Development and Evaluation of an Intervention to Increase Sun Protection in Young Women

by

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ABSTRACT

In the present research, two interventions were developed to increase sun protection in young women. The purpose of the study was to compare the effects of intervention content eliciting strong emotional responses to visual images depicting photoaging and skin cancer, specifically fear and disgust, coupled with a message of self-efficacy and benefits of sun protection (the F intervention) with an intervention that did not contain an emotional arousal component (the E intervention). Further, these two intervention conditions were compared to a control condition that contained an emotional arousal component that elicited emotion unrelated to the threat of skin cancer or photoaging (the C control condition). A longitudinal study design was employed, to examine the effects of condition immediately following the intervention, and to examine sun protection behavior 2 weeks after the intervention. A total of 352 undergraduate women at Arizona State University were randomly assigned to one of the three conditions (F n = 148, E n = 73, C n = 131). Several psychosocial constructs, including benefits of sun protection, susceptibility to and severity of photoaging and sun exposure, self-efficacy beliefs of making sun protection a daily habit, and barriers to sun protection were measured before and immediately following the intervention. Sun protection behavior was measured two weeks later. Those in the full intervention reported higher self-efficacy and severity of photoaging at immediate posttest than those in the efficacy only and control conditions. The fit of several path
models was tested to explore underlying mechanisms by which the intervention affected sun protection behavior. Experienced emotion, specifically fear and disgust, predicted susceptibility and severity, which in turn predicted anticipated regret of failing to use sun protection. The relationship between this overall threat component (experienced emotion, susceptibility, severity, and anticipated regret) and intentions to engage in sun protection behavior was mediated by benefits. The present research provided evidence of the effectiveness of threat specific emotional arousal coupled with a self-efficacy and benefits message in interventions to increase sun protection. Further, this research provided additional support for the inclusion of both experienced and anticipated emotion in models of health behavior.
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The purpose of this research was to examine the potential role of emotional arousal in interventions to increase health protective behavior. Specifically, the present research targeted sun protection in young women. Unique among sun protection interventions, the current intervention incorporated an emotional component via the presentation of graphic images depicting the proximal and distal negative outcomes of sun exposure. This research informs the effectiveness of the use of threat-specific emotionally arousing stimuli in health interventions. It also informs the effect of discrete emotions on perceptions of risk, attitudes, and subsequent health protective behavior, and the potential predictors of discrete emotional arousal in response to the emotionally arousing images. In addition, this research extends research in what have traditionally been referred to as fear appeals by examining the role of both experienced emotions (e.g. fear) and anticipated emotions (i.e. anticipated regret) in a health decision making context.

**Potential Risks of Sun Exposure**

**Skin Cancer**

Skin cancers are malignant skin cell growths that can occur anywhere on the body. There are two main types of skin cancer, melanoma and nonmelanoma, also known as keratinocyte cancer (American Cancer Society). The most common types of nonmelanoma skin cancers are basal cell and squamous cell carcinomas. Basal cell carcinoma most often occurs on skin that is exposed to the sun, particularly the face. According to the American Cancer Society (ACS), skin
cancer is the most common cancer in the United States, and there were more than one million new cases of nonmelanoma skin cancers diagnosed in the U.S. in 2009 (ACS, Cancer Facts & Figures 2009).

The malignant growth of melanocytes, the cells that produce melanin, is called melanoma. Melanoma is less common, but more severe than other forms of skin cancer. Most skin cancer deaths are from melanoma. According to the American Cancer Society, there were more than 65,000 new cases of melanoma in the United States in 2009 (ACS, Cancer Facts & Figures 2009). In all, an estimated 11,500 people in the United States died from either melanoma or nonmelanoma skin cancers in 2009 (ACS). Melanoma is the most common cancer for adults aged 25 to 29 years, and it is the second most common cancer for young people aged 15 to 29 years (SEER AYA Monograph, 2007).

Skin cancers are prevalent in Arizona, one of the sunniest states in the U.S. (University of Arizona Skin Cancer Institute, http://azcc.arizona.edu/sci/about-skin-cancer/skin-cancer-in-arizona. Accessed 3-17-10). Though more recent statistics are not available, as of 1998 the Arizona Skin Cancer Institute at the University of Arizona reported that Arizona had the highest rates of skin cancers, both melanoma and nonmelanoma, in the U.S. (University of Arizona Skin Cancer Institute, http://azcc.arizona.edu/sci/about-skin-cancer/skin-cancer-in-arizona. Accessed 3-17-10). The 2006 rates provided by the Center for Disease Control and Prevention (CDC) indicate that Arizona has high mortality rates associated with melanoma, with approximately 2.8 to 2.9
melanoma deaths per 100,000 people each year (http://www.cdc.gov/cancer/skin/statistics/state.htm Accessed 3-17-10).

The leading cause of both types of skin cancer is thought to be ultraviolet radiation from the sun (Armstrong & Kricker, 1993; Pleasance et al., 2010). Of the three ultraviolet wavelengths (i.e. UVA, UVB, and UVC), UVB rays, which are responsible for most sunburns, are thought to cause most skin cancers. UVA rays, though they may cause damage to skin cells’ DNA, are linked primarily to long-term skin damage, such as wrinkles and age spots (http://www.cancer.org/docroot/PED/content/ped_7_1_What_You_Need_To_Know_About_Skin_Cancer.asp?sitearea=&level=. Accessed 03-10-10). Aside from exposure to UV radiation, the NCI lists several other risk factors associated with skin cancer including, but not limited to, having fair skin, family history of skin cancer, medical conditions and drugs that suppress the immune system, a history of sunburns as a child, or having a personal history of one or more skin cancers (NCI pamphlet, “What You Need to Know About Skin Cancer”, 2010). The current recommendations from the NCI, the ACS, and the CDC to reduce one’s risk of skin cancer are to reduce UV exposure by avoiding being outdoors during the peak hours of sun (10 AM to 4 PM), staying in the shade when outdoors, wearing protective clothing such as long sleeves and hats, wearing a sunscreen with a Sun Protection Factor (SPF) of at least 15, and avoiding tanning beds, or a combination of some or all of these protective

**Photoaging**

Aside from skin cancer, exposure to UV rays also causes photoaging, which is the premature aging of the skin and includes the development, wrinkles, age spots, and skin discoloration (American Skin Cancer Foundation, ASCF, 2010; Wang et al., 2010). In fact, it has been estimated that up to 90% of the signs of skin aging are a result of UV exposure (ASCF, 2010).

The recommendations for reducing one’s risk of photoaging are the same as those for reducing one’s risk of skin cancer, namely avoiding UV exposure through use of sun screen, protective clothing and sunglasses, and avoiding the outdoors during the peak hours of sun (Wang et al., 2010). Of particular importance is the fact that the use of sunscreen and other methods of reducing UV exposure not only prevent new skin damage, but facilitate the repair of existing skin damage (ASCF, 2010).

**Risk Behaviors**

Though clear recommendations have been put forth by the ACS, the NCI, and the CDC, an alarming number of people in the United States continue to engage in skin cancer risk behaviors, according to a review by Coups, Manne, and Heckmann (2008). The researchers analyzed data from the 2005 National Health Interview Survey (NHIS) to assess age differences among skin cancer risk behaviors, such as infrequent use of sun screen and the use of tanning beds. Data
from a sample of 28,235 individuals who had never been diagnosed with any form of skin cancer were analyzed, and stratified into the following age ranges: 18 to 29 years, 30 to 39, 40 to 49, 50 to 64, and 65 and older. Coups and colleagues (2008) found that approximately half of all participants did not use a sunscreen with an SPF of 15 or more regularly. Almost 85% of those aged 18 to 29 reported infrequent use of sun-protective clothing and 20% of those in the same age range reported using an indoor tanning device at least once in the past year. Almost half (45.6%) of those aged 18 to 29 reported getting a sunburn in the past year. When analyzed as a count of number of skin cancer risk behaviors, those aged 18 to 29 had the highest rates of overall risk behaviors, with approximately 46% of the sample reported engaging in 3 or more risk behaviors. By comparison, in the sample of participants aged 65 or older, only 17% reported engaging in 3 or more risk behaviors (Coups, et al., 2008).

**Past Interventions to Increase Sun Protection**

Given the increase in all forms of skin cancer, health researchers have developed and tested many interventions to increase sun protection.

In a 2009 meta-analysis of predictors of sun protection and interventions to increase sun protection, Kasparian, McLoone and Meiser found that key psychological factors associated with sun protection include: a) perceived risk of skin cancer b) perceived benefits of sun protection c) lower perceived barriers to sun protection d) intentions to use sun protection e) increased skin cancer anxiety
or worry f) greater knowledge of skin cancer and sun protection recommendations and g) greater perceived severity of skin cancer.

