Participant Sign-Up Deadline	24 hours before the study is to occur
Participant Cancellation Deadline	1 hour before the study is to occur
Study Status	Visible to participants Active study (appears on list of available studies) Online (web) study administered by the system
HIC Approval Code	109011B3E

A6: HIC Informational Sheet (Pilot/Primary Study)

Women's Exercise Plans Date: 9/27/11 Page 1 of 2 Protocol Version #: 1110010267 HIC Date: 5/08

Research Information Sheet

Title of Study: Women's Exercise Plans

Principal Investigator (PI): Bibia Redd

Psychology

313-685-7353

Purpose

You are being asked to participate in a research study examining the exercise plans of women and how well they adhere to their exercise plans. Because you are an English speaking female, between the ages of 18-30, have a BMI > 25.0, are enrolled in an undergraduate Psychology class, healthy, medically able to perform physical activity, and exercise fewer than 2 days a week or less, you meet the minimum eligibility requirements to participate in this study. This study is being conducted at Wayne State University and the estimated number of study participants is approximately 250.

Study Procedures

Should you decide to participate in this study, you will be asked to provide general demographic information and complete a short survey assessing some general concerns of college students. After completing this information, you will be asked to read a short essay. Some, but not all participants will be asked to complete a brief statement explaining their plan to exercise. Each participant will be asked to complete an exercise intention questionnaire. In a week, participants will be sent a reminder through the SONA system indicating the dates they will need to return to complete follow-up information (Phase 2/ optional Phase 3). During each follow-up phase, participants will be asked to complete the exercise intention questionnaire and to indicate their frequency of exercise for the past 2 weeks. It should take no more than 45 minutes for each session.

The types of questions you will be asked to answer will be measured on a scale of strongly disagree to strongly agree and will focus on your current thoughts about exercise. Answering any or all of the questions is totally voluntary and you may withdraw your participation at any point in the process. Because the information that you provide during various phases of the study will need to be linked, certain personal information about you, such as your name will need to be collected. Once all of the data that you have provided has been linked, it will be given an identifier, and your personal identifying information will be removed and eliminated so that there will no longer be any information available to link your identity to your data. In addition, your personal information will be kept strictly confidential, and will only be seen by the P.I.

Benefits

As a participant in this research study, the only direct benefit you will receive will be those associated with the performance of physical activity.

Risks

There are no known risks at this time to participation in this study, however, some participants may suffer mild discomfort or feelings of guilt associated with participation. Should you experience feelings of discomfort or guilt while participating in this study, you may refuse to respond to any question causing these feelings or withdraw your participation at any time.

Costs

There will be no costs to you for participation in this research study.

Compensation

You will not be paid for taking part in this study; however, you will receive up to 1.5 credits of extra credit (depending how many of the 3 phases you elect to complete) to be distributed in your eligible registered Psychology course.

Confidentiality

All information collected about you during the course of this study will be kept strictly confidential in it will not be shared with anyone else aside from the P.I. In addition the file containing your personal information will be kept in a locked secure file cabinet in the P.I.'s locked office. In addition the information will be deleted as soon as possible by electronic deletion and/or by the shredding of any hardcopies.

Voluntary Participation /Withdrawal

Taking part in this study is strictly voluntary. You may choose not to take part in this study, or if you decide to take part, you can change your mind later and withdraw from the study. You are free to not answer any questions or withdraw at any time. Your decision will not change any present or future relationships with Wayne State University or its affiliates

Questions

If you have any questions about this study now or in the future, you may contact Bibia Redd (PI) at (313) 685-7353. If you have questions or concerns about your rights as a research participant, the Chair of the Human Investigation Committee can be contacted at (313) 577-1628. If you are unable to contact the research staff, or if you want to talk to someone other than the research staff, you may also call (313) 577-1628 to ask questions or voice concerns or complaints.

Participation

By completing the questionnaire you are agreeing to participate in this study.

A7: HIC Amendment Approval

**WAYNE STATE
UNIVERSITY**

IRB Administration Office
87 East Canfield, Second Floor
Detroit, Michigan 48201
Phone: (313) 577-1628
FAX: (313) 993-7122
<http://irb.wayne.edu>

NOTICE OF EXPEDITED AMENDMENT APPROVAL

To: Bibia Redd
Psychology
3310 Suffolk Court

From: Dr. Scott Millis *S. Millis, PhD*
Chairperson, Behavioral Institutional Review Board (B3)

Date: January 06, 2012

RE: IRB #: 109011B3E
Protocol Title: Women's Exercise Plans
Funding Source:
Protocol #: 1110010267

Expiration Date: November 09, 2012

Risk Level / Category: Research not involving greater than minimal risk

FILE

The above-referenced protocol amendment, as itemized below, was reviewed by the Chairperson/designee of the Wayne State University Institutional Review Board (B3) and is APPROVED effective immediately.

- Protocol - Changes to data collection methods and/or instruments which includes changes to the wording and organization of items in the data collection instruments to improve clarity.

APPENDIX B: FOCUS GROUP MATERIALS**B1: Demographic Sheet (Focus Groups)**

- 1) Wayne State Access Id _____
- 2) Age _____
- 3) Date of birth _____
- 4) Race:
- 5) Class ranking: freshman sophomore junior senior
- 6) Height _____
- 7) Weight _____
- 8) Gender _____

B2: Obesity Study Focus Group Questionnaire

We are working on developing materials for a future study that will use the currently held obesity perceptions of young adults to: 1) design a scale to measure protection motivation and 2) to design a fear arousal communication to focus on issues/concerns of obesity that are much more salient to young adults. This portion of the study will focus on what determining what young adults think about obesity, in terms of its seriousness, their vulnerability or risks, what are good (effective) methods of prevention, and what things may prohibit young adults or people like you from becoming obese. There are obviously no right or wrong answers to these questions, we just want your opinions. We are not asking that you describe your personal experiences; we just want to know about people like you. Please do not identify yourself, or provide the names of any individuals.

Obesity is defined as being extremely overweight. Researchers would like to know what young adults think about obesity.

- 1) What makes young adults vulnerable (or places them at risk) to becoming obese?
- 2) What are some of the problems or concerns that obesity poses for young adults?
- 3) What are the obesity related health risks for young adults?
- 4) What are some effective methods for obesity prevention for young adults?
- 5) Looking at physical activity:

- a. What are some reasons young adults like to engage in physical activity?
 - b. What things keep adults from engaging in physical activity?
- 6) What are some things that would make young adults more interested in performing physical activity?
- 7) Is there anything about being obese that is “scary”?
- 8) Looking at physical activity in particular; do you think that young adults are capable of performing physical activity? Why or why not?
- 9) What are some things that would make young adults more interested in performing physical activity?
- 10) How do you think young adults feel about obesity?
- 11) Do you think that young adults are “afraid” of becoming obese? Why or why not?

What do you think would make young adults “afraid” of becoming obese?

B3: Obesity Study Focus Groups Script

We are working on developing materials for a future study that will use the obesity perceptions of young adults to examine their coping responses in terms of obesity fear arousal. Therefore, it is necessary to determine the current perceptions young adults like you have towards obesity.

This study will focus on what young adults think about obesity, in terms of its seriousness, their vulnerability or risks to obesity, what are good (effective) methods of prevention, and what, if anything about becoming obese may frighten you or young adults like yourself. There are obviously no right or wrong answers to these questions, we just want your opinions. We are not asking that you describe your personal experiences; we just want to know about people like you. Please do not identify yourself, or provide the names of any individuals.

Before we get started, let's discuss some basic rules:

- 1) We want to give everyone the chance to talk
- 2) There will be no put downs, or disrespecting of opinions, everyone's opinion is valuable
- 3) Disagreements will be handled in a respectful manner
- 4) We will not discuss or mention any names. When you respond to a question begin by saying "people like me" or "young adults".....
- 5) We are not to repeat anything discussed in this session and we will treat the information presented here as confidential.

Since there were no objections, we will turn on the tape recorder now.

Obesity is defined as being extremely overweight. Researchers would like to know what young adults think about obesity.

- 12) What do you or young adults like you think about obesity?
 - a. (Females only) What do you think young males think about obesity?
 - b. (Males only) What do you think young females think about obesity?
- 13) Do you think that young adults are at risk for becoming obese? Why or Why not?
 - a. Do you think that certain cultures or races are at risk for obesity?
 - b. Are there family traditions that make it easier for some young adults to become obese?

- 14) Do you think that being obese is severe for young adults? Why or why not?
 - a. When you hear the word severe, what does it make you or young adults like you think?
 - b. Is there a better word that should be used instead of severe when speaking to young adults?
- 15) Do you think that obesity causes health risks for young adults?
 - a. Why or why not?
 - b. Do you know of any health risks that obesity causes?
- 16) Do you think that obesity poses any other concerns or issues for young adults? If so, what are some of them?
- 17) What are some effective methods to prevent obesity for young adults?
 - a. What works to keep young adults from becoming obese?
 - b. Why do you think that young adults choose these methods?
- 18) Looking at physical activity in particular; do you think that young adults are capable of performing physical activity? Why or why not?
- 19) What are some things that keep young adults like you from performing physical activity?
- 20) What are some things that would make young adults more interested in performing physical activity? (Mention anything that you can think of.)
- 21) How do you think young adults feel about obesity? (What types of emotions do young people like you experience in terms of obesity?)
- 22) Do you think that young adults are “afraid” of becoming obese? Why or why not?
- 23) Do you think that young adults have any “fears” in terms of obesity?
- 24) What do you think would make young adults “afraid” of becoming obese?

APPENDIX C: STIMULUS MATERIALS

C1: Fear Arousal Communications (Pre-focus group discussions)

No Threat (no susceptibility/no severity/ no response efficacy)

A body mass index (BMI) ≥ 30 classifies an individual as obese. This index is calculated by weight as measured in kilograms divided by height in meters². A BMI ≥ 30 is not always indicative of obesity as weight gain as a result of weight training results in the accumulation of muscle mass, making BMI a weak indicator of obesity.

Low Threat (low susceptibility/low severity/low response efficacy)

Individuals with a BMI ≥ 30 are considered obese. In 2007, 27% of America's population was considered obese. This rate is expected to increase in 2015.

Obesity is one of the fastest growing albeit preventable causes of illness in America. Obesity has been associated with sleep apnea, nonalcoholic fatty liver disease, and some cancers. The diseases associated with obesity range in severity and most of them can be treated. Even though these diseases do not manifest themselves until middle or late adulthood, overweight and obesity during young adulthood sets the stage for the development of illnesses.

There are many ways obesity can be prevented or treated. A person can change their diet by adding more fruits and vegetables or by lowering their fat intake. Obesity can also be prevented by engaging in physical activity.

High Threat (high susceptibility/high severity/high response efficacy)

Obesity has become the fastest growing preventable disease among young adults in America. In fact, 35% of young adults attending college are either overweight or obese.

Obesity causes illness such as Type II diabetes, hypertension, coronary heart disease, and cancer. Even though these diseases do not manifest themselves until middle or late adulthood, overweight and obesity during young adulthood sets the stage for the development of illnesses. Many of the diseases associated with obesity are chronic, in that there is no cure, and after being diagnosed, the person will live the duration of their life with these diseases.

Physical activity has been proven to decrease the accumulation of body mass that leads to overweight and obesity. In fact many young adults attending college who maintain regular levels of physical activity have found it to be very effective in decreasing their risks of obesity.

C2: Fear arousal communications (post focus group discussions)

Personal Susceptibility

Individuals with a BMI ≥ 30 are considered obese. This index is calculated by weight as measured in kilograms divided by height in meters². A BMI ≥ 30 is not always indicative of obesity as weight gain as a result of weight training results in the accumulation of muscle mass, making BMI a weak indicator of obesity. Young adults such as yourself between the ages of 18-30 tend to have diets that are generally low in fruit and vegetable intake. They also rarely cook meals at home preferring carry out and fast food over home prepared meals. Young adults also do not normally engage in regular physical activity daily, and as a result, at least 35% of young adults either overweight or obese.

Group Susceptibility

Individuals with a BMI ≥ 30 are considered obese. This index is calculated by weight as measured in kilograms divided by height in meters². A BMI ≥ 30 is not always indicative of obesity as weight gain as a result of weight training results in the accumulation of muscle mass, making BMI a weak indicator of obesity. Young adults or college students tend to consume large quantities of fast food which places them at risk for the development of obesity. In addition young adults and especially those attending college do not have enough time between their studies, and work schedules to allow them to engage in regular physical activity. This factor also contributes to the development of physical activity among this group.

Short-term Severity

Obesity is one of the fastest growing preventable causes of disease in America. Obesity has been associated with chronic fatigue, tiredness and shortness of breath while performing simple daily activities such as walking, climbing a flight of stairs or getting in/out of a car. Obesity is also associated with several late life chronic illnesses, such as diabetes. In addition, individuals developing obesity suffer social consequences such as ostracism and discrimination. Furthermore, obese individuals are considered unattractive, especially by the opposite sex, and as a result have fewer dates when compared to non-obese individuals.

Long-term Severity

Obesity is one of the fastest growing preventable causes of disease in America. Obesity causes illnesses such as Type II diabetes, hypertension, coronary heart disease, and cancer. Even though these diseases do not manifest themselves until middle or late adulthood, obesity during young adulthood sets the stage for their development. Many of the diseases associated with obesity are chronic and once they are acquired, cannot be cured. In addition, to a life of chronic illness, an additional long-term effect of obesity is the lack of social opportunities such as marriage/family and employment.

C3: Protection Motivation Theory Construct Definitions

Severity: one's perception of the seriousness of the health threat

Susceptibility: one's perception of their risk to acquiring the health threat

Fear: one's emotional response to their perception of susceptibility to the health threat

Response Efficacy: the belief that the recommended behavior is capable of reducing the health threat

Self-efficacy: the belief in one's capability of performing the recommended behavior

Response Cost: one's real or perceived perceptions of the associated costs to the performance of the recommended response

Protection Motivation: one's perception of the likelihood or intention to perform the recommended behavior

C4: Protection Motivation Questionnaire Items categorized according to construct

Severity

Using the following 5-point Likert scale (strongly agree = 1 to strongly disagree = 5), indicate your degree of agreement with the following statements concerning your perception of severity of obesity.