A 2006 study conducted by Reynolds and colleagues (Reynolds, et al., 2006) examined several potential mediators of the relationship between a sun protection intervention and sun protection behavior in middle school students aged 11 to 15 years. The core components of the intervention were drawn from social cognitive theory (Bandura, 1986) and the theory of planned behavior (Ajzen, 1991) and included knowledge of sun protection, barriers to sunscreen use and shade availability, perceived social norms, perceived self-efficacy, tan importance, tan attractiveness, tan desire, and perceived susceptibility. Barriers to sunscreen use, perceived self-efficacy, and knowledge emerged as significant mediators of the impact of the intervention on a composite measure of sun protection behavior. Separately, barriers accounted for 9.2% of the mediated effect, self-efficacy accounted for 7.6% of the mediated effect, and knowledge accounted for 23.4% of the mediated effect.

Jackson and Aiken (2000) developed a psychosocial model of sun protection and suntanning in young women. Their model included constructs from the Theory of Planned Behavior (Ajzen, 1991), the Health Belief Model (Rosenstock, 1974), and Protection Motivation Theory (Rogers, 1983). The constructs included as predictors of intentions for sun protection in the model were as follows: a) objective risk, b) susceptibility and severity, c) benefits of sun protection, d) barriers to sun protection, e) image norms for tanness, f) norms for
sun protection, and f) self-efficacy. The constructs included to predict intentions for sunbathing were as follows: a) norms for sunbathing, b) advantages of sunbathing, and c) image norms for tanness. In two separate samples of young women from Arizona State University aged 18 to 27 years old and 18 to 25 years old, respectively, the authors found that susceptibility to skin cancer, self-efficacy, and norms for sun protection emerged as significant predictors of intentions to sun protect. In support of their proposed model, objective risk was found to be a significant predictor of susceptibility, which in turn significantly predicted benefits of sun protection. Severity of skin cancer and photoaging also significantly predicted benefits of sun protection in the first sample, but this relationship was not replicated in the second sample. Norms for sunbathing and advantages of sunbathing emerged as significant predictors of intentions to sun protect in both samples. Both intentions and self-efficacy predicted sun protection at a five-month follow-up. Also, of great importance is the finding that intentions to sun protect and intentions to sunbathe were not significantly correlated in these samples of young women, indicating that these two behaviors may be independent and may occur simultaneously.

In an extension of this work, Jackson and Aiken (2006) conducted an intervention to increase sun protection in young women. The intervention considered the two distinct threats of sun exposure—photoaging and skin cancer. The intervention consisted of elements targeting the following constructs: a) image norms for tanness b) advantages of tanning, c) health beliefs toward skin
cancer and photoaging including perceived susceptibility to and severity of skin
cancer and photoaging, the benefits of sun protection for mitigating the threats of
skin cancer and photoaging, and d) self-efficacy for sun protection. Their
intervention was conducted at Arizona State University with a sample of women
aged 18 to 25. The intervention was successful at producing changes in the
predicted direction on all targeted constructs. Self-efficacy mediated the
relationship between intervention and intentions to sun protect. Severity and
susceptibility to photoaging significantly mediated the relationship between
intervention and benefits of sun protection, which in turn predicted intentions to
sun protect. Susceptibility to photoaging also emerged as a direct negative
predictor of hours sunbathing at the two-week follow-up. Changing the perception
of image norms from tan to pale appeared to decrease perceived advantages of
tanning, which, in turn, was associated with decreased intentions for sunbathing.
Effects were stronger for photoaging than for skin cancer.

Extensive work in sun protection intervention has been carried out by
Mahler and colleagues (2003, 2006, and 2007). Much of this work has focused on
the use of information about photoaging, including the use of UV photographs
showing the underlying skin damage that may not yet be visible on the skin’s
surface. In a 2003 study, Mahler, Kulik, Gibbons, Gerrard, and Harrell tested the
effectiveness of appearance-based interventions in young men and women aged
18 to 37 years. The authors used a 2 x 2 design to test the effectiveness of an
intervention including information about photoaging (yes/no) and individual UV
photographs showing participants’ own photoaging (yes/no). Overall, the combined UV photograph and photoaging condition resulted in significantly fewer hours of sunbathing than the other conditions. They found a main effect of UV photograph on intentions, with participants who were provided their own photograph indicating greater intentions to use sunscreen. They also found a main effect of UV photograph on rewards of tanning and self-efficacy of sunscreen use. Further, they found a main effect of information about photoaging on perceived severity of photoaging, efficacy of sunscreen use, and self-efficacy of sunscreen use.

In a similar study, Mahler, Kulik, Gerrard, and Gibbons (2006) again tested the effectiveness of interventions including information about photoaging and UV photographs of participants in a community sample of beach-goers in Southern California. They found a significant interaction between information and UV photographs on sun protection, with those in the combined information and UV photograph condition engaging in greater self-reported sun protection behaviors.

In a longitudinal study, Mahler, Kulik, Gerrard, and Gibbons (2007) again tested the effectiveness of interventions consisting of information about photoaging and UV photographs. They again used a 2 x 2 design, and assessed sun protection behavior at 4-5 months and 12-months later. They did find a main effect both information and UV photograph on intentions to sun protect immediately following the intervention; information and UV photograph did not
interact. The UV photograph had a main effect on perceived susceptibility to photoaging immediately following the intervention. Photoaging information yielded a main effect on follow-up incidental sun exposure, with participants in the photoaging condition reporting less incidental sun exposure than those who did not receive information about photoaging, both 4-5 months and 12 months after the intervention. Finally, the UV photograph affected incidental sun exposure at the 4-5 month follow-up, but not at the 12-month follow-up. Those who received their UV photograph reported less incidental sun exposure at the initial follow-up and greater incidental sun exposure at the 12-month follow-up than those in the control.

Overall the set of interventions supported roles for perceptions of susceptibility to and severity of both photoaging and skin cancer, and also perceptions of benefits of sun protection, in encouraging intentions to sun protect and sun protection itself. In addition, self-efficacy for sun protection played a central role in increasing sun protection. These results informed the model of the intervention implemented in the present research.

**Existing Models of Health Behavior and the Incorporation of Emotion**

Several models of behavior have been used to explain the adoption of health protective behaviors or the cessation of health risk behavior. These models provide a framework for understanding the causal relationships among cognitive beliefs and perceptions (e.g. risk perceptions) as predictors of behavioral intentions and behaviors. These models informed the model proposed in the
present research to characterize the mechanisms of action of the sun protective intervention.

**Health Belief Model**

The health belief model (HBM), shown in Figure 1, originated in the 1950’s when Hochbaum (1958) attempted to understand the public’s failure to utilize a free tuberculosis screening test. He found that two major predictors of participating in the screening were one’s feelings of susceptibility to the disease and one’s beliefs in the benefits of the screening test. Also included in the model was the construct perceived severity, one’s belief in the seriousness of the consequences of a given condition, and cues to action, which were described by Hochbaum (1958) as events that made one aware of a disease and one’s own susceptibility to and severity of the disease. Eventually, the model included perceived barriers to performing the health protective behavior (i.e. cost, lack of availability) as a negative predictor of performing the behavior (Rosenstock, 1974).

The constructs in the classic HBM (i.e. perceived benefits, perceived barriers, susceptibility, and severity) are co-equal predictors of the health behavior (Rosenstock, 1974) (see Figure 1). In 1988, Rosenstock, Stecher, and Becker (1988) added self-efficacy to the HBM, one's belief that he or she can adequately carry out the prescribed health related behavior. This addition was made because the HBM was now being used to predict recurring health behaviors (e.g. condom use) rather than one-time health behaviors (e.g. health screenings). More recent work in the application of the HBM to mammography screening, condom use, and
sun protective behaviors has shown that perceived susceptibility and perceived severity predict benefits (Aiken, West, Woodward, & Reno, 1994; Bryan, Aiken & West, 1997; Jackson & Aiken, 2000; Jackson & Aiken, 2006), which in turn predict intentions to perform the health behavior.

**Theory of Reasoned Action**

The theory of reasoned action (TRA), shown in Figure 2, was developed to explain behavior through one’s beliefs, attitudes, and intentions (Fishbein, 1967; Fishbein & Ajzen, 1975). In the model, the primary predictor of one’s behavior is his or her intention to perform that behavior. The factors that determine one’s behavioral intention are one’s direct attitude toward the behavior and the subjective norms associated with the behavior. Fishbein and Ajzen (1975) developed an expectancy-value conceptualization of attitude, which includes one’s beliefs about the outcome of a decision weighted by one’s evaluation of that outcome. Essentially, one’s direct attitude towards a behavior is comprised of the likelihood that a given outcome will occur (e.g. “If I use sunscreen, I will not get a sunburn”) weighted by the value one places on that outcome (e.g. “It is good to avoid sunburns”). Thus, one’s direct attitude towards a behavior will be positive if she believes that a highly valued outcome will likely occur as a result of that behavior. Conversely, one’s direct attitude will be negative if she believes that an adverse outcome will likely occur as a result of a behavior (Fishbein and Ajzen, 1975). Fishbein and Ajzen (1975) also developed a similar formulation for characterizing subjective norms. Subjective norms are one’s beliefs as to others’
approval or disapproval of the behavior weighted by the person’s motivation to be
have in a manner consistent with others’ opinions. Put more simply, subjective
norms are comprised of a person’s beliefs about others’ opinions of a behavior (e.g. “My friends think I should tan”) weighted by one’s desire to behave in a complementary manner (e.g. “I want to do what my friends think is right”). Thus, one’s subjective norms towards a behavior will be positive if she believes that her referents approve of the behavior and she is motivated to comply with their opinions. Conversely, one’s subjective norms will be negative if she believes that her referents do not approve of the behavior (Fishbein and Ajzen, 1975).

**Theory of Planned Behavior**

Ajzen modified the original TRA by adding perceived behavioral control as a predictor of behavioral intention (see Figure 3), forming the theory of planned behavior (TPB) (Ajzen, 1991). The addition of perceived behavioral control resulted from the recognition that there are some forces outside a person’s control that may account for failure to perform a behavior even though he or she has positive attitudes, subjective norms, and behavioral intentions (Ajzen, 1991). Perceived behavioral control is a function of one’s control beliefs (i.e. the presence or absence of barriers to the behavior or facilitators of the behavior) weighted by the perceived power of each barrier or facilitator (i.e. the amount of influence each barrier or facilitator has on performing the behavior). Essentially, perceived behavioral control, closely related to the concept of self-efficacy, is
one’s belief that she is able to perform the behavior. Perceived behavioral control positively predicts intention to perform a behavior (Ajzen, 1991).

**Social Cognitive Theory**

Stemming from the fact that behavior may be learned from the modeling of others’ behaviors, social cognitive theory (SCT) includes the core constructs of self-efficacy and outcome expectancies (Bandura, 1986, 1998), which lead to the formation of behavioral intentions. The SCT is shown Figure 4. Unlike HBM, TRA, and TPB, Bandura’s theory includes goal formation as a necessary component to eventually performing a behavior. Distinctions are made between long term and short term goals, though there is a lack of discussion as to situations in which there are discrepancies between proximal and distal goals (e.g. one’s short term goal to be tanned and long term goal to avoid skin cancer). Distinct from TRA, TPB, and the augmented HBM, self-efficacy falls at the outset of SCT as a driving force for the development of outcome expectancies and goals. For example, one's estimate of her ability to sun protect effectively (self-efficacy) precedes the adoption of the goal to sun protect and the positive outcome expectancies for sun protection.

**Protection Motivation Theory**

Originally developed to explain the effects of fear-arousing messages on behavior, Protection Motivation Theory (PMT), shown in Figure 5, posits that when confronted with a health message, individuals engage in threat appraisal and coping appraisal, which in turn predict protection motivation, which is defined as
the arousal and motivation necessary to engage in a behavior (Rogers, 1975; Rogers & Prentice-Dunn, 1997). When an individual is confronted with a health message, she may engage in a maladaptive response (i.e. health risk behavior) or an adaptive response (i.e. health protective behavior). An individual engages in threat appraisal to evaluate the maladaptive response. Threat appraisal consists of a consideration of the intrinsic and extrinsic benefits of the maladaptive response, here the health risk behavior (e.g. benefits of having a tanned appearance) and one’s severity and vulnerability to the negative effects of the response (e.g. risks of skin cancer and/or photoaging). Conversely, coping appraisal consists of a consideration of the adaptive response, here the health protective behavior. In the coping appraisal, one considers the response efficacy of the behavior (e.g. the belief that sunscreen can prevent skin cancer and photoaging) and self-efficacy (e.g. the belief that one can reduce one’s amount of UV exposure) as well as the response costs associated with the health protective behavior (e.g. cost of sunscreen, being uncomfortable in protective clothing during summer months) (Floyd, Prentice-Dunn, & Rogers, 2000). The model also posits that the emotional arousal elicited by the health message (e.g. fear) is both a predictor of severity and vulnerability and a function of existing feelings of susceptibility and vulnerability. The emotional arousal can also have a direct effect on the formation of the protective motivation. Selection of the health protective behavior will occur if there is high severity and vulnerability and few benefits associated with the
maladaptive behavior coupled with high efficacy (both self-efficacy and response-efficacy) and low response cost of the health protective behavior.

Unlike other models of health behavior (e.g. HBM, TRA, TPB), PMT includes emotional arousal, namely fear. This is of great importance, as there has been much work on the interplay of cognition and emotion both generally (e.g. Connolly & Zeelenberg, 2002; Gray, 1999; Hanoch, 2002; Hockey, Maule, Clough, & Bdzola, 2000; Janis & Mann, 1977; Ketelaar & Goodie, 1998; Lerner & Keltner, 2001; Lo & Repin, 2002; Luce & Raiffa, 1988; Luce, Payne, & Bettman, 1999; Schwarz, 2000; Tiedens & Linton, 2001; Toda, 1980) and in the area of health decision-making (e.g. Conner & Armitage, 1998; Conner et al., 2006, Conner et al., 2007; Frost et al., 2001; Kellar & Abraham, 2005; McGilligan et al., 2009; McMillan et al., 2005; Sheeran & Orbell, 1999). Recognizing the need to incorporate emotion into other models of health behavior, researchers have recently begun to study the role of both experienced and anticipated emotions in models of health behavior. These modifications are discussed further.

**Hybrid Models**

Rather than using the classic versions of existing health behavior models to predict behavior, Noar and Zimmerman (2005) argued that our understanding of health behaviors might be improved if we were to integrate constructs from classic theories into new theories of health behavior that could be tested empirically. The addition of constructs to the theory of planned behavior, for
example, has been supported by both Fishbein (2000) and Ajzen (1991). It is now a common practice to modify traditional conceptions of the models by adding constructs, though some caution that parsimony should be the rule, at least when considering the permanent modification of these traditional models of behavior (Conner & Armitage, 1998).

**Addition of constructs to HBM.**

*Self-efficacy added to HBM.* As described above, Rosenstock and colleagues (1988) added self-efficacy to the HBM; self-efficacy is one’s belief that she can adequately perform the behavior. This addition was made because the HBM was now being used to predict recurring health behaviors (e.g. condom use) rather than one-time health behaviors (e.g. vaccination).

**Emotion in Decision Making**

The role of emotion in decision making has been studied extensively (e.g. Connolly & Zeelenberg, 2002; Gray, 1999; Hanoch, 2002; Hockey, Maule, Clough, & Bdzola, 2000; Janis & Mann, 1977; Ketelaar & Goodie, 1998; Lerner & Keltner, 2001; Lo & Repin, 2002; Luce & Raiffa, 1988; Luce, Payne, & Bettman, 1999; Schwarz, 2000; Tiedens & Linton, 2001; Toda, 1980). This line of research has been extended to include examination of anticipated emotions in decision making (e.g. Baron, 1992; Mellers, Shwartz, & Ritov, 1999; Zeelenberg, 1999). Although some researchers highlight the negative effects of emotion, particularly with regard to decision avoidance (Anderson, 2003), most researchers have concluded that emotions aid in decision making; still others conclude that
emotions and emotional forecasting are *necessary components* to decision making (Bechara, 2004; Damasio, 2000; Slovic, Finucane, Peters & MacGregor, 2004; Turnbull, Berry, Bowman, 2003).

Researchers have also long noted that emotions may be elicited from the decision-making context itself, particularly in decisions that incur great risk or in situations in which the options under consideration differ in multiple attributes (e.g. Luce, et al., 1999). In their 1999 study, Luce and colleagues introduced the concept of emotional trade-off difficulty. They defined emotional trade-off difficulty as the experienced or anticipated negative emotion associated with comparing a product on multiple distinct attributes. For example, when deciding between two cars with different prices and safety ratings, Luce and colleagues suggest that the consumer will experience negative emotion as a result of this decision-making context, and that the need to process multiple and conflicting dimensions (here price and safety) may affect one’s ability to rationally compare the two options.

Not only does the consumer experience negative emotion while making the decision, but he may also attempt to choose the product that will result in the lesser amount of negative emotion in the future. Luce, Bettman, and Payne (1997) found that high levels of emotional trade-off difficulty resulted in the comparison of one attribute at a time in order to avoid the conflict in attributes that presumably leads to the experienced or anticipated negative emotion. When deciding to perform a behavior, such as sun tanning, an individual may experience
negative emotion when she considers she may experience the emotional and psychological benefits of being tan (e.g. feeling self-confident and attractive, Jackson & Aiken, 2000) at the cost of increasing her susceptibility to skin cancer. She may thus focus on one specific aspect of tanning at a time instead of considering the positive and negative outcome beliefs simultaneously. In this way, she can minimize negative emotion by avoiding the conflict between the pros and cons of the decision.