- 1) If I were obese, I would suffer a lot of discomfort.
- 2) Being obese is severe for young adults.
- 3) Being obese would be severe for me.
- 4) If I were obese, I would have decreased mobility.
- 5) If I were obese, I would have health problems.
- 6) If I were obese, I would be ridiculed.
- 7) If I were obese, I would be perceived negatively by others.
- 8) If I were obese, I would suffer opportunity losses.
- 9) If I were obese, I would suffer discrimination.
- 10) If I were obese, I would have a lower quality of life.
- 11) If I were obese, I would have higher health risks.
- 12) If I were obese, I would have higher risk for heart disease.
- 13) If I were obese, I would have higher risk for diabetes.
- 14) If I were obese, I would have higher risk for high blood pressure.
- 15) If I were obese, I would have risk for sleep apnea.
- 16) If I were obese, I would have risk for respiratory concerns.
- 17) If I were obese, I would have high cholesterol risk.
- 18) If I were obese, it would likely cause me to die prematurely.
- 19) If I were obese, it would increase my risk for health problems.
- 20) If I were obese, I would have to wear a different style of clothing from everyone else.
- 21) If I were obese, I would have fewer friends.
- 22) If I were obese, I would have lower self-esteem.
- 23) If I were obese, I would have physical limitations.
- 24) If I were obese, it would hinder my social life.
- 25) If I were obese, I would be depressed.
- 26) If I were obese, I would wear loose fitting clothes to cover my body.
- 27) If I were obese, members of the opposite sex would not find me attractive.
- 28) If I were obese, I would have fewer dates.
- 29) If I were obese, I'd probably do more activities that require less physical activity like reading, or going to the movies.

30) If I were obese, it would cause me to tire easily.

Susceptibility

Using the following 5-point Likert scale (strongly agree = 1 to strongly disagree = 5), indicate your degree of agreement with the following statements concerning your perception of susceptibility of obesity.

- 1) Young adults are at risk for becoming obese.
- 2) My chances of becoming obese in the future are low.
- 3) Family history of obesity increases young adults' risk for becoming obese.
- 4) Family history of obesity increases my risk of becoming obese.
- 5) The dietary habits of young adults increase young adults' risk for becoming obese.
- 6) My dietary habits increase my risks for becoming obese.
- 7) The early unhealthy dietary habits of young adults increase young adults' risk for becoming obese.
- 8) My early unhealthy dietary habits increase my risk for becoming obese.
- 9) The lifestyles of young adults increase young adults' risk for becoming obese.
- 10) My lifestyle increases my risk of becoming obese.
- 11) Lack of education increases young adults' risks for becoming obese.
- 12) Lack of education increases my risks of becoming obese.
- 13) Obesity knowledge increases young adults risk for becoming obese. (Reverse scored)
- 14) Obesity knowledge increases my risk of becoming obese.
- 15) Lower SES increases young adults risk for becoming obese.
- 16) Lower SES increases my risk of becoming obese.
- 17) Peers increase young adults' risk for becoming obese.
- 18) Peers increase my risk of becoming obese.
- 19) I am unlikely to become obese in the future.
- 20) I am physically inactive.
- 21) Young adults are physically inactive.
- 22) I tend to eat fast foods more than meals prepared at home.
- 23) Young adults tend to eat fast foods more than meals prepared at home.
- 24) I am too busy to exercise.
- 25) Young adults are too busy to exercise.
- 26) Young adults tend to eat more fruits and vegetables than other people my age.
- 27) I tend to eat more fruits and vegetables than other people my age.
- 28) Young adults tend to engage in physical activity regularly.
- 29) I tend to engage in physical activity regularly.
- 30) I am not at risk for becoming obese. (Reverse coded)

Fear

(very frightened to not at all frightened; not at all anxious to very anxious; not at all worried to very worried; very scared to not at all scared, not at all tense to very tense; very nauseous to not at all nauseous, very uncomfortable to not at all uncomfortable)

- 1) The thought of developing obesity makes me feel (frightened)
- 2) The thought of developing obesity makes me feel (anxious)
- 3) The thought of developing obesity makes me feel (worried)
- 4) The thought of developing obesity makes me feel (scared)
- 5) The thought of developing obesity makes me feel (tense)
- 6) The thought of developing obesity makes me feel (nauseous)
- 7) The thought of developing obesity makes me feel (uncomfortable)

Response efficacy (baseline-daily physical activity/health enhancing-traditional physical activity)

Using the following 5-point Likert scale (strongly agree = 1 to strongly disagree = 5), indicate your degree of agreement with the following statements concerning your perception of response efficacy of physical activity in terms of obesity.

- 1) Physical activity is a good way of reducing the risk of developing obesity.
- 2) Increasing daily physical activity by taking the stairs instead of the elevator is a good way to reduce obesity risk.
- 3) Obesity in young adults can be prevented by increasing daily physical activity.
- 4) Exercise can prevent obesity in young adults.
- 5) Eating a balanced diet can prevent obesity in young adults.
- 6) Education can prevent obesity in young adults.
- 7) Physical activity is a good way to stay in shape.
- 8) Engaging in more physical activity would lessen my chances of developing obesity.

Self-efficacy

Using the following 5-point Likert scale (strongly agree = 1 to strongly disagree = 5), indicate your degree of agreement with the following statements concerning your perception of your self-efficacy in terms of physical activity performance.

- 1) I am discouraged from engaging in physical activity because it is not fun.
- 2) Young adults do not engage in physical activity because it is not fun.
- 3) Young adults are discouraged from increasing their physical activity because they are unable to do so.
- 4) I am discouraged from increasing my physical activity because I feel unable to do so.
- 5) I feel confident in my ability to increase my physical ability during the next week.
- 6) Young adults should be able to increase their levels of physical activity with little or no difficulty.
- 7) There are several barriers to performing physical activity for young adults.
- 8) There are several barriers to performing physical activity for me.
- 9) Young adults lack the necessary energy for increasing physical activity.
- 10) I do not have the necessary energy for increasing physical activity.

Behavioral Intentions

Using the following 5-point Likert scale (strongly agree = 1 to strongly disagree = 5), indicate your degree of agreement with the following statements concerning your behavioral intentions.

- 1) I intend to increase my physical activity during the next 2 weeks.
- 2) I do not wish to increase my physical activity during the next 2 weeks.

C5: Intention Implementation Plan Conditions

Intention Implementation Plan

Many people are aware that physical activity will decrease weight gain leading to obesity and as a result find that they intend to take at least one 30 minute session of physical activity but find that they forgot or never get around to it. It has been found that if you form a definite plan of exactly when and where you will carry out an intended behavior you are more likely to actually do so and less likely to forget or find that you don't get around to doing it. It would be useful for you to plan when and where you will increase your physical in the next 2 weeks.

Therefore, please complete the following sentence: During the next 2 weeks, I will partake in at **least 30 minutes of moderate intensity physical activity** on _____ day/days, at _____ time of day, at _____ location.

No Intention Implementation Plan

There are many ways that obesity can be prevented or treated. The most common ways are dietary changes or increases in physical activity. A person can improve their dietary intake by adding more fruits and vegetables or by lowering their fat intake which can be lowered by decreasing their frequency of fast food and carry out consumption. Obesity can also be prevented by engaging in physical activity. Physical activity has been proven to decrease the accumulation of body mass that leads to obesity. In fact many young adults attending college who maintain regular levels of physical activity have found it to be very effective in decreasing their risks of obesity.

APPENDIX D: PILOT AND PRIMARY STUDY MATERIALS

D1: Demographic Sheet

Demographic Sheet (Pilot & Primary Study)

This demographic sheet will be used to gather demographic information on participants electing to take part in this study. Understand that your name is not required, therefore any information that you provide is kept strictly confidential. In addition, neither your information, nor the information of any other participant will be shared with anyone other than the Principal Investigator.

1) Date of birth _____ (month/day/year)

Please respond to the following questions as the information will be used to determine if gender or racial differences exist in participant responses.

2) Race/Ethnicity: (Please check all that apply)

_____ White

_____ African American

_____ Hispanic

_____ Asian

_____ Pacific Islander

_____ Other/Please specify

4) Class ranking: _____ freshman _____ sophomore

_____ junior _____ senior

5) Height _____

6) Weight _____

Physical activity is defined as 30 minutes of moderate intensity activity. Moderate intensity activities are those where you experience an increase in heart rate and breathing, but find it possible to speak comfortably.

1) Please indicate the number of days in the **past 30 days** that you engaged in physical activity as explained above by completing the following sentence: I engaged in moderate intensity physical activity ___ days during the past 30 days.

7) Please indicate which days of the **past week** that you engaged in moderate intensity physical activity as explained above.

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday

D2: Baseline Fear Measure

The following questions focus on some of the most common concerns young adults face while in college.

We would you like to rate on a scale of 1-5 indicating a strong level of agreement to a strong level of disagreement to the following statements.

Scale

- 1- Strongly disagree
- 2- Disagree
- 3- Neither disagree or agree
- 4- Agree
- 5- Strongly agree

- 1) I have what it takes to succeed in college.
- 2) I am able to fit in with other college students.
- 3) *I will be able to maintain my current weight.*
- 4) I will not engage in any undesired behaviors, such as driving while intoxicated.
- 5) I will be safe on campus.
- 6) I will be able to maintain my current health status.

D3: Fear Arousal Communications (Conditions 1-8)

Condition 1- Short-term severity- Personal susceptibility -Intention Implementation

Plan (Yes)

You have a 40% increased risk of developing obesity, if you are:

- between the ages of 18-30
- have a diet that is low in fruits and vegetables
- prefer take- out and fast foods over home prepared meals
- **do** not normally engage in regular physical activity daily

Obesity has been associated with:

- Chronic fatigue, tiredness and shortness of breath while performing simple activities such as walking or climbing stairs
- Ostracism, discrimination and harassment
- Unattractiveness and fewer dates

Many people are aware that physical activity will decrease weight gain leading to obesity and as a result find that they intend to take at least one 30 minute session of physical activity but find that they forgot or never get around to it. It has been found that if you form a definite plan of exactly when and where you will carry out an intended behavior you are more likely to actually do so and less likely to forget or find that you don't get around to doing it. It would be useful for you to plan when and where you will increase your physical activity in the next 2 weeks. Therefore, please complete the following sentence: During the next 2 weeks, I will partake in at **least 30 minutes of moderate intensity physical activity** on _____ day/days, at _____ time of day, at _____ location.

Condition 2 –Short-term severity -Group Susceptibility -Intention implementation

plan (Yes)

You and your circle of friends have a 40% increased risk of developing obesity if you are:

- between the ages of 18-30
- have a diet that is low in fruits and vegetables
- prefer take- out and fast foods over home prepared meals
- **do** not normally engage in regular physical activity daily

Obesity has been associated with

- Chronic fatigue, tiredness and shortness of breath while performing simple daily activities such as walking or climbing stairs
- Ostracism, discrimination and harassment
- Unattractiveness and fewer dates

Many people are aware that physical activity will decrease weight gain leading to obesity and as a result find that they intend to take at least one 30 minute session of physical activity but find that they forgot or never get around to it. It has been found that if you form a definite plan of exactly when and where you will carry out an intended behavior you are more likely to actually do so and less likely to forget or find that you don't get around to doing it. It would be useful for you to plan when and where you will increase your physical activity in the next 2 weeks. Therefore please complete the following sentence: During the next 2 weeks, I will partake in at **least 30 minutes of moderate intensity physical activity** on _____ day/days, at _____ time of day, at _____ location.

Condition 3-Long-term Severity- Personal Susceptibility -Intention implementation

plan (Yes)

You have a 40% increased risk of developing obesity, if you are:

- between the ages of 18-30
- have a diet that is low in fruits and vegetables
- prefer take- out and fast foods over home prepared meals
- **do** not normally engage in regular physical activity daily

Obesity has been associated with

- Chronic diseases such as diabetes, hypertension, cancer, infertility, and even premature death
- Unemployment, lower salaries and fewer job promotions
- Fewer marriage and family opportunities

Many people are aware that physical activity will decrease weight gain leading to obesity and as a result find that they intend to take at least one 30 minute session of physical activity but find that they forgot or never get around to it. It has been found that if you form a definite plan of exactly when and where you will carry out an intended behavior you are more likely to actually do so and less likely to forget or find that you don't get around to doing it. It would be useful for you to plan when and where you will increase your physical activity in the next 2 weeks. Therefore, please complete the following sentence: During the next 2 weeks, I will partake in at **least 30 minutes of moderate intensity physical activity** on _____ day/days, at _____ time of day, at _____ location.

Condition 4- Long-term Severity- Group Susceptibility-Implementation Intention

(Yes)

You and your circle of friends have a 40% increased risk of developing obesity if you are:

- between the ages of 18-30
- have a diet that is low in fruits and vegetables
- prefer take- out and fast foods over home prepared meals
- **do** not normally engage in regular physical activity daily

Obesity has been associated with

- Chronic diseases such as diabetes, hypertension, cancer, infertility, and even premature death
- Unemployment, lower salaries and fewer job promotions
- Fewer marriage and family opportunities

Many people are aware that physical activity will decrease weight gain leading to obesity and as a result find that they intend to take at least one 30 minute session of physical activity but find that they forgot or never get around to it. It has been found that if you form a definite plan of exactly when and where you will carry out an intended behavior you are more likely to actually do so and less likely to forget or find that you don't get around to doing it. It would be useful for you to plan when and where you will increase your physical activity in the next 2 weeks. Therefore, please complete the following sentence: During the next 2 weeks, I will partake in at least **30 minutes of moderate intensity physical activity** on _____ day/days, at _____ time of day, at _____ location.

Condition 5-Short-term Severity- Personal Susceptibility -No Implementation

Intention

You have a 40% increased risk of developing obesity, if you are:

- between the ages of 18-30
- have diets that are low in fruits and vegetables
- prefer take- out and fast foods over home prepared meals
- **do** not normally engage in regular physical activity daily

Obesity has been associated with:

- Chronic fatigue, tiredness and shortness of breath while performing simple activities such as walking or climbing stairs
- Ostracism, discrimination and harassment
- Unattractiveness and fewer dates

Young women attending college generally find that it is an extremely exhilarating albeit stressful experience. There are several reasons for the causes of college associated stress. For example, some young women having to leave the safety and security of the family home find the prospect of living on campus or alone stressful, while others view the prospect of living on their own and away from parents and family invigorating and liberating. Other forms of stress come from the prospects of having to develop new social networks, while focusing on academic success. No matter what the individual concern, you women attending college will find that the experience can be especially rewarding once they learn how to prioritize and effectively manage their time. Therefore, it is important to list your activities and deadlines and categorize them according to their importance. Many find daily to-do lists very helpful.

Condition 6-Short-term Severity -Group Susceptibility -No Implementation

Intention

You & your circle of friends have a 40% increased risk of developing obesity if you are:

- between the ages of 18-30
- have a diets that is low in fruits and vegetables
- prefer take- out and fast foods over home prepared meals
- **do** not normally engage in regular physical activity daily

Obesity has been associated with:

- Chronic fatigue, tiredness and shortness of breath while performing simple activities such as walking or climbing stairs
- Ostracism, discrimination and harassment
- Unattractiveness and fewer dates

Young women attending college generally find that it is an extremely exhilarating albeit stressful experience. There are several reasons for the causes of college associated stress. For example, some young women having to leave the safety and security of the family home find the prospect of living on campus or alone stressful, while others view the prospect of living on their own and away from parents and family invigorating and liberating. Other forms of stress come from the prospects of having to develop new social networks, while focusing on academic success. No matter what the individual concern, you women attending college will find that the experience can be especially rewarding once they learn how to prioritize and effectively manage their time. Therefore, it is important to list your activities and deadlines and categorize them according to their importance. Many find daily to-do lists very helpful.