Damasio suggested that emotion is a necessary component of decision-making (Damasio, 2000). In an example that highlights the importance of loss aversion, and by extension anticipated regret, in decision-making, Damasio and colleagues had participants with and without frontal lobe damage complete a card gambling task in which participants either won money or lost money, depending on what was written on the card. Damasio found that participants with normal cognitive functioning tried to find patterns in the amounts listed on the cards. After the pattern had been successfully observed, the participants demonstrated classic patterns of loss aversion, that is, making selections that minimized the potential for loss, even when such selections also diminished the chance of gain (Tversky & Kahneman, 1981; Kahneman & Tversky, 2000). In contrast, participants with frontal lobe damage did not exhibit the same loss-averse strategy. These participants consistently chose the high-risk cards, even though the results of their choices resulted in “bankruptcy” during the task. Damasio explained this phenomenon by suggesting that although participants with frontal
lobe damage are able to reason through a whole array of possible outcomes of a behavior, they lack the ability to anticipate the long-term consequences of a behavior.

In his Somatic Marker Hypothesis (SMH), Damasio (1996) specified the role of emotions, both experienced and anticipated, in decision making. He noted that humans make decisions that result in consequences and that there are corresponding emotional responses to these consequences. He posited that over time, people form associations with decision contexts and their resulting emotions. According to SMH, these associations are stored in the ventromedial prefrontal cortex. When faced with a new decision context, outcome-emotion associations from similar decision contexts are activated, resulting in an emotion.

Activation of these associations allows one to anticipate the emotional consequences of a choice, and in turn evaluate the choice at a base level of “good” or “bad”. This facilitates the decision making process in that rather than considering every possible choice, as Damasio’s patients did, people are able to very quickly anticipate the outcomes of the choice, make an evaluation, and choose an option. It should be noted that this hypothesis has been informed by an analysis of decisions that are immediate and may not have long-term implications (e.g. laboratory gambling tasks, choosing meeting times, etc). Health decisions, which can incur serious long-term consequences, may require more thoughtful considerations of the choice options over the course of a longer time-frame. However, in the context of deciding to use sunscreen, particularly in cases of
habitual sunscreen use, the decision process may be much more automatic, as described by the SMH.

**Integration of Emotion into Models of Health Behavior**

Models of behavior, specifically models of health behavior as described above, are comprised almost exclusively of cognitive beliefs; Protection Motivation Theory is an exception in this regard (Rogers, 1983; Rogers & Prentice-Dunn, 1997). It is of interest, given the extensive research on the role of emotion in decision making, to understand why emotion has been largely absent from commonly used models of health behavior.

The cognitive beliefs that comprise these models are thought to be generally stable over time. Some serious difficulty arises when one considers the influence of emotion in these behavioral models, particularly with regard to the interaction of beliefs and emotions. Emotions, by standard definition, are short-lived and transitory in nature. Ekman (1992) posited that discrete emotional experiences are characterized by a distinctive physiological response, quick onset, and brief duration. Classic work on the influence of emotion in decision-making has taken place in the laboratory and has measured the immediate effects of short lived emotional arousal on cognition. Studies of behavior, particularly health behaviors in real world settings, often make use of self-report questionnaire data, often cross-sectional. The use of questionnaires, while well-suited for measuring stable cognitive beliefs, may not be ideal for measuring the immediate and transitory influence of emotions.
Given the issue of assessing transitory emotions, some researchers have used creative methodologies in studies that examine the role of emotion in health decision-making. Such studies include those in which participants are paged at random intervals over a set time period and instructed to record their emotions (e.g., Todd, Armeli, & Tennen, 2009), or daily diary studies in which participants record their emotional states and experiences at the end of each day (e.g., Adam, 2006; Barta, Kiene, Tennen, Abu-Hasaballah, & Ferrer, 2007; Finan, Zautra, & Davis, 2009; Harrington & Harris, 2009; Rook, 2001). Others have examined the physiological markers of emotional experience during decision-making tasks (Lo & Repin, 2002). The majority of researchers who have thus far tried to incorporate emotion into models of health behavior have instead examined the role of anticipated emotions and the role of dispositional emotions such as cancer worry (Hay, Buckley and Ostroff, 2005; McCaul, Canevello, Mathwig, & Klein, 2003; Schwartz, Taylor, & Willard, 2003). Both anticipated emotions and the trait-like emotional states such as worry sidestep the measurement issues associated with what emotion researchers would consider to be actual emotional experiences. Nonetheless, anticipated emotions and dispositional emotions have been successfully added to models of health behavior. Anticipated emotions, specifically anticipated regret, are cognitive in nature in that the necessary components of anticipated emotion are the ability to both imagine the outcome of a particular behavior and anticipate the emotional response associated with that outcome. Anticipated emotions do, however, offer predictive utility above and
beyond cognitive beliefs (e.g. Parker, Manstead & Stradling, 1995; Sheeran & Orbell, 1999).

**Regret and Anticipated Regret in Decision-Making.**

Over the past decade, there has been increasing research on the factors involved in regret. Regret is essentially a cognitively based negative emotion that is experienced when one compares her current negative situation to a counterfactual positive situation (Zeelenberg, 1999). Counterfactual thinking occurs when one imagines an alternative outcome of a decision. For example, a woman who sunbathes without using any sunscreen and experiences a severe sunburn as a result may engage in the following counterfactual thought: “If I had used sunscreen, I wouldn’t have gotten a sunburn.” As a result of this counterfactual thinking, the woman would then experience regret for her decision to sunbathe without sunscreen. This emotion stems from recognizing the loss of the foregone opportunity that would have presumably resulted in a positive outcome.

Researchers have identified several conditions that are necessary in order for people to experience regret. One important factor is *choice* (i.e. that the person willingly chooses the option that then leads to the negative outcome). If the person feels coerced, or feels that the decision is forced in any way, the person will not experience regret (Connolly, Ordonez & Coughlan, 1997; Zeelenberg, van Dijk, & Manstead, 1998). This is directly related to another important factor in regret, which is *responsibility*. To the extent that the person can be held
responsible for the decision and its resulting negative outcome, the person will experience regret (Zeelenberg et al, 1998). Finally, experienced regret is related to the relative closeness of the forgone opportunity. That is, people experience more regret if they “just miss” the opportunity rather than if they miss the opportunity by a long shot (Miller & Gunasegaram, 1990). Although the impact of outcome severity on experienced regret has not been tested, there is evidence to suggest that outcome severity does lead to increased feelings of disappointment (van Dijk & van der Pligt, 1997). To the extent that disappointment involves the negative emotion regarding the outcome of a decision itself, and regret is defined as the comparison of an experienced outcome to its better alternative, it may be that experienced regret would also increase as a result of an increase in the severity of the negative outcome. Put another way, an increase in the severity of the negative outcome may increase feelings of regret because the gap between what is and “what might have been” has increased.

More recent studies have focused on the concept of anticipated regret. Anticipated regret refers to the amount of regret one expects to experience when imagining the negative outcome of a decision. Like experienced regret, anticipated regret is a function of choice and responsibility. Additionally, to experience anticipated regret, one must have sufficient foresight to imagine the potential consequences that could result from one’s decision. In general, researchers have found that high ratings of anticipated regret for a given option, that is, the judgment that an option could lead to powerful negative consequences,
result in decreased selection of that option (Zeelenberg & Beattie, 1997). Put another way, people choose options in order to avoid any future regrets.

**Anticipated regret in models of health behavior.** Anticipated regret has been added to models of health behavior, including the TRA (Langdridge et al., 2007), TPB (e.g. Conner & Armitage, 1998; Conner et al., 2006, Conner et al., 2007; Frost et al., 2001; Kellar & Abraham, 2005; McGilligan et al., 2009; McMillan et al., 2005; Sheeran & Orbell, 1999), and hybrid models (e.g. Abraham et al., 2004; Moser & Aiken, 2011; Steptoe, et al., 2004; Weinstein et al., 2007). In the majority of these studies, anticipated regret accounted for significant variance in behavioral intentions over and above classic constructs of models of health behavior. In three of these studies (Abraham et al., 2004; Sheeran and Orbell, 1999; Taylor, 2007), anticipated regret predicted behavior over and above cognitive constructs and intentions. Two studies examining behavior directly, without the measure of intentions, (Steptoe, et al., 2004; Weinstein et al, 2007) found that anticipated regret was a significant predictor of behavior over and above cognitive constructs and demographic variables.

That anticipated regret does not appear to consistently predict behavior over intentions is consistent with the orginal TRA and TPB models (Fishbein & Ajzen, 1975; Ajzen, 1991). It may well be the case that the role of anticipated regret is to increase intentions to perform a health protective behavior, and that any impact of anticipated regret on behavior is completely mediated by intentions. Models that include intentions and anticipated regret as simultaneous predictors of
behavior are only examining the potential impact of anticipated regret on behavior that is not mediated through intention.

**Fear Appeals.**

There has been extensive work on the use of fear inducing messages to promote health behavior change (see Ruiter, Abraham, & Kok, 2001 for review). A meta-analysis of such fear appeals found that highly threatening messages coupled with messages to induce strong feelings of self-efficacy were more effective at changing intentions and behavior than highly threatening messages without the self-efficacy messages, or weak threatening messages with and without self-efficacy messages (Witte & Allen, 2000). This is consistent with the PMT model (Rogers, 1983).