Condition 7-Long-term Severity- Personal Susceptibility -No Implementation

Intention

You have a 40% increased risk of developing obesity, if you are:

- between the ages of 18-30
- have a diet that is low in fruits and vegetables
- prefer take- out and fast foods over home prepared meals
- **do** not normally engage in regular physical activity daily

Obesity has been associated with

- Chronic diseases such as diabetes, hypertension, cancer, infertility, and even premature death
- Unemployment, lower salaries and fewer job promotions
- Fewer marriage and family opportunities

Young women attending college generally find that it is an extremely exhilarating albeit stressful experience. There are several reasons for the causes of college associated stress. For example, some young women having to leave the safety and security of the family home find the prospect of living on campus or alone stressful, while others view the prospect of living on their own and away from parents and family invigorating and liberating. Other forms of stress come from the prospects of having to develop new social networks, while focusing on academic success. No matter what the individual concern, you women attending college will find that the experience can be especially rewarding once they learn how to prioritize and effectively manage their time. Therefore, it is important to list your activities and deadlines and categorize them according to their importance. Many find daily to-do lists very helpful.

Condition 8- Long-term Severity- Group Susceptibility -No Implementation

Intention

You & your circle of friends have a 40% increased risk of developing obesity if you are:

- between the ages of 18-30
- have a diet that is low in fruits and vegetables
- prefer take- out and fast foods over home prepared meals
- **do** not normally engage in regular physical activity daily

Obesity has been associated with

- Chronic diseases such as diabetes, hypertension, cancer, infertility, and even premature death
- Unemployment, lower salaries and fewer job promotions
- Fewer marriage and family opportunities

Young women attending college generally find that it is an extremely exhilarating albeit stressful experience. There are several reasons for the causes of college associated stress. For example, some young women having to leave the safety and security of the family home find the prospect of living on campus or alone stressful, while others view the prospect of living on their own and away from parents and family invigorating and liberating. Other forms of stress come from the prospects of having to develop new social networks, while focusing on academic success. No matter what the individual concern, you women attending college will find that the experience can be especially rewarding once they learn how to prioritize and effectively manage their time. Therefore, it is important to list your activities and deadlines and categorize them according to their importance. Many find daily to-do lists very helpful.

D4: Protection Motivation Theory (PMT) Questionnaire (Pilot)

Please answer these questions using the following scale.

Scale

1=strongly disagree

2=disagree

3=neutral (neither disagree/nor agree)

4=agree

5=strongly agree

1) If I were to develop obesity, I would suffer a lot of discomfort.

1=strongly disagree 2=disagree 3=neutral 4=agree 5=strongly agree

2) Developing obesity would be unlikely to cause me to die prematurely.

1=strongly disagree 2=disagree 3=neutral 4=agree 5=strongly agree

3) If I continue to perform physical activity at the level I do now, my chances of developing obesity in the future are low.

1=strongly disagree 2=disagree 3=neutral 4=agree 5=strongly agree

4) If I continue to perform physical activity at the level I do now I am unlikely to develop obesity in the future.

1=strongly disagree 2=disagree 3=neutral 4=agree 5=strongly agree

For the next set of questions, please answer using a scale of 1-5.

5) The thought of developing obesity makes me feel

1=not at all frightened 2= 3=neutral 4= 5=very frightened

6) The thought of developing obesity makes me feel

1=not at all anxious 2= 3=neutral 4= 5=very anxious

7) The thought of developing obesity makes me feel

1=not all worried 2= 3=neutral 4= 5=very worried

8) The thought of developing obesity makes me feel

1=not at all scared 2= 3=neutral 4= 5=very scared

Physical activity is defined as 30 minutes of moderate intensity activity. Moderate intensity activities are those activities where you experience an increase in heart rate and breathing, but find it possible to speak comfortably.

For the next set of questions, please answer using a scale of 1-5.

- 9) Performing regular physical activity by engaging in at least 30 minutes of moderate activity at least once a week and doing so for 3-5 times a week is a good way of reducing the risk of developing obesity.
1=strongly disagree 2=disagree 3=neutral 4=agree 5=strongly agree
- 10) Engaging in at least one 30 minute session of moderate exercise at least once a week and doing so for 3-5 times a week one could lessen one's chances of developing obesity.
1=strongly disagree 2=disagree 3=neutral 4=agree 5=strongly agree
- 11) I am discouraged from taking at least one 30-minute session of moderate physical activity and doing so for 3-5 times during the next week because I feel unable to do so.
1=strongly disagree 2=disagree 3=neutral 4=agree 5=strongly agree
- 12) I feel confident in my ability to partake in at least one 30-minute session of moderate physical activity and doing so for 3-5 times during the next week.
1=strongly disagree 2=disagree 3=neutral 4=agree 5=strongly agree
- 13) Taking at least one 30-minute session of moderate physical activity and doing so for 3-5 times during the next week would be easy for me.
1=strongly disagree 2=disagree 3=neutral 4=agree 5=strongly agree
- 14) The benefits of taking at least one 30-minute session of moderate physical activity and doing so for 3-5 times a week would outweigh the costs.
1=strongly disagree 2=disagree 3=neutral 4=agree 5=strongly agree
- 15) Taking at least one 30-minute session of moderate physical activity and doing so for 3-5 times during the next week would cause me too many problems.
1=strongly disagree 2=disagree 3=neutral 4=agree 5=strongly agree
- 16) I would be discouraged from taking at least one 30-minute session of moderate physical activity and doing so for 3-5 times during the next week as it would take too much time.
1=strongly disagree 2=disagree 3=neutral 4=agree 5=strongly agree

17) I would be discouraged from taking at least one 30-minute session of moderate physical activity and doing so for 3-5 times a week because I would feel silly doing so.

1=strongly disagree 2=disagree 3=neutral 4=agree 5=strongly agree

18) I intend to partake in at least one 30-minute session of moderate physical activity (e.g. sport, swimming, aerobics, dancing, running or walking briskly) and doing so for 3-5 times during the next 2 weeks.

1=strongly disagree 2=disagree 3=neutral 4=agree 5=strongly agree

Please answer the following question by indicating the number from 0-14 of days that you plan to engage in at least 30 minutes of moderate physical activity.

19) I intend to engage in 30 minutes of moderate physical activity _____ days during the next 2 weeks.

Time1: Thank You for your participation. As a reminder, you will be contacted within the next week with the information necessary to complete your follow-up sessions.

Time2: Thank you for your participation. Remember, you can return in two weeks to complete the optional 3rd phase of this study and receive an additional .5 credits.

Time3: Thank you for your participation.

D5: Debriefing Statement

We would like to thank you for taking part in the current study and for providing the very important necessary information. The current goal of this study is to examine the effects making the threat of obesity more salient to young, physically inactive females would have on their physical activity intentions and subsequent physical activity performance. Therefore, it was necessary to manipulate certain conditions in the essays you were asked to read to determine if these manipulations would have a significant impact on the intentions of young females to engage in physical activity.

In addition, some participants were asked to develop plans to exercise and these plans were also examined to determine if planning in advance would have a significant impact on the subsequent performance of physical activity.

In asking participants to read different essays, it provides the researcher with additional information that can be potentially used in determining which factors are more important to focus on when developing future interventions aimed at increasing levels of physical activity among inactive young adults with the primary goal of decreasing the consistent and rapidly growing rates of obesity among this group.

D6: Amended PMT Questionnaire

Protection Motivation Questionnaires (Primary Study)

Please answer these questions using the following scale.

Scale

1=strongly disagree

2=disagree

3=neutral (neither disagree/nor agree)

4=agree

5=strongly agree

- 1) If I were to develop obesity, I would suffer a lot of discomfort.
- 2) Developing obesity is **unlikely** to cause me to die prematurely.
- 3) If I continue performing physical activity at my current level of performance, my chances of developing obesity in the future are low.
- 4) If I continue performing physical activity at my current level of performance, I am **unlikely** to develop obesity in the future.

For the next set of questions, please answer using a scale of 1-5.

1) The thought of developing obesity makes me feel
1=not at all frightened 2= 3=neutral 4= 5=very frightened

2) The thought of developing obesity makes me feel
1=not at all anxious 2= 3=neutral 4= 5=very anxious

3) The thought of developing obesity makes me feel
1=not all worried 2= 3=neutral 4= 5=very worried

4) The thought of developing obesity makes me feel
1=not at all scared 2= 3=neutral 4= 5=very scared

Physical activity is defined as 30 minutes of moderate intensity activity. Moderate intensity activities are those activities where you experience an increase in heart rate and breathing, but find it possible to speak comfortably.

For the next set of questions, please answer using the following scale.

Scale

1=strongly disagree

- 2=disagree
 3=neutral (neither disagree/nor agree)
 4=agree
 5=strongly agree

Performing regular physical activity by engaging in at least 30 minutes of moderate physical activity at least once a week.....

- 1) Is a good way to reduce the risk of obesity.
- 2) Could lessen one's chances of developing obesity.
- 3) Is discouraging to me because I am physically unable to do so.
- 4) Would be very easy for me to do physically.
- 5) Is beneficial in decreasing the risk of developing obesity.
- 6) Would outweigh the costs of not performing at least 30 minutes of moderate physical activity at least one time a week.
- 7) Would cause too many inconveniences for me.
- 8) Would be too time consuming for me.
- 9) Would make me feel uncomfortable, so I am discouraged from doing so.
- 10) Is my intention for the next 2 weeks.

Now, the next set of questions is very similar to those you just completed, except your responses will be based on performing 30 minutes of moderate physical activity at least **3-5** times a week, rather than at least once weekly.

Remember that physical activity is defined as 30 minutes of moderate intensity activity. Moderate intensity activities are those activities where you experience an increase in heart rate and breathing, but find it possible to speak comfortably. For the following set of questions, please answer using the following scale.

- Scale**
 1=strongly disagree
 2=disagree
 3=neutral (neither disagree/nor agree)
 4=agree
 5=strongly agree

Performing regular physical activity by engaging in at least 30 minutes of moderate physical activity at least **3-5** times a week.....

- 1) Is a good way to reduce the risk of obesity.
- 2) Could lessen one's chances of developing obesity.
- 3) Is discouraging to me because I am physically unable to do so.
- 4) Would be very easy for me to do physically.
- 5) Is beneficial in decreasing the risk of developing obesity.
- 6) Would outweigh the costs of not performing at least 30 minutes of moderate physical activity at least 3-5 times a week.
- 7) Would cause too many inconveniences for me.
- 8) Would be too time consuming for me.
- 9) Would make me feel uncomfortable, so I am discouraged from doing so.
- 10) Is my intention for the next 2 weeks.

Please answer the following question by indicating the number from 0-14 of days that you plan to engage in at least 30 minutes of moderate physical activity.

- 11) I intend to engage in 30 minutes of moderate physical activity _____ days during the next 2 weeks.

Time 1: Thank you for your participation. As a reminder, you will be contacted within the next week with the information necessary to complete your follow-up sessions.

Time 2: Thank you for your participation. Remember, you can return in two weeks to complete the optional 3rd phase of this study and receive an additional .5 credits.

Time 3: Thank you for your participation.

APPENDIX E: TABLES

Table 1

Young Adult's Perceptions Regarding Obesity and Physical Activity

Theme	Perception
Obesity	
Susceptibility	Family history of obesity Poor dietary habits (Past/Present) Sedentary lifestyle Lack of nutritional information Negative reinforcements
Severity	Difficulties in romantic relationships Health problems Premature death Negative perception by others Lower levels of self-esteem
Health Risks	Heart disease/Atherosclerosis Diabetes High blood pressure/cholesterol
Physical Activity	
Benefits	Health maintenance/staying fit Weight loss Popularity Fun, enjoyment Social Connections
Barriers	Lack of energy/ time/ interest/ motivation Other priorities (family, employment, school) Preference for sedentary activities (TV, internet, Facebook, etc.)

Table 2

Comparison of Participants Completing Survey at Times 1 and 2 and at Time 1 Only

<u>Variable</u>	<u>Times 1 & 2</u>		<u>Time 1</u>		<u>t(169)</u>	<u>p</u>
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>		
Age	21.40	2.67	21.5	2.97	0.245	0.81
Body Mass Index	30.94	6.02	31.3	8.99	0.261	0.80
Current Physical Activity	9.20	6.78	10.2	6.58	0.746	0.46
Obesity Fear	3.54	0.91	3.44	0.82	-0.587	0.56
Severity	4.42	0.937	4.53	0.71	0.617	0.54
Susceptibility	3.01	1.14	3.31	1.08	1.370	0.17
Fear	4.47	0.59	4.35	0.80	-0.937	0.35
Response Efficacy	4.40	0.55	4.49	0.69	0.807	0.42
Self-efficacy	4.07	0.82	4.04	0.85	-0.182	0.86
Protection Motivation	4.15	0.80	4.21	0.83	0.334	0.74
Response Costs	2.04	0.96	2.11	0.95	0.343	0.73
Physical Activity	6.69	3.53	6.64	2.92	-0.079	0.94

* $p < .05$ ** $p < .01$

Table 3

Comparison of Participants Completing Survey at Times 1, 2 and 3 and at Time 2 Only

<u>Variable</u>	<u>Times 1-3</u>		<u>Time 2</u>		<u>t(135)</u>	<u>p</u>
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>		
Age	21.38	2.58	21.44	2.84	0.128	0.90
Body Mass Index	31.64	6.77	29.71	4.22	-1.820	0.07
Current Physical Activity	8.94	6.62	9.64	7.06	0.579	0.56
Obesity Fear	3.46	0.90	3.68	0.91	1.356	0.18
Severity	4.40	0.90	4.46	1.01	0.346	0.73
Susceptibility	3.13	1.13	2.81	1.15	-1.556	0.12
Fear	4.49	0.59	4.42	0.59	-0.632	0.53
Response Efficacy	4.38	0.55	4.42	0.55	0.391	0.70
Self-efficacy	4.02	0.87	4.15	0.74	0.855	0.39
Protection Motivation	4.21	0.74	4.06	0.91	-1.039	0.30
Response Costs	2.07	1.03	2.01	0.82	-0.323	0.75
Physical Activity	6.71	3.76	6.66	3.14	-0.068	0.95

* $p < .05$ ** $p < .01$

Table 4

Intercorrelations between SEV1 and SEV2 with Fear Scale at Time 1, Time 2 and Time 3

Variable Name	Time 1 <i>N</i> =171	Time 2 <i>N</i> =137	Time 3 <i>N</i> =87
SEV1	.48**	.52**	.49**
SEV2	.04	.08	.16

* $p < .05$ ** $p < .01$

Table 5

Intercorrelations between Fear Items at Time 1, Time 2, and Time 3

Variable Name	1	2	3	4
Time 1 (<i>N</i> = 171)				
1. Frightened		.49**	.85**	.82**
2. Anxious			.54**	.51**
3. Worried				.91**
4. Scared				
Time 2 (<i>N</i> = 137)				
1. Frightened		.67**	.84**	.84**
2. Anxious			.73**	.65**
3. Worried				.91**
4. Scared				
Time 3 (<i>N</i> = 87)				
1. Frightened		.82**	.80**	.74**
2. Anxious			.87**	.81**
3. Worried				.89**
4. Scared				

* $p < .05$ ** $p < .01$

Table 6

Intercorrelations between Response Efficacy Items at Time 1, Time 2 and Time 3

Variable Name	1	2	3	4	5	6	7	8
Time 1 (N = 171)								
1. RE1Low		.77**	.71**	.05	.14	.24**	.12	.02
2. RE2Low			.72**	.12	.29**	.37**	.26**	.13
3. RE3Low				.15	.36**	.45**	.38**	.11
4. RE4low					.16*	.16*	.18*	.50*
5. RE1High						.88**	.61**	.30**
6. RE2High							.58**	.31**
7. RE3High								.41**
8. RE4High								
Time 2 (N = 137)								
1. RE1Low		.91**	.70**	.35*	.32*	.33*	.26*	.16
2. RE2Low			.74**	.43**	.38**	.40**	.34**	.25**
3. RE3Low				.38**	.25**	.29**	.33**	.23**
4. RE4low					.20*	.22**	.20*	.69**
5. RE1High						.96**	.66**	.33**
6. RE2High							.70**	.34**
7. RE3High								.30**
8. RE4High								
Time 3 (N = 87)								
1. RE1Low		.73**	.74**	-.02	.04	.12	.06	.06
2. RE2Low			.72**	.06	.10	.21*	.18	.03
3. RE3Low				.05	.13	.24**	.30**	-.05
4. RE4low					.05	.09	.10	.48**
5. RE1High						.83**	.45**	.20
6. RE2High							.45**	.26*
7. RE3High								.29**
8. RE4High								

* $p < .05$ ** $p < .01$

Table 7

Intercorrelations between Self-efficacy Items at Time 1, Time 2 and Time 3

Variable Name	1	2	3	4
Time 1 (N = 171)				
1. SE1		.62**	.60**	.43**
2. SE2			.46**	.63**
3. SE3				.31**
4. SE4				
Time 2 (N = 137)				
1. SE1		.41**	.65**	.37**
2. SE2			.48**	.56**
3. SE3				.35**
4. SE4				
Time 3 (N = 87)				
1. SE1		.45**	.70**	.31**
2. SE2			.41**	.53**
3. SE3				.32**
4. SE4				

* $p < .05$ ** $p < .01$

Table 8

Intercorrelations between Response Costs Items at Time 1, Time 2 and Time 3

Variable Name	1	2	3	4	5	6
Time 1 (<i>N</i> = 171)						
1. RC1low		.79**	.60**	.66**	.62**	.64**
2. RC2low			.70**	.68**	.68**	.70**
3. RC3low				.58**	.58**	.81**
4. RC1High					.90**	.66**
5. RC2High						.65**
6. RC3High						
Time 2 (<i>N</i> = 137)						
1. RC1low		.82**	.67**	.73**	.69**	.61**
2. RC2low			.75**	.67**	.67**	.63**
3. RC3low				.56**	.56**	.83**
4. RC1High					.92**	.67**
5. RC2High						.66**
6. RC3High						
Time 3 (<i>N</i> = 87)						
1. RC1low		.85**	.77**	.74**	.68**	.62**
2. RC2low			.78**	.70**	.68**	.55**
3. RC3low				.71**	.63**	.75**
4. RC1High					.87**	.70**
5. RC2High						.69**
6. RC3High						

**p* < .05 ** *p* < .01

Table 9

Analysis of Variance for Main Effect of Severity Manipulation (Short, Long) on Protection Motivation Outcomes at Time 1 and Time 2
($N = 87$)

Variable	Time 1				Time 2			
	<i>MS</i>	<i>F</i> (1,79)	<i>p</i>	η^2	<i>MS</i>	<i>F</i> (1,79)	<i>p</i>	η^2
Severity	0.82	0.98	0.32	0.01	0.07	0.09	0.77	0.00
Susceptibility	4.37	3.66	0.06	0.04	1.41	1.10	0.30	0.01
Fear	0.03	0.08	0.79	0.00	0.73	1.95	0.17	0.02
Response Efficacy	0.17	0.52	0.47	0.01	0.13	0.35	0.56	0.00
Self-efficacy	0.00	0.00	0.98	0.00	0.22	0.33	0.57	0.00
Response Costs	0.51	0.46	0.50	0.01	0.01	0.01	0.91	0.00
Protection Motivation	0.32	0.59	0.45	0.01	0.66	0.91	0.34	0.01
Intended Physical Activity	6.70	0.46	0.50	0.01	2.53	0.17	0.68	0.00

* $p < .05$ ** $p < .01$

Table 10

Analysis of Variance for the Main Effect of Severity Manipulation (Short, Long) on Protection Motivation Outcomes at Time 3 ($N = 87$)

Variable	Time 3			
	<i>MS</i>	<i>F</i> (1,79)	<i>p</i>	η^2
Severity	0.05	0.09	0.77	0.00
Susceptibility	0.30	0.27	0.61	0.00
Fear	0.30	0.70	0.41	0.01
Response Efficacy	0.32	0.85	0.36	0.01
Self-efficacy	0.38	0.57	0.45	0.01
Response Costs	0.10	0.12	0.73	0.00
Protection Motivation	0.14	0.18	0.67	0.00
Intended Physical Activity	1.47	0.09	0.76	0.00

* $p < .05$ ** $p < .01$

Table 11

Analysis of Variance for Main Effect of Susceptibility Manipulation (Personal, Group) on Protection Motivation Outcomes at Time 1 and Time 2 ($N = 87$)

Variable	Time 1				Time 2			
	<i>MS</i>	<i>F (1,79)</i>	<i>p</i>	η^2	<i>MS</i>	<i>F (1,79)</i>	<i>p</i>	η^2
Severity	0.04	0.05	0.82	0.00	0.01	0.01	0.91	0.00
Susceptibility	0.03	0.03	0.87	0.00	0.77	0.60	0.44	0.01
Fear	0.81	2.25	0.14	0.03	1.30	3.46	0.07	0.04
Response Efficacy	0.10	0.30	0.58	0.00	0.16	0.42	0.52	0.01
Self-efficacy	0.00	0.00	0.99	0.00	0.25	0.38	0.54	0.01
Response Costs	1.06	0.97	0.33	0.01	2.45	2.57	0.11	0.03
Protection Motivation	0.07	0.14	0.71	0.00	0.52	0.72	0.40	0.01
Intended Physical Activity	2.00	0.14	0.71	0.00	12.12	0.80	0.37	0.01

* $p < .05$ ** $p < .01$

Table 12

Analysis of Variance for the Main Effect of Susceptibility Manipulation (Personal, Group) on Protection Motivation Outcomes at Time 3 ($N = 87$)

Time 3				
Variable	<i>MS</i>	<i>F</i> (1,79)	<i>p</i>	η^2
Severity	1.26	2.21	0.14	0.03
Susceptibility	1.64	1.48	0.23	0.02
Fear	0.06	0.13	0.72	0.00
Response Efficacy	0.00	0.01	0.92	0.00
Self-efficacy	0.02	0.03	0.86	0.00
Response Costs	0.75	0.91	0.34	0.01
Protection Motivation	0.20	0.26	0.61	0.00
Intended Physical Activity	7.51	0.47	0.49	0.01

* $p < .05$ ** $p < .01$

Table 13

Analysis of Variance for the Main Effect of Intention Implementation Plan (Yes, No) on Protection Motivation Outcomes at Time 1 and Time 2 ($N = 87$)

Variable	Time 1				Time 2			
	<i>MS</i>	<i>F</i> (1,79)	<i>p</i>	η^2	<i>MS</i>	<i>F</i> (1,79)	<i>p</i>	η^2
Severity	0.81	0.97	0.33	0.01	0.33	0.40	0.53	0.01
Susceptibility	1.21	1.02	0.32	0.01	6.44	5.01	0.03*	0.06
Fear	0.16	0.43	0.51	0.01	0.07	0.18	0.67	0.00
Response Efficacy	0.04	0.14	0.71	0.00	0.16	0.42	0.52	0.01
Self-efficacy	0.29	0.39	0.53	0.01	0.03	0.05	0.83	0.00
Response Costs	0.00	0.00	0.97	0.00	0.51	0.54	0.47	0.01
Protection Motivation	0.69	1.29	0.26	0.02	4.59	6.37	0.01*	0.08
Intended Physical Activity	2.42	0.17	0.69	0.00	0.11	0.01	0.93	0.00

* $p < .05$ ** $p < .01$

Table 14

Analysis of Variance for the Main Effect of Intention Implementation Plan (Yes, No) on Protection Motivation Outcomes at Time 3 ($N = 87$)

Variable	Time 3			
	<i>MS</i>	<i>F (1,79)</i>	<i>p</i>	η^2
Severity	0.22	0.39	0.53	0.01
Susceptibility	1.03	0.92	0.34	0.01
Fear	0.68	1.58	0.21	0.02
Response Efficacy	0.25	0.67	0.42	0.01
Self-efficacy	0.14	0.21	0.65	0.00
Response Costs	0.00	0.01	0.95	0.00
Protection Motivation	0.88	1.17	0.28	0.02
Intended Physical Activity	3.89	0.25	0.62	0.00

* $p < .05$ ** $p < .01$

Table 15

Analysis of Variance for the Interaction Effect of Severity Manipulation (Short, Long) x Susceptibility Manipulation (Personal, Group) on Protection Motivation Outcomes at Time 1 and Time 2 ($N = 87$)

Variable	Time 1				Time 2			
	<i>MS</i>	<i>F</i> (1,79)	<i>p</i>	η^2	<i>MS</i>	<i>F</i> (1,79)	<i>p</i>	η^2
Severity	1.28	1.52	0.22	0.02	0.07	0.08	0.78	0.00
Susceptibility	0.99	0.83	0.36	0.01	0.05	0.04	0.84	0.00
Fear	0.31	0.85	0.36	0.01	0.09	0.24	0.62	0.00
Response Efficacy	0.07	0.23	0.64	0.00	0.21	0.53	0.47	0.01
Self-efficacy	0.08	0.11	0.74	0.00	3.09	4.75	0.03*	0.06
Response Costs	0.38	0.34	0.56	0.00	1.01	1.06	0.31	0.01
Protection Motivation	0.02	0.03	0.86	0.00	0.28	0.38	0.54	0.01
Intended Physical Activity	1.41	0.10	0.76	0.00	16.95	1.12	0.29	0.01

* $p < .05$ ** $p < .01$

Table 16

Analysis of Variance for the Interaction Effect of Severity Manipulation (Short, Long) x Susceptibility Manipulation (Personal, Group) on Protection Motivation Outcomes at Time 3 ($N = 87$)

Variable	Time 3			
	<i>MS</i>	<i>F (1,79)</i>	<i>p</i>	η^2
Severity	0.02	0.04	0.85	0.00
Susceptibility	0.01	0.01	0.93	0.00
Fear	0.03	0.06	0.81	0.00
Response Efficacy	0.34	0.91	0.34	0.01
Self-efficacy	0.00	0.00	1.00	0.00
Response Costs	0.21	0.25	0.62	0.00
Protection Motivation	0.66	0.87	0.35	0.01
Intended Physical Activity	4.22	0.27	0.61	0.00

* $p < .05$ ** $p < .01$

Table 17

Analysis of Variance for the Interaction Effect of Severity Manipulation (Short, Long) x Intention Implementation Plan Manipulation (Yes, No) on Protection Motivation Outcomes at Time 1 and Time 2 ($N = 87$)

Variable	Time 1				Time 2			
	<i>MS</i>	<i>F</i> (1,79)	<i>p</i>	η^2	<i>MS</i>	<i>F</i> (1,79)	<i>p</i>	η^2
Severity	0.00	0.00	0.95	0.00	0.00	0.00	0.96	0.00
Susceptibility	3.59	3.01	0.09	0.04	0.08	0.07	0.80	0.00
Fear	0.31	0.87	0.36	0.01	0.10	0.27	0.61	0.00
Response Efficacy	0.31	0.98	0.33	0.01	0.65	1.69	0.20	0.02
Self-efficacy	0.01	0.01	0.93	0.00	0.47	0.72	0.40	0.01
Response Costs	0.10	0.09	0.76	0.00	0.13	0.13	0.72	0.00
Protection Motivation	0.30	0.57	0.45	0.01	0.40	0.55	0.46	0.01
Intended Physical Activity	0.84	0.06	0.81	0.00	1.61	0.11	0.75	0.00

* $p < .05$ ** $p < .01$

Table 18

Analysis of Variance for the Interaction Effect of Severity Manipulation (Short, Long) x Intention Implementation Manipulation (Yes, No) on Protection Motivation Outcomes at Time 3 ($N = 87$)

Variable	Time 3			
	<i>MS</i>	<i>F (1,79)</i>	<i>p</i>	η^2
Severity	0.41	0.73	0.40	0.01
Susceptibility	0.55	0.49	0.48	0.01
Fear	0.19	0.45	0.51	0.01
Response Efficacy	0.73	1.95	0.17	0.02
Self-efficacy	0.05	0.08	0.78	0.00
Response Costs	0.00	0.00	0.96	0.00
Protection Motivation	0.15	0.19	0.66	0.00
Intended Physical Activity	1.42	0.09	0.77	0.00

* $p < .05$ ** $p < .01$

Table 19

Analysis of Variance for Interaction Effect of Susceptibility Manipulation (Personal, Group) x Intention Implementation Plan Manipulation (Yes, No) on Protection Motivation Outcomes at Time 1 and Time 2 ($N = 87$)