This work stems from early research by Leventhal (1970) who found a distinction between one’s engaging in fear control as opposed to danger control. As specified by the PMT and Leventhal’s work (1970), fear control, associated with defensive avoidance of the message or reactance to the message, results from a highly threatening situation with no clear method of protection. Conversely, danger control, associated with positive attitudes toward the protective behavior, intentions to engage in the protective behavior, and actual behavior, results from a threatening situation in which there is a clear method of protection from the threat (see also Witte, 1994).

Fear appeal messages have been used to increase sun protection. In a test of the PMT, McMath and Prentice-Dunn (2005) examined the effectiveness of
fear-arousing messages on sun protection behavior in young people. In a 2 x 2 design, 208 participants were randomly assigned to receive either low or high threat communications (e.g. information and photos of skin cancer) and either low or high coping appraisal communications (e.g. message focused on self- and response efficacies, with an undermining of response costs). While they did not find a significant interaction for Threat X Coping on behavioral intentions, the authors did find a main effect for threat condition, with those in the high threat condition indicating greater intentions to sun-protect than those in the low threat condition. They found a marginally significant \( p = .08 \) main effect of coping condition on behavioral intentions. Those in the high coping condition reported marginally significantly increased intentions to sun protect relative to those in the low coping condition.

**Proposed Theoretical Model Underlying Intervention**

Drawing on health behavior models, research on emotion and health behavior, and previous psychosocial and intervention research on sun protection, I proposed a model of the processes that might underlie an intervention to increase sun protection. Specifically the model refers to an intervention which combines an emotional arousal component followed by a component to increase self-efficacy for use of sun protection.

While each of the aforementioned constructs in the classic models of health behavior may have a role in the prediction of sun protection intentions and behavior, the focus of this dissertation is an examination of the interplay among a
small number of core constructs: emotional arousal, anticipated regret, attitudes toward sun protection, self-efficacy, benefits of sun protection, susceptibility to and perceived severity of skin cancer and photoaging. What emerges is a hybrid model of sun protection behavior and intentions, drawing from the Theory of Reasoned Action and Planned Behavior, the Health Belief Model, Protection Motivation Theory, and Social Cognitive Theory. The hypothesized model is shown in Figure 7.

**Sun Protection Behavior**

As discussed previously, the CDC, NCI, and ACS recommend several methods of sun protection, including the use of sunscreen with an SPF of 15 or higher, use of protective clothing, and staying in the shade when outside. Recognizing that the adoption of one or more of these behaviors constitutes sun protection behavior, the present model includes several methods of sun protection as a composite of general sun protection behavior.

**Intentions.**

Both the Theory of Reasoned Action and the Theory of Planned Behavior posit that intentions are the primary predictor of behavior, and that any other psychosocial predictor of behavior is fully mediated by intentions. Thus, in this model, intentions to use sunscreen are included as a direct predictor of behavior.

**Attitudes.**

Both the Theory of Reasoned Action (Fishbein & Ajzen, 1975) and the Theory of Planned Behavior (1991) posit that intentions to engage in a behavior
are predicted in part by attitudes, that is, an evaluation of the behavior as “good” or “bad”. Further, much research on the use of TRA and TPB to predict sun protection behavior in young adults has shown that attitudes significantly predict intentions to engage in sun protective behavior (e.g. Myers & Horswill, 2006; Steen, Peay, & Owen, 1998; White, Robinson, Young, Anderson, Hyde, Greenbank, Rolfe, Keane, Vardon & Baskerville, 2008). Thus, attitudes are included as a predictor of intentions to engage in sun protective behaviors.

Based on Damasio’s somatic marker hypothesis (SMH), a consideration of the anticipated emotional consequences of the behavior guides one’s evaluations of the behavior as “good” or “bad” (Damasio, 1996). Work from Moser and Aiken (2011) and Moser, Shiota, and Aiken (2009) has found that anticipated regret in particular significantly predicted young women’s attitudes toward breast augmentation surgery. Thus, in the proposed model, attitudes are predicted from anticipated regret. In sum, the relationship between anticipated regret and direct attitudes is predicted to be at least partially mediated by evaluative attitudes, a relationship supported theoretically by the SMH and found in the substantive area of young women’s health behavior (Moser & Aiken, 2011).

**Anticipated regret.**

Research in both the decision theoretic domain (e.g. Zeelenberg, 1999) and the health behavior domain (e.g. Abraham & Sheeran, 2003; Moser & Aiken, 2011; Steptoe et al., 2000; Steptoe et al., 2004) has found that people make decisions in an effort to avoid future regrets. In the majority of studies on the
addition of anticipated regret to classic models of health behavior, anticipated regret was found to be a direct predictor of intentions, but did not emerge as a predictor of behavior over and above intentions (e.g. Conner & Armitage, 1998; Conner et al., 2006, Conner et al., 2007; Frost et al., 2001; Kellar & Abraham, 2005; McGilligan et al., 2009; McMillan et al., 2005; Moser & Aiken, 2011). Thus, anticipated regret of failing to protect one’s skin from the sun is included as a negative predictor of intentions to sun protect.

**Perceived susceptibility and severity.**

According to the Health Belief Model (Rosenstock, 1974) both perceived susceptibility to and perceived severity of the negative effects of a health threat are included as direct predictors of behavior, or in modified forms of HBM as predictors of intentions (e.g. Abraham, 1992; Aiken et al, 1994). In the proposed model, the influence of perceived susceptibility and severity on intentions is mediated by anticipated regret, as has been found in previous research (Moser & Aiken, 2011). Consistent with work characterizing the elicitors and correlates of anticipated regret, susceptibility to and severity of the negative outcomes of failing to engage in sun protective behavior (i.e. skin cancer and photoaging) are included in the proposed model as direct predictors of anticipated regret (Weinstein et al., 2007; Zeelenberg, van Dijk, Manstead, and van der Pligt, 2000;). Both components of risk, susceptibility and severity, have been found to be direct predictors of anticipated regret in a psychosocial model predicting young women’s intentions to obtain breast implants (Moser & Aiken, 2011). Chapman
and Coups (2006) have also found that anticipated regret mediated the relationship perceived risk and intentions to get a flu vaccination. Perceived risk was a function of both perceived likelihood of getting the flu if one were to be vaccinated and perceived severity of the flu.

**Experienced emotion.**

The proposed theoretical model was developed to characterize an intervention in which strong emotional arousal consisting of negative emotions like fear would be elicited through exposure to intense threatening stimuli with regard to the consequences of sun exposure. Thus, the primary indirect path from the intervention to behavior was specified in the theoretical model as flowing through emotional arousal.

According to the somatic marker hypothesis (Damasio, 1996), emotion that is experienced as a result of the activation of previously learned associations between outcomes and behavior shape one’s anticipated emotional outcomes of the decision. In the proposed model, emotion experienced during the intervention is included as a direct predictor of anticipated regret.

Consistent with both the work on affect, defined as a general evaluation of good or bad experienced as a feeling, and perceptions of risk (e.g. Slovic et al., 2004), and on the specific negative emotion fear and perceptions of risk (e.g. Lerner & Keltner, 2000), emotion is included as a direct predictor of susceptibility to and severity of the negative effects of sun exposure (i.e., skin cancer and photoaging).
Finally, individual participants in interventions come to the intervention setting with different histories of sun protection, and different levels of perceived risk (i.e., susceptibility and severity) for skin cancer and photoaging. Thus previous sun protective behaviors and existing perception of susceptibility and severity at the outset of the intervention were included as precursors of the emotional arousal experienced in the intervention.

**Self-efficacy and benefits of sun protection.**

Protection motivation theory (Rogers, 1975; Rogers & Prentice-Dunn, 1997) posits that in addition to self-efficacy, response efficacy, defined as the perception of the protective utility of the health behavior, also mediates the relationship between the message and the health protective behavior. Thus both self-efficacy and response-efficacy are included as mediators of the effect of the intervention and downstream intentions and behavior; response-efficacy is referred to in the model as ‘perceived benefits', consistent with HBM. This proposed relationship between self-efficacy plus perceived benefits and intentions and behavior is also supported by the revised Health Belief Model (Rosenstock, et al., 1988).

**Preliminary Data Collection**

In the fall of 2009, I conducted a pilot study to support development of the visual stimuli that would serve as the intense emotion arousing stimuli at the outset of the intervention. I examined both the self-reported emotions and physiological arousal associated with images of sun damage (i.e. photoaging in
young women, photoaging in older women, sunburns, skin cancers, and Moh’s surgery). These specific categories of sun damage were selected because a) skin cancer, photoaging, and sunburns are the primary negative effects of failure to protect one’s skin from the sun’s UV rays as described by the CDC, NCI, and ACS, and b) research has shown that sun protection behavior in young people, particularly women, may be motivated by concerns of avoiding proximal threats of photoaging as well as the distal threats of skin cancer (e.g. Jackson & Aiken, 2000, 2006; Mahler et al., 2003). The results of this study informed the selection of sufficiently emotionally arousing images for the subsequent intervention study. This pilot study also supported relationships between perceptions of risk (e.g. susceptibility and severity), intentions to engage in sun protection, and self-reported sun protection behavior 2 weeks later. All procedures and materials in this pilot study were approved by the Arizona State University Institutional Review Board in the office of Research Integrity and Assurance. The IRB approval page is found in Appendix A.