Variable	Time 1				Time 2			
	<i>MS</i>	<i>F</i> (1,79)	<i>p</i>	η^2	<i>MS</i>	<i>F</i> (1,79)	<i>p</i>	η^2
Severity	0.25	0.50	0.58	0.00	2.88	3.42	0.07	0.04
Susceptibility	2.59	2.17	0.15	0.03	1.46	1.13	0.29	0.01
Fear	0.42	1.17	0.28	0.02	0.19	0.51	0.48	0.01
Response Efficacy	0.35	1.12	0.29	0.01	0.05	0.12	0.73	0.00
Self-efficacy	1.27	1.70	0.20	0.02	0.15	0.23	0.64	0.00
Response Costs	0.20	0.18	0.67	0.00	0.88	0.92	0.34	0.01
Protection Motivation	1.80	3.35	0.07	0.04	2.82	3.92	0.05*	0.05
Intended Physical Activity	3.20	0.22	0.64	0.00	2.01	0.13	0.72	0.00

* $p < .05$ ** $p < .01$

Table 20

Analysis of Variance for Interaction Effect of Susceptibility Manipulation (Personal, Group) x Intention Implementation Plan Manipulation (Yes, No) on Protection Motivation Outcomes at Time 3 ($N = 87$)

Variable	Time 3			
	<i>MS</i>	<i>F (1,79)</i>	<i>p</i>	η^2
Severity	0.71	1.25	0.27	0.02
Susceptibility	0.85	0.76	0.39	0.01
Fear	1.38	3.20	0.08	0.04
Response Efficacy	0.01	0.02	0.88	0.00
Self-efficacy	0.09	0.14	0.71	0.00
Response Costs	0.24	0.29	0.59	0.00
Protection Motivation	1.07	1.41	0.24	0.02
Intended Physical Activity	2.48	0.16	0.69	0.00

* $p < .05$ ** $p < .01$

Table 21

Analysis of Variance for the Interaction Effect of Severity Manipulation (Short, Long) x Susceptibility Manipulation (Personal, Group) x Intention Implementation Plan Manipulation (Yes, No) on Protection Motivation Outcomes at Time 1 and Time 2 ($N = 87$)

Variable	Time 1				Time 2			
	<i>MS</i>	<i>F</i> (1,79)	<i>p</i>	η^2	<i>MS</i>	<i>F</i> (1,79)	<i>p</i>	η^2
Severity	0.24	0.28	0.60	0.00	0.04	0.05	0.83	0.00
Susceptibility	2.73	2.29	0.14	0.03	0.31	0.24	0.63	0.00
Fear	0.07	0.18	0.67	0.00	0.35	0.93	0.34	0.01
Response Efficacy	0.37	1.17	0.28	0.02	0.32	0.82	0.37	0.01
Self-efficacy	4.02	5.37	0.02*	0.06	1.48	2.28	0.14	0.03
Response Costs	3.52	3.21	0.08	0.04	0.96	1.01	0.32	0.01
Protection Motivation	1.15	2.14	0.15	0.03	0.98	1.37	0.25	0.02
Intended Physical Activity	32.85	2.24	0.14	0.03	3.74	0.25	0.62	0.00

* $p < .05$ ** $p < .01$

Table 22

Analysis of Variance for the Interaction Effect of Severity Manipulation (Short, Long) x Susceptibility Manipulation (Personal, Group) x Intention Implementation Manipulation (Yes, No) on Protection Motivation Outcomes at Time 3 ($N = 87$)

Variable	Time 3			
	<i>MS</i>	<i>F (1,79)</i>	<i>p</i>	η^2
Severity	0.00	0.00	0.95	0.00
Susceptibility	1.09	0.98	0.33	0.01
Fear	0.49	1.14	0.29	0.01
Response Efficacy	0.13	0.36	0.55	0.00
Self-efficacy	1.28	1.95	0.17	0.02
Response Costs	0.94	1.15	0.29	0.01
Protection Motivation	0.02	0.02	0.88	0.00
Intended Physical Activity	0.07	0.00	0.95	0.00

* $p < .05$ ** $p < .01$

Table 23

Repeated Measures Analysis of Variance for the Main Effect of Time on Protection Motivation Outcomes for Time 1 and 2 and Time 1, 2 and 3 ($N = 87$)

Variable	Time 1 and 2				Time 1, 2 and 3			
	<i>MS</i>	<i>F</i> (1,79)	<i>p</i>	η^2	<i>MS</i>	<i>F</i> (1,79)	<i>p</i>	η^2
Severity	0.56	0.86	0.36	0.01	0.63	1.11	0.33	0.01
Susceptibility	2.17	4.70	0.03*	0.06	3.91	8.69	0.00**	0.10
Fear	0.00	0.03	0.86	0.00	0.09	0.72	0.49	0.01
Response Efficacy	0.03	0.26	0.61	0.00	0.03	0.20	0.82	0.00
Self-efficacy	0.02	0.11	0.75	0.00	0.14	0.80	0.45	0.01
Response Costs	0.01	0.03	0.87	0.00	0.93	4.12	0.02*	0.05
Protection Motivation	0.37	2.22	0.14	0.03	0.20	0.77	0.47	0.01
Intended Physical Activity	5.51	1.53	0.22	0.02	15.56	3.45	0.03*	0.04

* $p < .05$ ** $p < .01$

Table 24

Repeated Measures Analysis of Variance for the Interaction Effect of Time x Severity on Protection Motivation Outcomes at Time 1 and 2 and Time 1, 2 and 3 (N = 87)

Variable	Time 1 and 2				Time 1, 2 and 3			
	MS	F (1,79)	p	η^2	MS	F (1,79)	p	η^2
Severity	0.20	0.31	0.58	0.00	0.34	0.60	0.54	0.01
Susceptibility	0.41	0.89	0.35	0.01	0.61	1.34	0.26	0.02
Fear	0.24	3.48	0.07	0.04	0.12	0.97	0.38	0.01
Response Efficacy	0.00	0.01	0.94	0.00	0.01	0.09	0.92	0.00
Self-efficacy	0.12	0.68	0.41	0.01	0.29	1.66	0.19	0.02
Response Costs	0.18	0.73	0.40	0.01	0.27	1.20	0.30	0.02
Protection Motivation	0.03	0.19	0.67	0.00	0.05	0.19	0.83	0.00
Intended Physical Activity	0.50	0.14	0.71	0.00	0.51	0.11	0.89	0.00

* $p < .05$ ** $p < .01$

Note: Within Subject Effects only
(between subjects effects reported on earlier table)

Table 25

Repeated Measures Analysis of Variance for the Interaction Effect of Time x
Susceptibility on Protection Motivation Outcomes at Time 1 and 2 and Time 1, 2 and 3
($N = 87$)

Variable	Time 1 and 2				Time 1, 2 and 3			
	<i>MS</i>	<i>F</i> (1,79)	<i>p</i>	η^2	<i>MS</i>	<i>F</i> (1,79)	<i>p</i>	η^2
Severity	0.01	0.01	0.93	0.00	0.33	0.58	0.55	0.01
Susceptibility	0.56	1.21	0.28	0.02	0.57	1.27	0.28	0.02
Fear	0.03	0.42	0.52	0.01	0.29	1.78	0.18	0.02
Response Efficacy	0.25	2.00	0.16	0.03	0.13	1.03	0.36	0.01
Self-efficacy	0.13	0.75	0.39	0.01	0.07	0.39	0.68	0.01
Response Costs	0.14	0.58	0.45	0.01	0.14	0.61	0.54	0.01
Protection Motivation	0.10	0.60	0.44	0.01	0.39	1.34	0.26	0.02
Intended Physical Activity	11.98	3.33	0.07	0.04	11.33	2.38	0.10	0.03

* $p < .05$ ** $p < .01$

Note: Within Subject Effects only
(between subjects effects reported on earlier table)

Table 26

Repeated Measures Analysis of Variance for the Interaction Effect of Time x Intention Implementation Plan on Protection Motivation Outcomes at Time 1 and 2 and Time 1, 2 and 3 ($N = 87$)

Variable	Time 1 and 2				Time 1, 2 and 3			
	<i>MS</i>	<i>F</i> (1,79)	<i>p</i>	η^2	<i>MS</i>	<i>F</i> (1,79)	<i>p</i>	η^2
Severity	0.05	0.08	0.78	0.00	0.54	0.96	0.38	0.01
Susceptibility	1.03	2.24	0.14	0.03	0.74	1.64	0.20	0.02
Fear	0.01	0.13	0.72	0.00	0.09	0.71	0.49	0.01
Response Efficacy	0.02	0.15	0.70	0.00	0.02	0.17	0.84	0.00
Self-efficacy	0.07	0.40	0.53	0.01	0.04	0.20	0.82	0.00
Response Costs	0.29	1.16	0.29	0.01	0.17	0.77	0.46	0.01
Protection Motivation	0.86	5.19	0.03*	0.06	0.53	2.06	0.13	0.03
Intended Physical Activity	1.77	0.49	0.49	0.01	1.50	0.33	0.72	0.00

* $p < .05$ ** $p < .01$

Note: Within Subject Effects only
(between subjects effects reported on earlier table)

Table 27

Repeated Measures Analysis of Variance for the Interaction Effect of Time x Severity x Susceptibility on Protection Motivation Outcomes at Time 1 and 2 and Time 1, 2, and 3 ($N = 87$)

Variable	Time 1 and 2				Time 1, 2 and 3			
	<i>MS</i>	<i>F</i> (1,79)	<i>p</i>	η^2	<i>MS</i>	<i>F</i> (1,79)	<i>p</i>	η^2
Severity	0.96	1.46	0.23	0.02	0.63	1.11	0.33	0.01
Susceptibility	0.75	1.62	0.21	0.02	0.40	0.89	0.41	0.01
Fear	0.03	0.46	0.50	0.01	0.17	1.07	0.33	0.01
Response Efficacy	0.26	2.04	0.16	0.03	0.21	1.65	0.20	0.02
Self-efficacy	1.08	6.28	0.01**	0.07	0.90	5.07	0.01**	0.06
Response Costs	0.08	0.31	0.58	0.00	0.08	0.37	0.69	0.10
Protection Motivation	0.08	0.47	0.50	0.01	0.13	0.46	0.61	0.01
Intended Physical Activity	4.29	1.19	0.28	0.02	2.65	0.50	0.58	0.01

* $p < .05$ ** $p < .01$

Note: Within Subject Effects only
(between subjects effects reported on earlier table)

Table 28

Repeated Measures Analysis of Variance for the Interaction Effect of
Time x Severity x Intention Implementation Plan on Protection
Motivation Outcomes at Time 1 and 2 and Time 1, 2 and 3 ($N = 87$)

Variable	Time 1 and 2				Time 1,2 and 3			
	<i>MS</i>	<i>F</i> (1,79)	<i>p</i>	η^2	<i>MS</i>	<i>F</i> (1,79)	<i>p</i>	η^2
Severity	0.01	0.01	0.93	0.00	0.15	0.26	0.76	0.00
Susceptibility	1.29	2.79	0.10	0.03	1.77	3.93	0.02*	0.05
Fear	0.03	0.43	0.52	0.01	0.27	2.19	0.12	0.03
Response Efficacy	0.03	0.25	0.62	0.00	0.03	0.21	0.81	0.00
Self-efficacy	0.19	1.10	0.30	0.01	0.10	0.58	0.56	0.01
Response Costs	0.00	0.00	0.95	0.00	0.03	0.13	0.87	0.00
Protection Motivation	0.00	0.02	0.89	0.00	0.02	0.06	0.94	0.00
Intended Physical Activity	0.06	0.02	0.90	0.00	0.04	0.01	0.99	0.00

* $p < .05$ ** $p < .01$

Note: Within Subject Effects only
(between subjects effects reported on earlier table)

Table 29

Repeated Measures Analysis of Variance for the Interaction Effect of Time x
Susceptibility x Intention Implementation Plan on Protection Motivation
Outcomes at Time 1 and 2 and Time 1, 2 and 3

Variable	Time 1 and 2				Time 1, 2 and 3			
	<i>MS</i>	<i>F</i> (1,79)	<i>p</i>	η^2	<i>MS</i>	<i>F</i> (1,79)	<i>p</i>	η^2
Severity	0.71	1.08	0.30	0.01	0.40	0.71	0.49	0.01
Susceptibility	0.08	0.18	0.68	0.00	1.86	4.12	0.02*	0.05
Fear	0.02	0.32	0.57	0.00	0.14	1.17	0.31	0.02
Response Efficacy	0.07	0.56	0.46	0.01	0.12	0.92	0.40	0.01
Self-efficacy	0.28	1.62	0.21	0.02	0.52	2.94	0.06	0.04
Response Costs	0.12	0.49	0.49	0.01	0.08	0.34	0.71	0.00
Protection Motivation	0.06	0.35	0.56	0.00	0.11	0.41	0.67	0.01
Intended Physical Activity	0.07	0.02	0.89	0.00	0.04	0.01	0.99	0.00

* $p < .05$ ** $p < .01$

Note: Within Subject Effects only
(between subjects effects reported on earlier table)

Table 30

Repeated Measures Analysis of Variance for the Interaction Effect of Time x Severity x Susceptibility x Intention Implementation Plan on Protection Motivation Outcomes at Time 1 and 2 and Time 1, 2 and 3

Variable	Time 1 and 2				Time 1, 2 and 3			
	<i>MS</i>	<i>F</i> (1,79)	<i>p</i>	η^2	<i>MS</i>	<i>F</i> (1,79)	<i>p</i>	η^2
Severity	0.04	0.06	0.80	0.00	0.05	0.10	0.90	0.00
Susceptibility	0.60	1.30	0.26	0.02	0.30	0.67	0.51	0.01
Fear	0.36	5.19	0.03*	0.06	0.27	2.21	0.11	0.03
Response Efficacy	0.00	0.01	0.93	0.00	0.02	0.13	0.88	0.00
Self-efficacy	0.31	1.81	0.18	0.02	0.23	1.33	0.27	0.02
Response Costs	0.40	1.62	0.21	0.02	0.28	1.23	0.29	0.02
Protection Motivation	0.00	0.02	0.89	0.00	0.27	1.07	0.35	0.01
Intended Physical Activity	7.22	2.00	0.16	0.03	7.86	1.74	0.18	0.02

* $p < .05$ ** $p < .01$

Note: Within Subject Effects only
(between subjects effects reported on earlier table)

Table 31

Analysis of Variance for Interaction Effect of Race/Ethnicity x Severity on Severity, Fear, Protection Motivation and Physical Activity (PMT)

<u>Variable</u>	<u>MS</u>	<u>F</u> <u>(1,79)</u>	<u>p</u>	<u>η^2</u>
<u>Time 1</u>				
Severity	0.25	0.31	0.82	0.05
Fear	0.05	0.13	0.94	0.01
Protection Motivation	0.36	0.65	0.59	0.02
<u>Time 2</u>				
Severity	0.65	0.79	0.50	0.03
Fear	0.24	0.64	0.59	0.02
Protection Motivation	0.24	0.30	0.82	0.01
Intended Physical Activity	5.21	0.36	0.78	0.01
<u>Time 3</u>				
Intended Physical Activity	2.83	0.18	0.91	0.01

* $p < .05$ ** $p < .01$

APPENDIX F: FIGURES

Figure 2. The Effect of Severity x Susceptibility Interaction on Self Efficacy Ratings at Time 2.

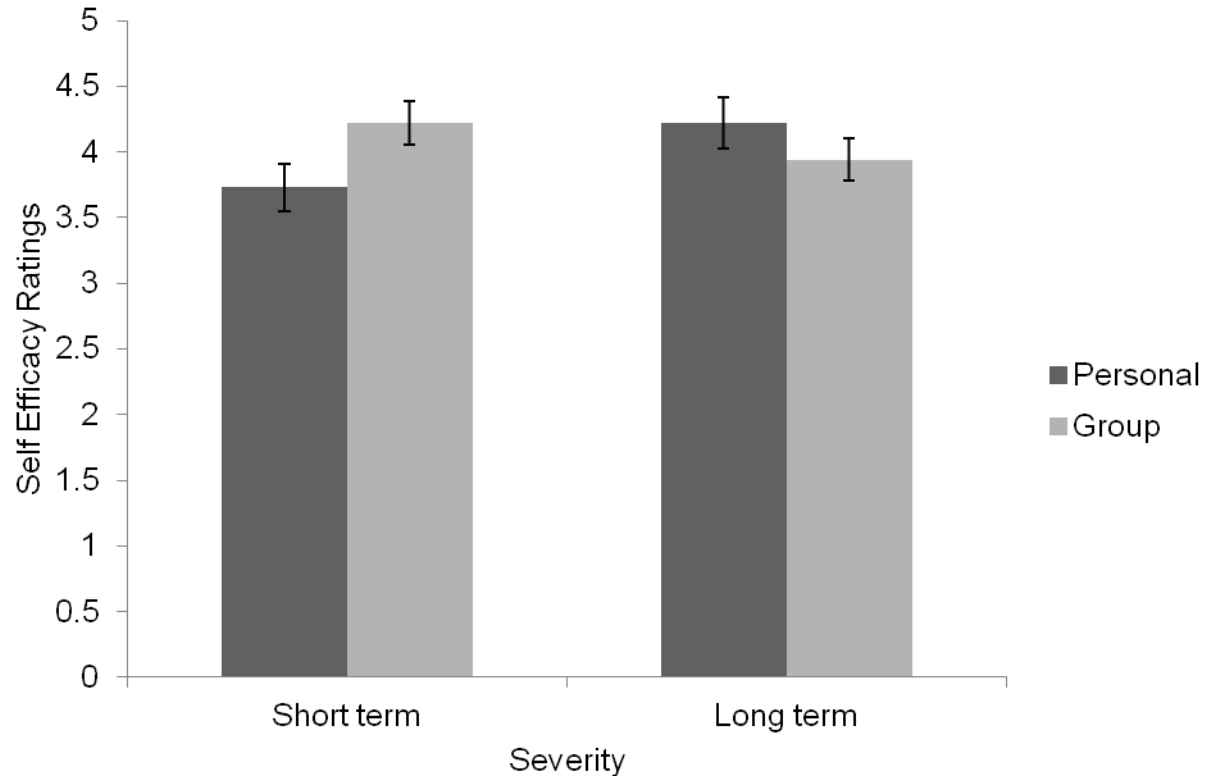


Figure 3. The Effect of Susceptibility x Intention Implementation Plan Interaction on Protection Motivation Ratings at Time 2.

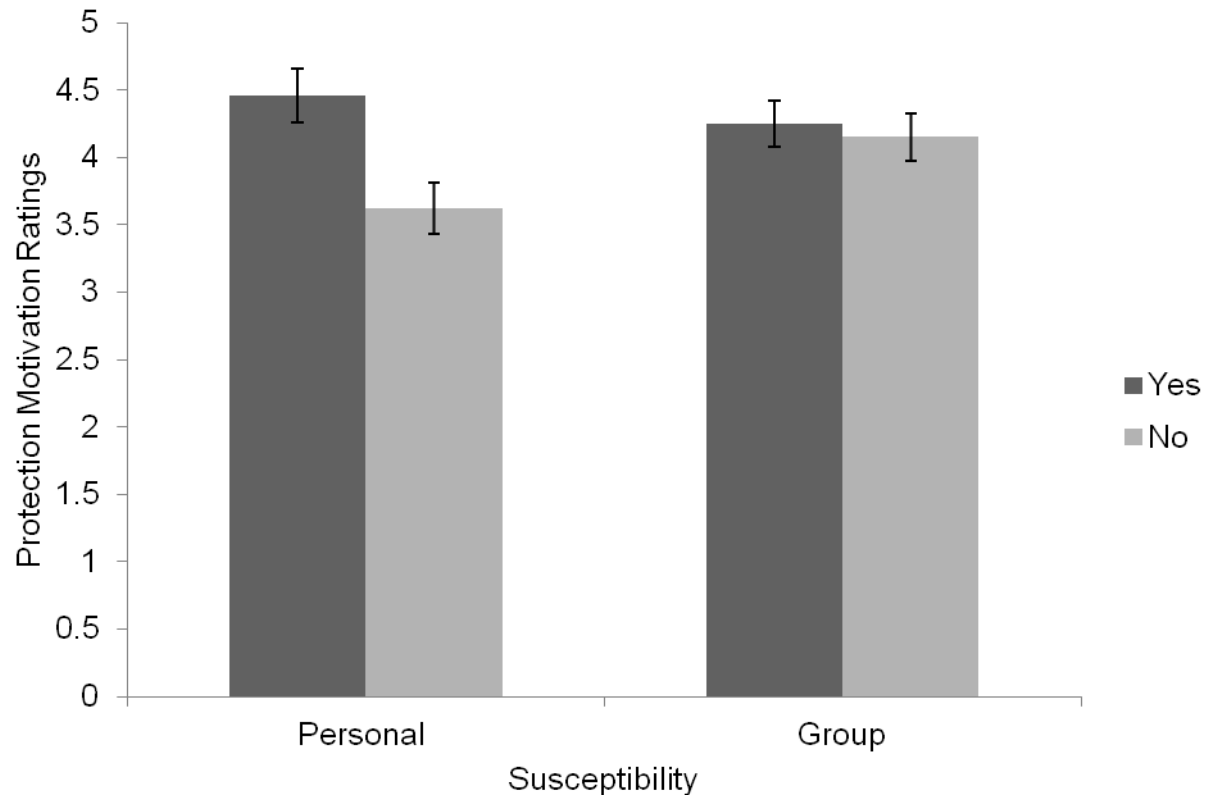


Figure 4. The Effect of Susceptibility x Intention Implementation Plan Interaction for Short Term Severity on the Self Efficacy Ratings at Time 1.

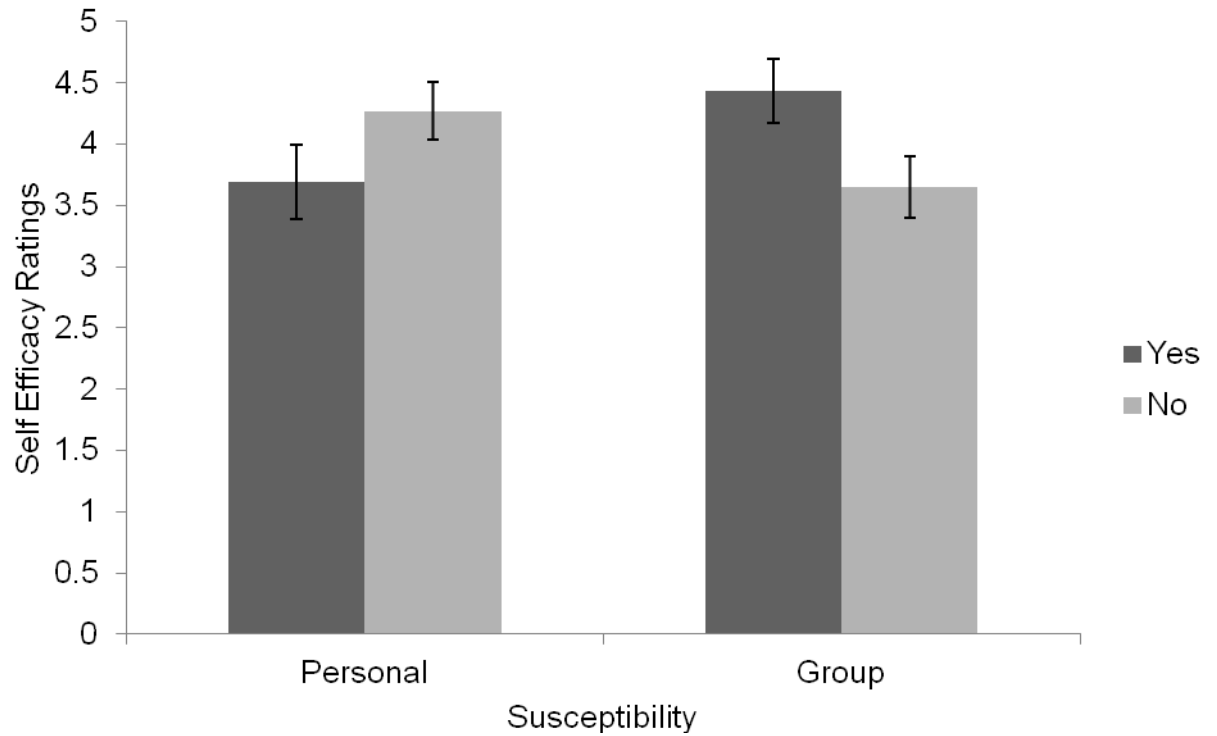


Figure 5. The Effect of Severity x Intention Implementation Plan Interaction for Group Susceptibility on the Self Efficacy Ratings at Time 1.

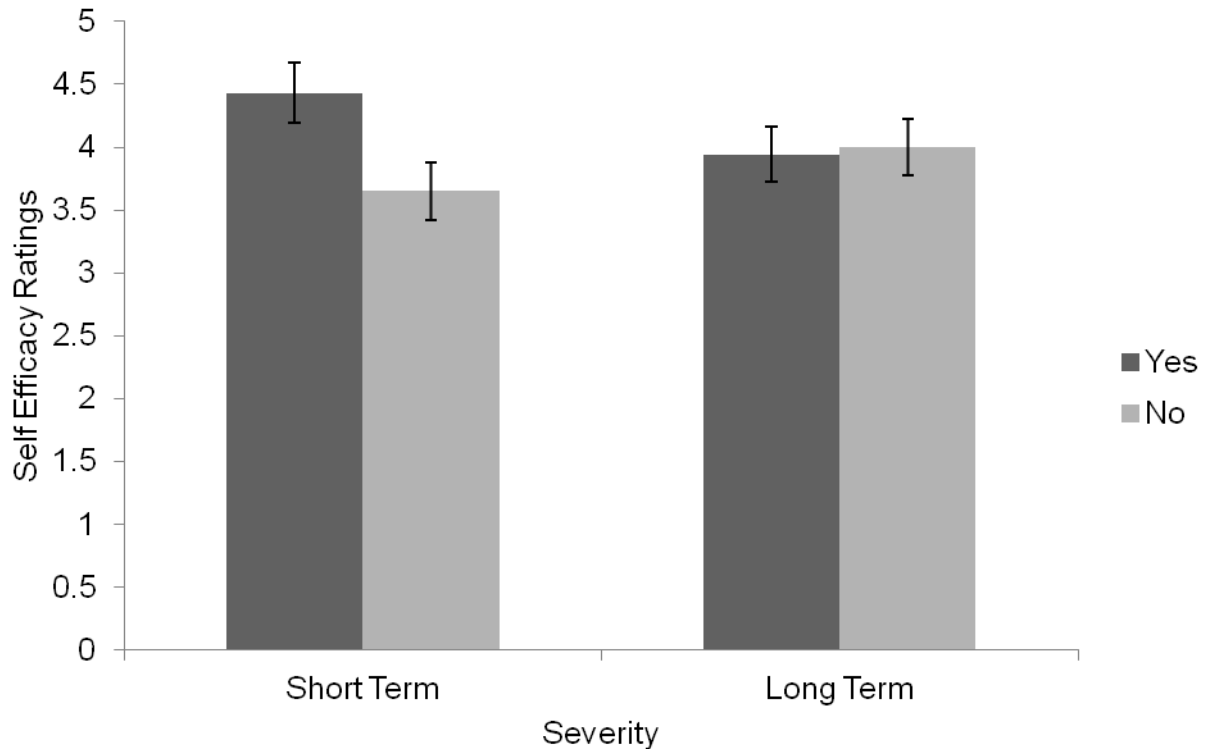


Figure 6. The Effect of Time on Susceptibility Ratings across Time.

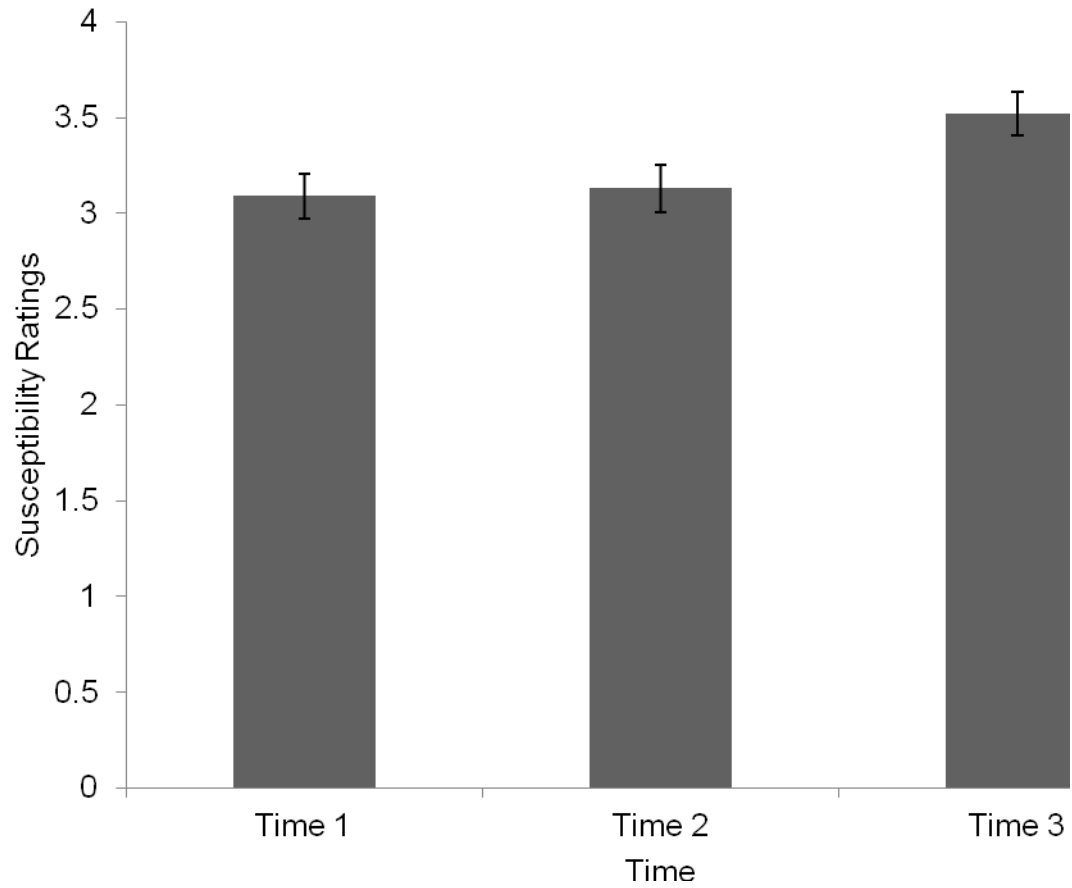


Figure 7. The Effect of Time on Response Costs Ratings across Time.