Method

Participants.

A total of 38 undergraduate women participated in this pilot study as partial fulfillment of a research requirement for an Introductory Psychology course. The participants’ ages ranged from 18 to 20 (mean = 18.4, standard deviation = .56; 2 ages were unreported). The majority of the participants were freshmen (n= 27, 71%). Nine women were sophomores (24%). Two women did
not indicate their class standing. The majority of the participants were Caucasian (n = 27, 71%). Nine women indicated they were Hispanic (24%), and 2 identified themselves as African American (5%).

Procedure

Participants were emailed a pretest questionnaire assessing: 1) conditional susceptibility to skin cancer and photoaging, 2) perceived susceptibility to skin cancer and photoaging, 3) severity of skin cancer and photoaging and, 4) sun protection behaviors during the previous week. The items are described below, and the pretest questionnaire is given in Appendix B. Participants completed the questionnaire prior to their laboratory session and brought it with them to their scheduled laboratory session.

Laboratory sessions were completed on an individual basis. After participants read and signed the consent form, sensors for the cardiac measures were placed to assess the key physiological measures of interest, interbeat interval (IBI) and pre-ejection period (PEP), which are described below. Sensors were placed (1) at the first thoracic vertebra, (2) at the center of the clavicle, (3) at the Xyphoid process, (4) on the spine one inch inferior to the placement of sensor 3, (5) on a lower rib on the left side, and (6) at the midpoint of the right clavicle, with the ground on a right rib. Respiration was measured using an elastic belt with a tension-sensitive component, stretched around the base of the participant’s rib cage. Signals were amplified using hardware provided by Mindware, Inc. and Biopac.
The experiment consisted of a within-subjects design. Each participant completed a total of 6 slide-viewing trials. Participants first viewed a set of 6 Skin Cancer/Sun Damage Neutral slides of women, followed by 5 sets of 6 slides each depicting images of Skin Cancers, Moh’s Surgery (removal of skin cancer), Photoaging in Young Women, Photoaging in Older Women, and Sunburns (see Appendix C). The order of the sun damage slide sets was randomized, counterbalanced across participants. For each participant, the Skin Cancer/Sun Damage Neutral slides, henceforth referred to as Neutral, were presented first. Each slide set was presented for 90 seconds, with each individual slide presented for 15 seconds. Prior to each slide set, participants viewed an ‘X’ on the screen for 60 seconds in order to assess baseline measures of IBI and PEP. After each slide set, the experimenter entered the room and administered a self-reported emotions scale, described below.

Following the final slide set, participants completed a post-test questionnaire assessing the following: 1) conditional susceptibility to skin cancer and photoaging, 2) Perceived susceptibility to skin cancer and photoaging, 3) severity of skin cancer and photoaging, 4) anticipated regret toward failing to protect one’s skin from the sun, and 5) intentions to use sunscreen. The items are described below, and the post-test questionnaire is found in Appendix D.

After completing the post-test questionnaire, the experimenter removed the sensors and respiration belt. Participants then completed a sheet requesting tracing information and made an appointment to complete a telephone interview
exactly 2 weeks later. Participants were then debriefed concerning the laboratory session of the experiment.

During the scheduled follow-up interview, participants reported their intentions to engage in sun protection and their sun protection behavior during the just previous week. The follow-up telephone interview is given in Appendix F.

Measures

**Pretest questionnaire.**

The pretest questionnaire (see Appendix B) consisted of 22 items. All items were taken from scales used in a study modeling the psychosocial determinants of sun protection intentions (Jackson & Aiken, 2000). Descriptive statistics for each scale are given in Table 1.

**Sun protection behaviors for the previous week.** Five items (items 1 – 5) assessed sun protection behaviors during the previous week, including use of sunscreen with an SPF of 15 or greater, use of protective clothing, and staying in the shade. The arithmetic mean of these five items served as the sun protection scale score.

**Conditional susceptibility to skin cancer.** Conditional susceptibility refers to one’s perception of risk if one does not engage in a health protective behavior (Ronis, 1992). One item (item 6) served as a measure of conditional susceptibility to skin cancer, specifically, one’s susceptibility to skin cancer if one does not engage in sun protection behavior.
**Conditional susceptibility to photoaging.** Three items (items 7-9) were used to assess conditional susceptibility to photoaging and general sun damage. The mean of these three items served as the scale score.

**Perceived susceptibility to skin cancer.** Three items (items 10-12) were used to assess perceived susceptibility skin cancer. Item 12, “I don’t need to worry about skin cancer until I am older”, was reverse scored. The mean of these three items served as the scale.

**Perceived susceptibility to photoaging.** Three items (items 13-15) were used to assess perceived susceptibility to photoaging. Item 13, “I am too young to spend time thinking that I might get wrinkles and age spots”, was reverse scored. The mean of these three items served as the scale score.

**Perceived severity of skin cancer.** Three items (items 16-18) were used to assess the severity of skin cancer. The mean of these three items served as the scale score.

**Perceived severity of photoaging.** Four items (items 19-22) were used to assess the severity of photoaging. The mean of these four items served as the scale score.

**Slide sets and presentation.**

Slide sets (see Appendix C) were presented on a 42” monitor approximately 10 feet away from the participant.

**Physiological measures.**
**Interbeat interval (IBI).** Interbeat interval is defined as the time elapsed, in milliseconds, between the R-peaks associated with each heartbeat. As it is the time elapsed between this point in each heartbeat, lower IBI indicates faster heart rate. IBI is a function of input from both the sympathetic nervous system and the parasympathetic nervous system. Mean IBI was calculated for each 90-second period of the presentation of slide sets and also for each 60-second baseline period when the ‘X’ was on the screen. To account for baseline measures of IBI, change scores were calculated by subtracting mean IBI during baseline from IBI during the corresponding slide sets.

**Pre-ejection period (PEP).** Pre-ejection period is defined as the time elapsed, in milliseconds, between the ECG “Q” point and the “B” point of the first derivative of the impedance signal for a composite beat. In other words, PEP is the time elapsed during a heartbeat between the onset of ventricular contraction and the release of blood through the aorta. PEP is a marker of sympathetic nervous system arousal. Lower PEP indicates increased sympathetic nervous system arousal. A clear indication of sympathetic nervous system arousal was of interest in this study, as fear is the primary emotion presumed to be associated with the images presented in the skin cancer and sun damage slides. Fear is marked by sympathetic nervous system arousal (e.g. Cacioppo, Berntson, Larsen, Poehlmann, & Ito, 2000). Mean PEP was calculated across each 90-second period of the presentation of slide sets and also for each 60-second baseline period when the ‘X’ was on the screen. To account for baseline measures of PEP, change
scores were calculated by subtracting mean PEP during the baseline from mean
PEP during the corresponding slide sets.

**Self-reported emotions and arousal.**

Self-reported measures of arousal and discrete positive and negative
emotions experienced while viewing the slide sets were measured with 14 items
(see Appendix E).

**Post-test questionnaire.**

The post-test questionnaire (see Appendix D) consisted of the same
psychosocial scales as on the pretest plus a measure of anticipated regret and a six
item scale of intentions for sunscreen use. All items except the anticipated regret
item were taken from Jackson and Aiken (2000).

The repeated scales consisted of conditional susceptibility to skin cancer
(Item 2 of the posttest), conditional susceptibility to photoaging (Items 3-5),
perceived susceptibility to skin cancer (Items 6-8), perceived susceptibility to
photoaging (Items 9-11), perceived severity of skin cancer (Items 12-14),
perceived severity of photoaging (Items 15-18). All scales were scored as on the
pretest.

*Anticipated regret.* One item (Item 1) was used to assess anticipated regret
associated with failing to use sun protection. This item is a common item in the
anticipated regret literature (e.g. Frost et al., 2001; Moser & Aiken, 2011).

*Intentions to use sunscreen.* Six items (Items 19-24) were used to assess
intentions to use sunscreen on a regular basis on one’s face and body. Item 23, “I
probably won’t use sunscreen on my face”, was reversed scored. The mean of these six items served as the scale score.

**Follow-Up Questionnaire.**

The follow-up questionnaire (see Appendix F) consisted of 11 items.

**Sun protection behaviors during the previous week.** Five items (Items 1 – 5) were used to assess sun protection behaviors during the previous week, including use of sunscreen with an SPF of 15 or greater, use of protective clothing, and staying in the shade. The mean of these five items served as the scale score.

**Intentions to use sunscreen.** Six items (Items 6-11) repeated the measure of intentions on the immediate posttest; the mean of the items again served as the scale score.

**Results**

**Physiological Responses to Slide Sets**

Two physiological measures of interest, IBI and PEP, were included in the analysis. First, in order to control for baseline measures of IBI and PEP, difference scores were calculated for each slide set by subtracting the IBI during the baseline (measured while participants viewed the ‘X’ on screen) from the IBI during the corresponding slide set. The same procedure was conducted for PEP. Henceforth, the measures of IBI and PEP are these difference scores.