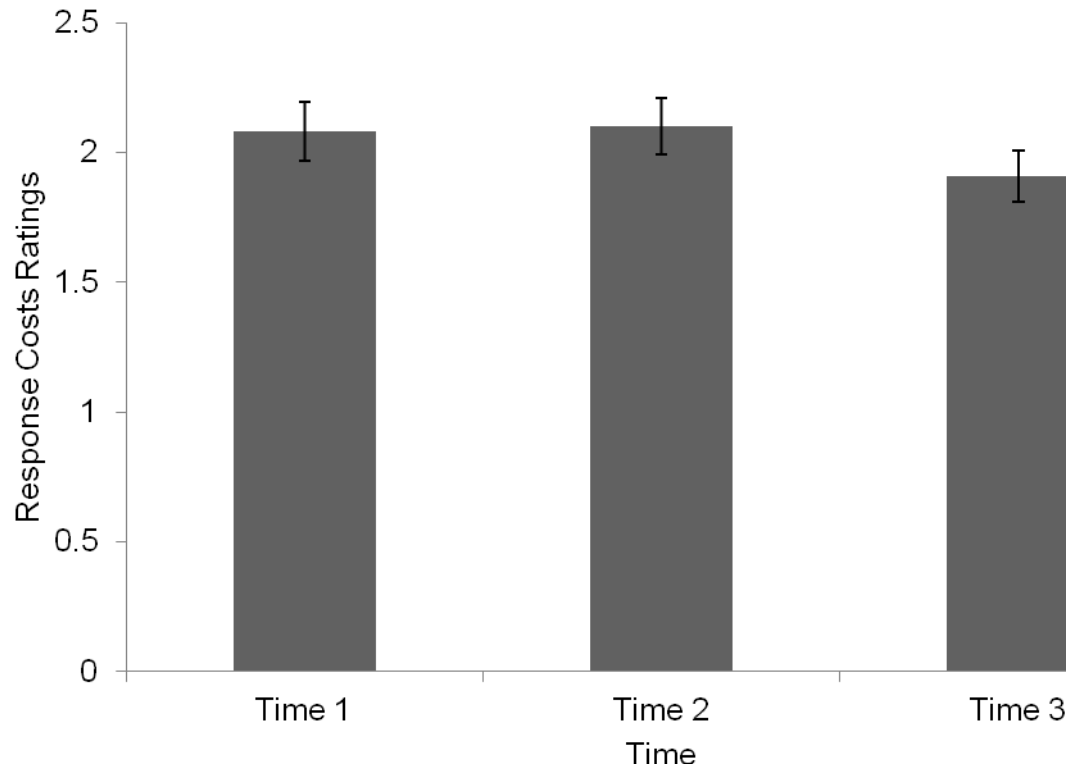


Figure 8. The Effect of Time on the Physical Activity Protection Motivation Ratings across Time.

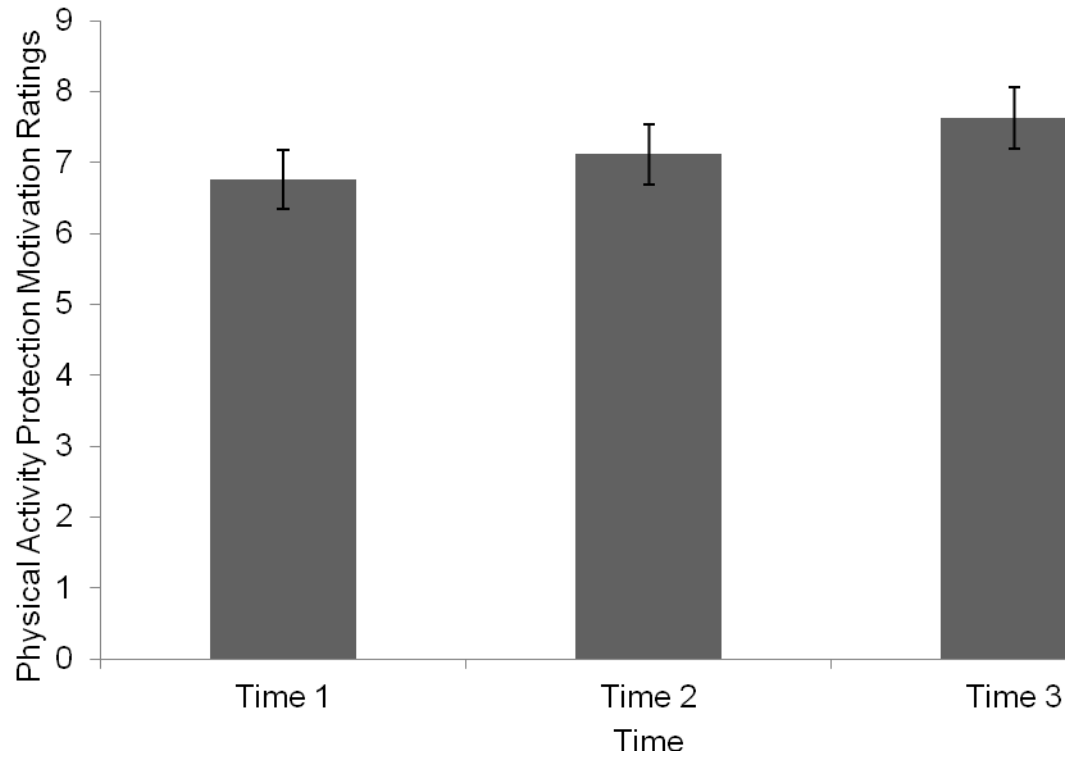


Figure 9. The Effect of Time x Intention Implementation Plan Interaction on Protection Motivation Ratings at Time 2.

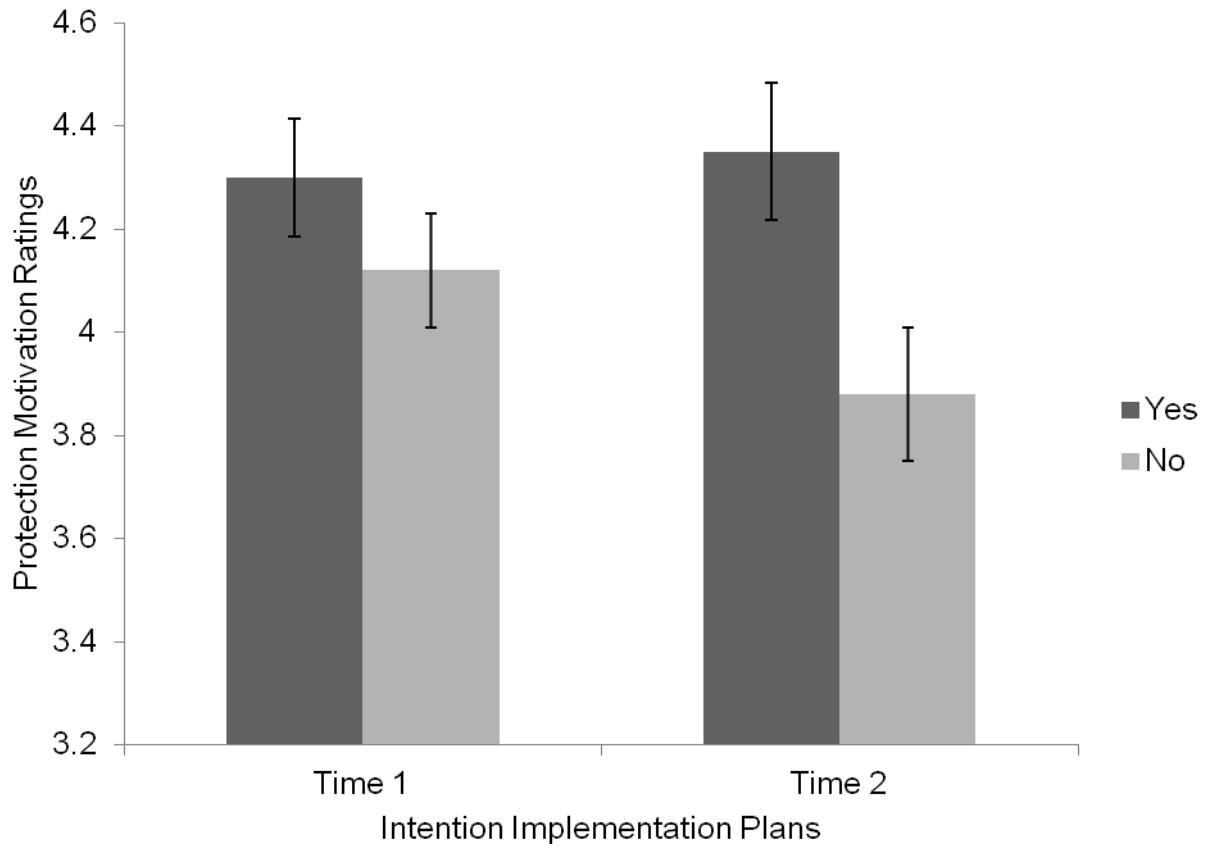


Figure 10. The Effect of Severity x Susceptibility Interaction on Self Efficacy Ratings across Time.

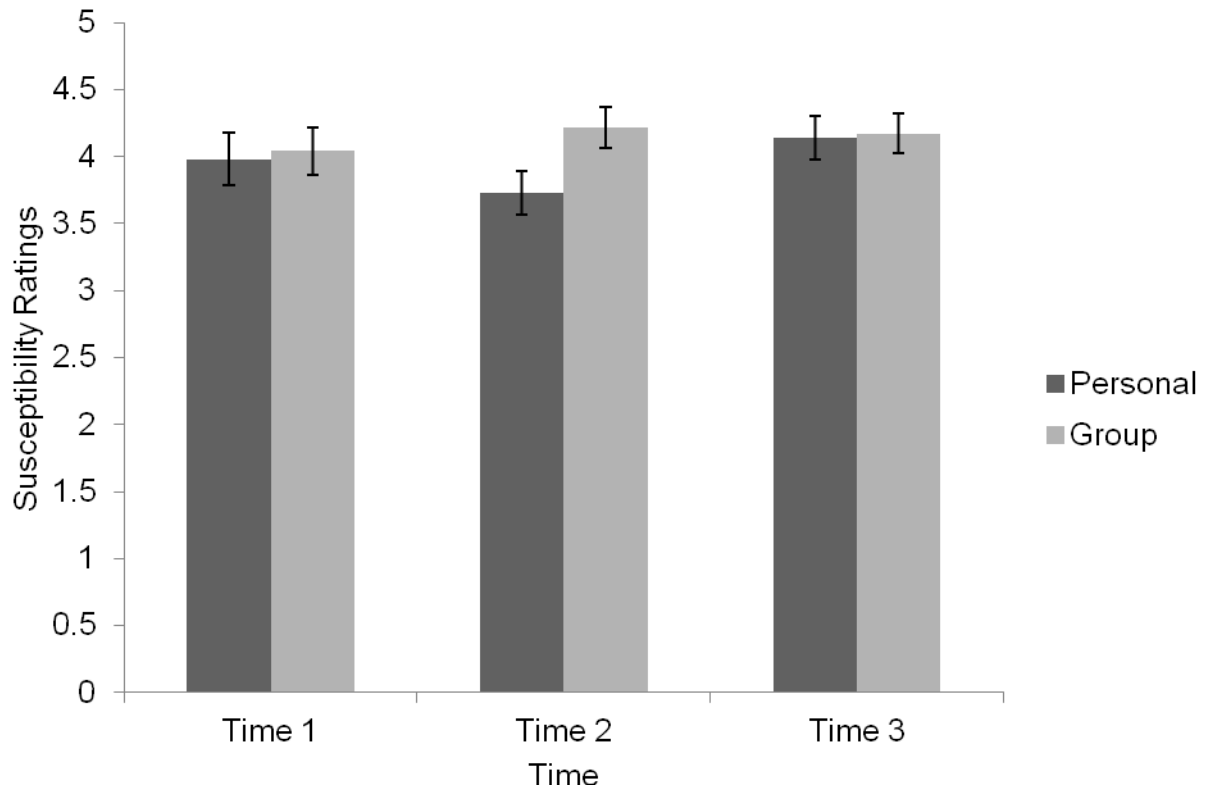


Figure 11. The Effect of Time x Susceptibility for No Development of Intention Implementation Plans on Susceptibility Ratings across Time.

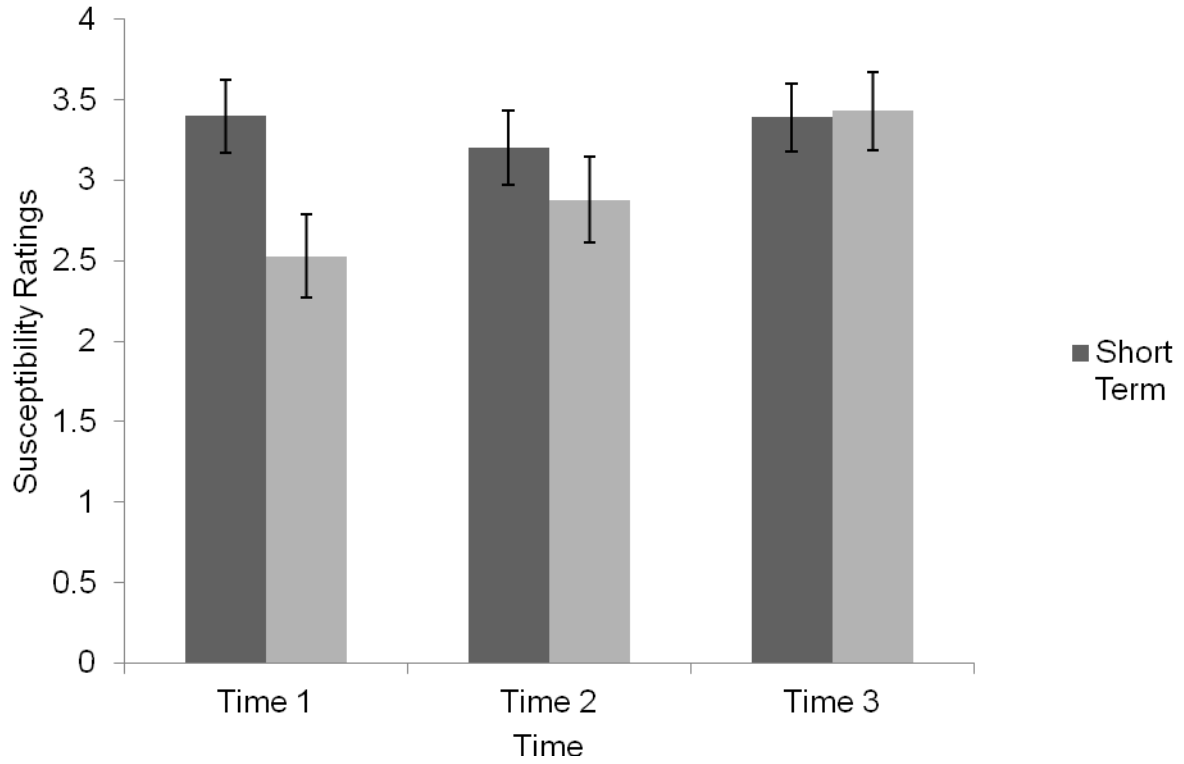


Figure 12. The Effect of Time x Intention Implementation Plan for Group Susceptibility on Susceptibility Ratings across Time.

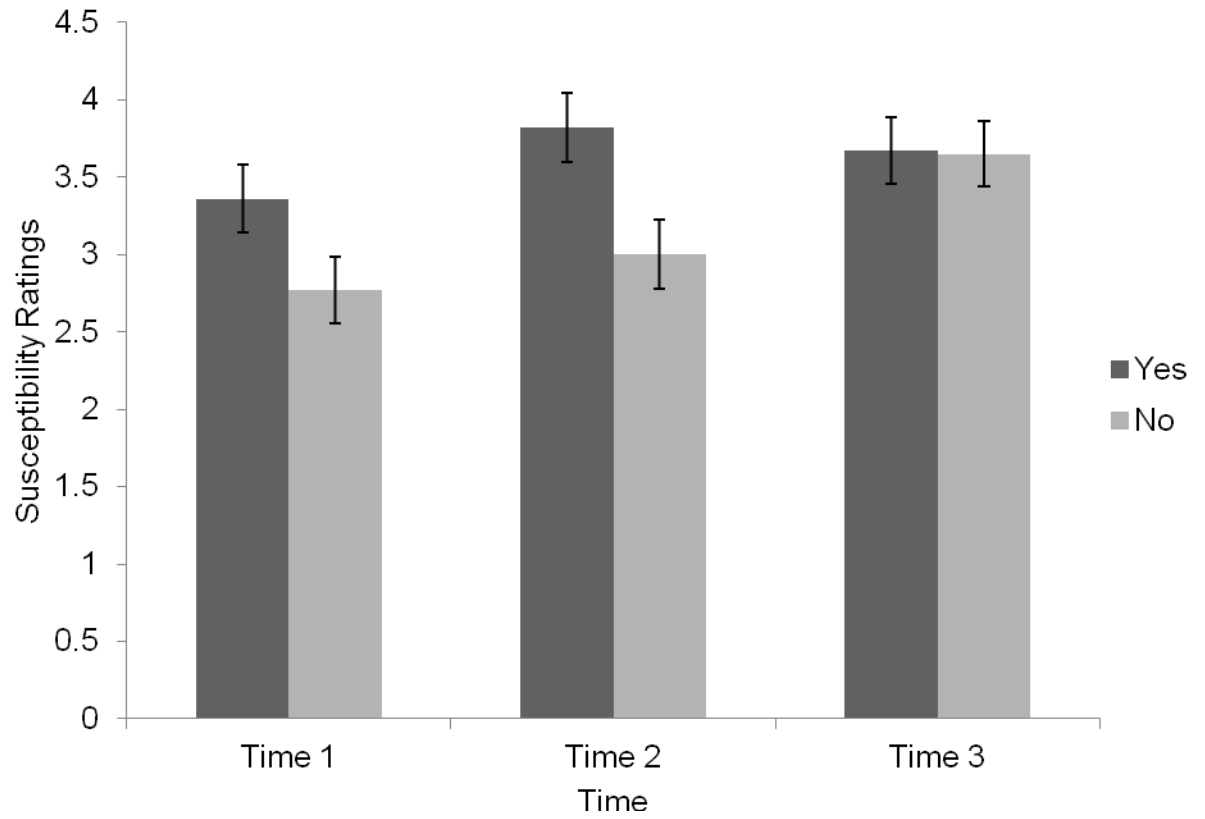


Figure 13. The Effect of Intention Implementation Plan x Susceptibility Interaction for Long Term Severity on Fear Ratings at Time 2.

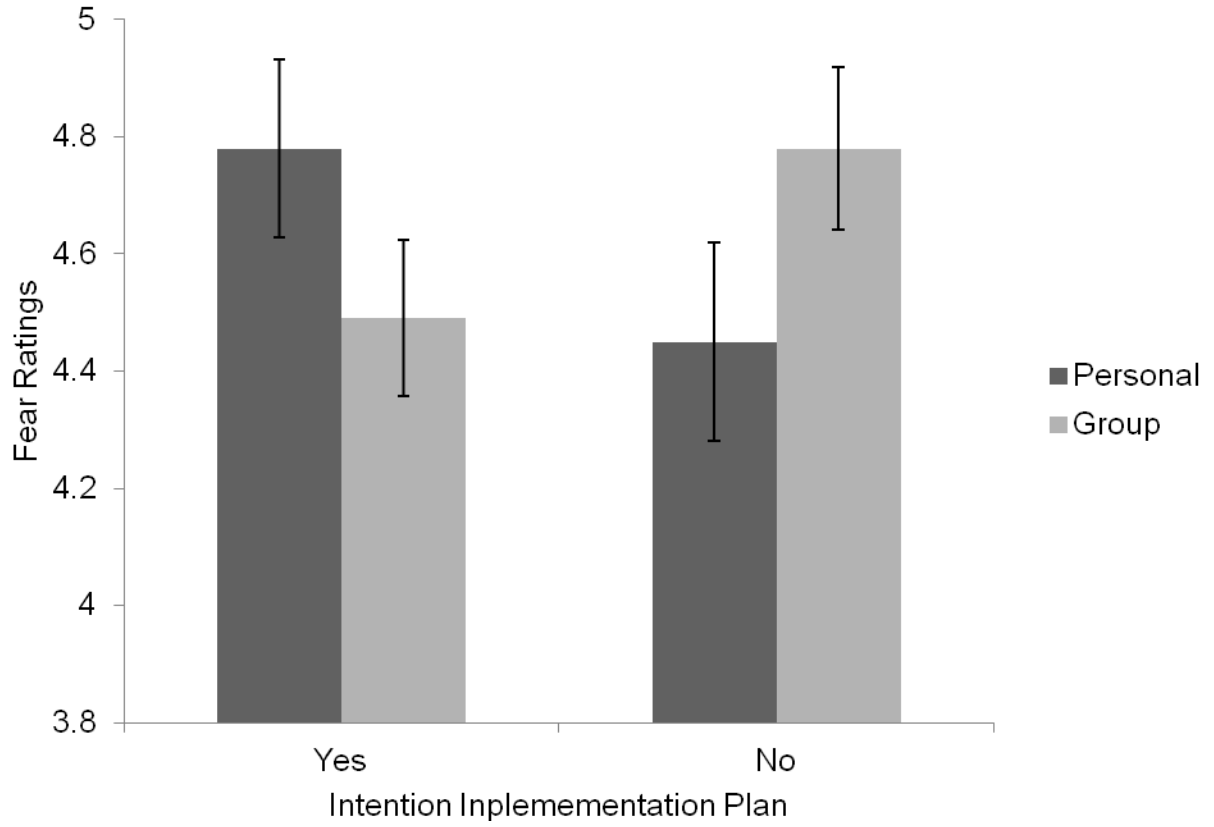
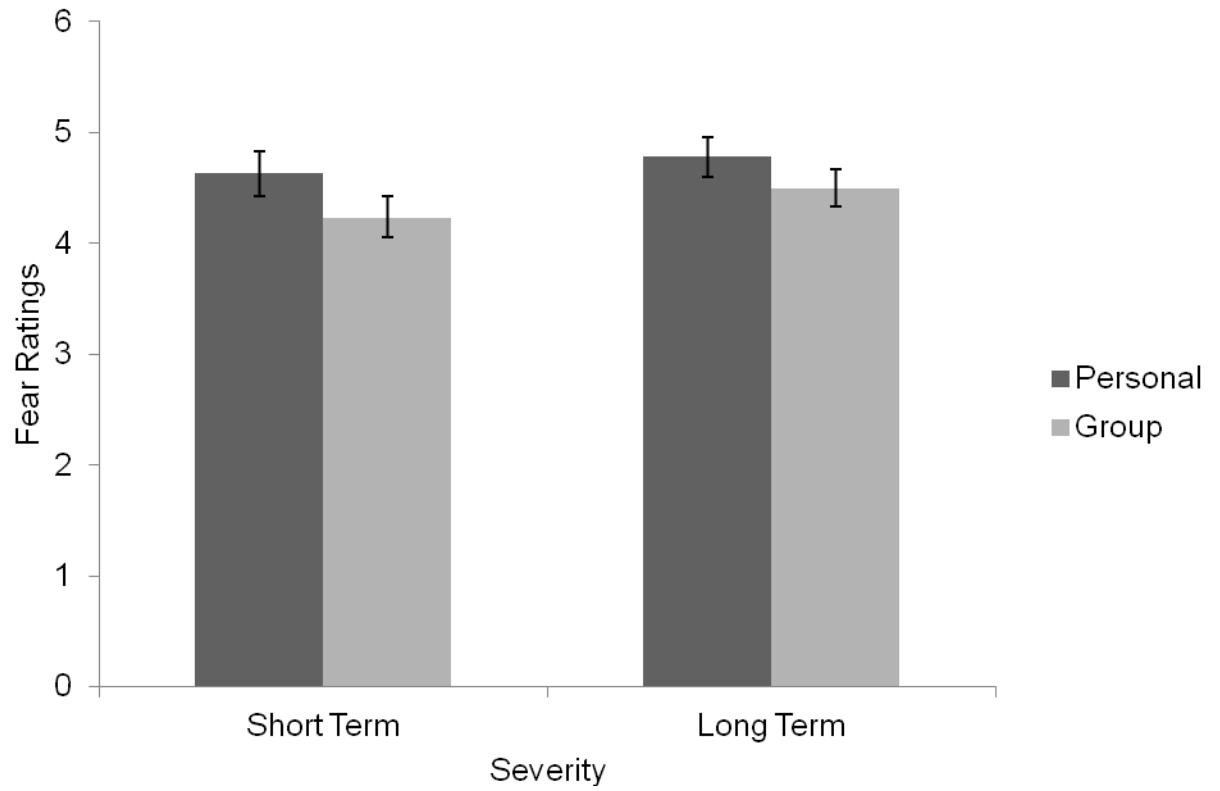


Figure 14. The Effect of Severity x Susceptibility Interaction for the Development of Intention Implementation Plans on Fear Ratings across Time.



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ABSTRACT**USING THE PROTECTION MOTIVATION THEORY TO EXAMINE THE EFFECTS OF OBESITY FEAR AROUSAL ON THE PHYSICAL ACTIVITY OF YOUNG ADULT FEMALE COLLEGE STUDENTS**

by

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The national rate of physical activity has been consistently declining while obesity and obesity-related illnesses are on the rise (French, Story, & Jeffrey, 2001; James, Leach, Kalamara, & Shayeghi, 2001; Malnick & Knobler, 2006). The current study employed a 2 (severity) x 2 (susceptibility) x 2 (intention implementation plan) x 3 (time) longitudinal within subject design examining the effects of the Protection Motivation Theory (Rogers, 1975; 1983) on the physical activity among 87 overweight young adult college females. A main effect was hypothesized for short-term severity, personal susceptibility, and the development of an intention implementation plan messages and an interaction effect was anticipated for messages containing group susceptibility and severity messages. It was also hypothesized that African American and Hispanic females receiving short-term severity messages would feel decreased severity, fear and protection motivation at Time 1 and 2, and would report having engaged in less physical activity when compared to white females at Time 2 and 3. Although the data did not support any of the hypotheses of this study, there was a significant effect of Time on physical activity, $F(1, 79) = 3.45, p = .03$, partial $\eta^2 = .04$, at Time 3, and there was a significant interaction effect of Time x

Intention Implementation Plan on Protection Motivation at Time 2, $F(1, 79) = 5.19, p = .03$, partial $\eta^2 = .06$. Given that the intervention used in this study was mild, these results provide useful directions for the development of stronger interventions in future research.

AUTOBIOGRAPHICAL STATEMENT

My life began May 4th of 1963. I graduated from Denby High school in 1980, and received an A.A.S. in Computer Data Processing from Wayne County Community College. Motherhood began for me on October 31, 1984 with the birth of my first daughter (Chantel Genee Napier), and a renewal of this commitment occurred May 24, 1988 with the birth of my youngest daughter (Shaterra Lanee Redd). I married Shaterra's father on October 18, 1988; and were divorced in December of 1991. I was employed as a Police Officer with the Wayne County Sheriff's Department from 1987 until 2002. Longing to do more with my life, I began attending Wayne State University (WSU) in the fall of 1999 on a part-time basis. In 2002, determined to continue my educational pursuit, I enrolled as a full-time student and completed my undergraduate studies in Psychology and Africana Studies in May of 2005. In the fall of the same year, I was accepted into WSU's doctoral program and earned my M.A. in Psychology in 2008. Currently, I am eagerly anticipating receipt of my doctoral degree in December of 2012. Throughout this journey, I held firm to my belief that faith is the substance of things hoped for and the evidence of things not seen. Now, that this journey is coming to its ending, I'm finding it to be bittersweet. My family and I are both tremendously proud of my accomplishment. However, as the single mother of two adult daughters, I am beginning to feel torn between the life of Academia and the ever increasing tug of grand-motherhood. Fortunately, one of the most valuable lessons I acquired along this journey is how to effectively multitask. For the acquisition of this gift I am ever grateful, as I cannot imagine a life more rewarding than honoring these commitments☺.