**IBI.**
A series of matched pairs t-tests was conducted comparing IBI reactivity during the Skin Cancer and Sun Damage slides to IBI reactivity in the neutral slides. In turn, each set of Skin Cancer and Sun Damage slides was compared to the neutral slides. Relative to neutral slides, IBI reactivity was significantly lower during the photoaging in older women slides \((t(34) = -2.51, p = .02)\) and photoaging in younger women slides \((t(33) = -2.10, p = .04)\) indicating faster heart rate during these slides relative to neutral slides. A similar pattern of results, though not significant, was observed for IBI reactivity during the Moh’s slides \((t(36) = -1.79, p = .08)\) and skin cancer slides \((t(34) = -1.21, p = .24)\) relative to IBI in the neutral slides. There was almost no difference between IBI during the sunburn slides compared to IBI in the neutral slides \((t(34) = -.08, p = .93)\). Hence, the sunburn slides were removed from further analyses.

**PEP.**

A series of matched pairs t-tests were conducted comparing the PEP during the Skin Cancer and Sun Damage slides to the PEP in the neutral slides. No significant differences were observed.

**Self-Reported Emotions to Slide Sets**

Figure 6 illustrates differences between self-reported fear to each skin damage related slide set relative to the self-reported fear response to neutral slides. As can be seen in Figure 6, self-reported fear, measured on a 0 to 8 point scale, was significantly greater in all slide conditions relative to neutral slides. The strongest fear was reported following the cancer and Moh’s surgery slides.
This is in contrast to the physiological measures of arousal (IBI and PEP), which were stronger for the photoaging slide sets than the cancer or Moh’s slides, relative to neutral slides.

**Correlations between Pretest Measures and Physiological Responses**

In order to control for IBI during neutral slides, difference scores were created by subtracting IBI during the neutral slides from the IBI during the Skin Cancer and Sun Damage slides. Longer IBI indicates slower heart rate; therefore negative difference scores indicate faster heart beat while viewing the skin damage related slides relative to neutral. Correlations of IBI skin damage reactivity-neutral reactivity difference scores with pretest measures of sun protection, susceptibility concerning cancer and photoaging, and conditional susceptibility to and severity of photoaging and skin cancer are presented in Table 2. Negative correlations indicate a positive relationship between heart rate and psychosocial constructs. Thus, a negative correlation indicates increases in heart rate are associated with increases in the psychosocial constructs. As shown in Table 2, significant negative correlations were observed between pretest measures of sun protection and IBI reactivity during the slides illustrating cancer ($r(33) = - .40, p = .02$), Moh’s ($r(35) = -.36, p = .03$), photoaging in older women ($r(33) = -.33, p = .05$), and photoaging in younger women ($r(32) = -.52, p = .001$), all relative to reactivity during the neutral slides. This indicates that increased heart rate, relative to neutral slides, was observed during these slides for those with greater rates of sun protection behavior at baseline. Similar patterns of results
were found for baseline measures of cancer and susceptibility to photoaging, and to some extent conditional susceptibility and severity.

In order to control for PEP reactivity during neutral slides, difference scores were created by subtracting PEP reactivity during the neutral slides from PEP reactivity during the Skin Cancer and Sun Damage slides. Again, more negative PEP difference scores indicate increased sympathetic nervous system activation, relative to neutral slides. The correlations between pretest measures and PEP difference scores are presented in Table 3. Negative correlations indicate a positive relationship between sympathetic nervous system activation and psychosocial constructs. Thus, a negative correlation indicates greater sympathetic nervous system activation is associated with increases in the psychosocial constructs.

As can be seen from the table, significant negative correlations were observed between pretest measures of sun protection and PEP during the Moh’s slides ($r(35) = -.43, p = .01$), and photoaging in younger women ($r(34) = -.44, p = .01$) slides. This indicates that increased sympathetic nervous system arousal, relative to neutral slides, was observed during these slides for those participants who had reported higher rates of sun protection behavior at baseline. Similar patterns of results were found for baseline measures of susceptibility to skin cancer and photoaging, and to some extent conditional susceptibility and severity.

**Correlations between Physiological Responses and Post-test Measures**
Correlations between IBI difference scores (i.e., IBI reactivity scores during sun damage slides, controlling for IBI reactivity during neutral slides) and posttest measures are presented in Table 4. Recall that negative correlations indicate a positive relationship between heart rate and psychosocial constructs. To some extent, a positive relationship pattern between heart rate and posttest measures of susceptibility to cancer and photoaging was observed. Conversely, to some extent, a negative relationship between heart rate during images depicting photoaging, and conditional susceptibility and severity was observed.

Correlations between PEP difference scores (i.e., PEP scores during sun damage slides controlling for PEP during neutral slides) and posttest measures are presented in Table 5. Again, negative correlations indicate a positive relationship between sympathetic nervous system activation and psychosocial constructs. Compared to the correlations between IBI and posttest measures, the negative correlations between PEP and posttest measures provide a clearer pattern of a positive relationship between sympathetic nervous system activation and posttest measures of worry, susceptibility, and severity.

**Correlations between Physiological Responses and Follow-Up Measures**

Correlations between IBI difference scores and follow-up measures of intentions for sun protection and actual sun protection at two week follow-up are presented in Table 6. Negative correlations indicate positive relationships between heart rate and follow-up measures. A clear pattern of a positive relationship (negative correlations) between heart rate during slide sets, controlling for heart
rate during neutral slides, and follow-up intentions and behaviors was observed. This indicates that increased heart rate during slides was associated with increases in sun protection intentions and behaviors at the 2-week follow-up.

Correlations between PEP difference scores and follow-up measures are presented in Table 7. Negative correlations indicate positive relationships between sympathetic nervous system activation and follow-up measures. A clear pattern of a positive relationship between sympathetic nervous system activation during slide sets, controlling for PEP during neutral slides, and follow-up intentions and behaviors was observed. This indicates that increased sympathetic nervous system activation during slides was associated with increases in sun protection intentions and behaviors at the 2-week follow-up.

**Correlations among Psychosocial Constructs and of Psychosocial Constructs with Behavior**

Several relationships observed in the pilot study support relationships in the hypothesized model of the intervention in Figure 7. Measures of conditional susceptibility to both skin cancer and photoaging and measures of severity to photoaging were positively correlated with anticipated regret toward failing to protect oneself from the sun (skin cancer susceptibility: \( r(36) = .36, \ p < .05 \), photoaging susceptibility: \( r(36) = .32, \ p < .05 \); photoaging severity: \( r(36) = .30, \ p = .06 \)). Anticipated regret correlated positively with intentions to use sunscreen, both cross-sectionally and over a 2 week period (\( r(36) = .77, \ p < .001 \) and \( r(32) = .54, \ p < .001 \), respectively).
Discussion

The results of this study informed the selection of slide sets to be used in the proposed intervention. Presentation of the Skin Cancer, Moh’s Surgery, Photoaging in Young Women and Photoaging in Older Women slides all resulted in increased heart rate (decreased IBI) compared to IBI in the neutral slides. These slides also elicited significantly greater self-reported fear than the neutral slides. The sunburn slide sets did not differ from the neutral slides in measures of IBI or PEP; further, these slides elicited self-reported amusement in conjunction with fear. Hence, they were not included in the intervention slides.

These results also showed that increased heart rate and sympathetic nervous system arousal during the skin cancer/sun damage slide sets, as compared to neutral slides, could be predicted by baseline measures of skin cancer and photoaging worry, skin cancer and photoaging susceptibility and severity, and previous sun protection behaviors. In turn, the results of this study also provide some evidence that these factors may be predicted by these physiological responses associated with these slides.

Finally, the finding that PEP was correlated with sun protection behavior and intentions 2 weeks after viewing the slides suggests the possibility that emotional arousal, as marked by sympathetic nervous system arousal, may influence subsequent intentions and behavior.

Present Study
The purpose of the present research was to evaluate the effectiveness of an intervention to increase sun protection using the emotionally arousing images employed in the pilot study. The second goal was evaluate the adequacy of the proposed theoretical model given in Figure 7, which specifies relationships among cognitive and emotional factors, and the relationships of these factors to both intentions to use sun protection and actual sun protection behavior.

Three experimental conditions were evaluated in the present research: a full intervention (F) consisting of visually arousing images of the damaging effects of the sun, along with a message of benefits of sun protection and strategies for easy use of sun protection to encourage self-efficacy; a partial intervention condition (E) consisting of a message of self-efficacy and benefits of sun protection; and a control condition (C) consisting of a message of stress reduction. The intervention was implemented and evaluated for efficacy. The theoretical model proposed in Figure 7 was tested. Finally, based on empirical findings, the theoretical model was respecified and a revised model was proposed.

**Hypotheses**

**Immediate posttest differences.**

Hypothesis 1. Due to the strong message of the negative effects of sun exposure (e.g., the images), it was expected that those in the full intervention (F), relative to those in the control (C) and efficacy conditions (E) would report higher levels of both susceptibility to skin cancer and photoaging and severity of skin cancer and photoaging at immediate posttest.
Hypothesis 2. As both the (F) and (E) interventions consisted of identical scripts of the self-efficacy message and benefits of sun protection message, it was hypothesized the those in the (F) and (E) conditions would report higher levels of self-efficacy and benefits of sun protection at immediate posttest.

Hypothesis 3. Again, due to the strong emotionally arousing images presented in the (F) condition, it was hypothesized that those in the (F) condition, relative to the (E) and (C) conditions, would report greater anticipated regret toward failing to use sun protection, greater anticipated positive emotion toward using sun protection, greater anticipated negative emotion toward sunbathing, and more positive attitudes toward sun protection.

Hypothesis 4. Further, it was predicted that those in the (F) intervention would report higher intentions to use sun protection than those in the (E) or (C) conditions at immediate posttest.

**Follow-up differences.**

Hypothesis 5. It was predicted that those in the (F) condition would report greater sun protection behaviors and intentions to engage in sun protection at the follow-up than those in the (E) or (C) conditions.

Hypothesis 6. It was also predicted that those in the (F) condition would report greater anticipated regret at the follow-up than those in the (E) or (C) conditions.
Hypothesis 7. Finally, it was predicted that those in the (F) and (E) conditions would report greater self-efficacy for sun protection than those in the (C) condition.

Method

All procedures in this research were approved by the Arizona State University Institutional Review Board in the office of Research Integrity and Assurance. The IRB approval page is found in Appendix G

Participants

A consort diagram of participant flow through the full study is provided in Figure 8. A total of 355 undergraduate women at Arizona State University participated in the pretest and immediate posttest of the study as a partial fulfillment for an introductory Psychology course. Of these, 3 (0.8%) were excluded from data analysis because the women indicated that they had already had skin cancer. Thus, a final total of 352 (99%) participants were included in the pretest and immediate posttest just following the experimental sessions.

The participants’ ages ranged from 18 to 49 years (M = 19.39, sd = 2.34). The majority of the participants were freshman (n= 233, 66.8%). Seventy women were sophomores (20.1%), 31 were juniors (8.9%), and 15 were seniors (4.3%). One woman did not indicate her class standing. The majority of the participants were Caucasian (n = 219, 62.4%). Sixty-one women indicated they were Hispanic (17.1%); 21, Asian (6%); 18, African-American (5.1%); 10, Native American
(2.8%); and 5, Middle Eastern (1.4%). Additionally, 17 women identified as multi-racial (4.8%). One woman did not indicate her race/ethnicity.

Of the original 352 women, 253 (72%) participated in the two week follow-up. The participants ages ranged from 18 to 49 (M = 19.43, sd = 2.5). The majority of participants at two-week follow-up were Caucasian (n = 156, 61.7%). Forty-four were Hispanic (17.4%), 17 were Asian (6.7%), 12 were African-American (4.7%), 7 were Native American (2.8%), 5 identified as Middle Eastern (2%), and 12 identified as multi-racial (4.7%). The majority were freshman (n = 162, 64.3%), 56 were sophomores (22.2%), 24 were juniors (9.5%), 9 were seniors (3.6), and 1 (0.4%) listed “other”. One woman did not indicate class standing.

**Intervention Conditions**

There were three intervention conditions: full (F) emotional arousal plus self-efficacy, self-efficacy treatment only (E), and control (C).

**Full emotional arousal plus self-efficacy (F).**

The script for the intervention condition is given in Appendix H. This is a modified version of the intervention script used by Jackson and Aiken (2006). The intervention condition, as informed by the fear appeals literature and the PMT (e.g. Rogers, 1983; McMath & Prentice-Dunn, 2005), consisted of two main components: (a) emotional arousal associated with images of skin cancer and photoaging and (b) efficacy, including benefits of sun protection (equivalent to response efficacy in PMT) followed by self-efficacy.
In the pilot study, the images (see Appendix C) had been shown to elicit both self-reported emotions (i.e. fear and disgust), as well as physiological arousal, relative to neutral images. Participants in the full condition (F) viewed 4 sets of images drawn from the pilot study: 1) photoaging in younger women, 2) photoaging in older women, 3) skin cancers, and 4) Moh’s surgery. These images were presented in this same order for all sessions. After each slide set, participants answered questions as to the emotions experienced during the slide set.

The benefits of sun protection component consisted of information about the effectiveness of sun protection at preventing skin cancer and photoaging as characterized by the National Cancer Institute (http://www.cancer.org/docroot/PED/content/ped_7_1_What_You_Need_To_Know_About_Skin_Cancer.asp?sitearea=&level=. Accessed 03-10-10). Further, an explanation of sun protection factor (SPF) and the different types of UV rays (A and B) was provided. The self-efficacy component, drawn from Jackson and Aiken (2006), consisted of information concerning the proper way to apply sunscreen and how to make sunscreen use a daily habit. Specifically, information was provided about travel sized bottles of sunscreen with SPF 15 and higher that can be kept in one’s purse or backpack to apply throughout the day. Information was also provided about body lotions and moisturizers that contain SPF 15 or higher. Further, the ease of keeping sunscreen in one’s bathroom to apply daily, like brushing one’s teeth, was highlighted. Finally, participants were led through a visualization exercise, in which they imagined going to the store,
buying sunscreen with SPF 15 or higher, putting it into a travel sized bottle and putting it in a purse or backpack to be reapplied throughout the day. In general, the order of the intervention consists of threat specific emotional arousal, followed by information as to how to avoid the threat.

**Self-efficacy only (E).**

The script for the efficacy-only intervention condition is given in Appendix I. This condition consisted of identical self-efficacy and benefits of sun protection information as in the full intervention. However, the initial presentation of the 4 sets of emotionally arousing images was eliminated from this condition. This condition was included in the study to serve as a more direct comparison to the full intervention, in order to examine whether the emotionally arousing images produced behavioral and psychosocial outcomes above and beyond those produced by the efficacy component alone.

**Control condition (C).**

The control condition consisted of a stress management intervention provided by Arizona State University Student Health Services, used as a control in previous interventions (Jackson & Aiken, 2006; Schmiege, 2005). The script for the control condition is found in Appendix J. The control condition began with a visualization exercise which consisted of eliciting emotional arousal toward taking a test. This component was added to ensure a similar structure to the control condition as the (F) intervention (e.g. emotional arousal, followed by information). Participants visualized oversleeping for an exam, arriving late,
feeling unprepared due to lack of studying, and not recognizing any of the material on the exam.

After this visualization activity, participants completed questions to document the emotions they had experienced during the visualization task. Information was then provided to participants about stress, its effects on the body, and two stress reduction techniques: deep abdominal breathing, and visualization. Participants were also taught to recognize their own symptoms of stress. They were given Biodots, small color-coded hand thermometers used as a marker of stress.

**Design and Procedure**

At each session, participants first completed a pretest questionnaire, described below. Immediately thereafter, the control or intervention materials were presented. Participants then completed a post-test questionnaire consisting of psychosocial measures and intentions to sun protect. Two weeks after participation, participants were emailed a link to a questionnaire assessing intentions to use sun screen and sun protection behavior. The median number of days after the lab session participants completed the follow-up questionnaire was 16 ($M = 17.65$, $sd = 4.77$). However, five participants completed the follow-up interview 30 days or more following the intervention.

Data collection took place over a 5 week period during the spring of 2010. A total of 59 sessions were conducted, consisting of between 1 and 15 participants in each session. The author conducted each session with the aid of an
undergraduate research assistant, who helped distribute materials and assured that the protocol was followed for each session. The research assistant completed a process evaluation check list making note of any deviations from the script.

Each week, 18 experimental sessions were implemented. Participants self-selected into sessions. Within each week of data collection, sessions were randomly assigned to the (F), (E) or (C) condition in a group randomized design. In order to ensure sufficient statistical power to detect differences between the (F) and (C) conditions, only (F) and (C) conditions were assigned during the first week of data collection. Assignment of conditions within each week helped to ensure that a similar number of sessions per week were devoted to each condition. This permitted balance across conditions in a) increased sun exposure due to weather effects and b) differential rates of attrition at follow-up due to time of semester (e.g. final exams, graduation, etc).

**Measures**

Participants completed three questionnaires in conjunction with the materials described in the intervention and control conditions (Appendices F, G, and H). Unless noted, these items are taken from questionnaires used by Jackson & Aiken (2000).

Table 8 includes a list of all constructs included in the questionnaires. For each questionnaire, Pretest, Posttest, and Follow-up, the specific item numbers of the items included in each scale are also reported in Table 8. A sample item is
provided for each scale. Finally, Cronbach’s alpha is reported for each scale at Pretest, Posttest, and Follow-up.

**Pretest questionnaire.**

The pretest questionnaire (see Appendix K) consisted of 150 individual items. The questionnaire assessed the intentions, behavior, and the core psychosocial constructs in the theoretical model: 1) intentions to sun protect, 2) general sun protection behavior, 3) previous week sun protection (5 individual items), 4) previous week sun exposure, 5) previous week sunbathing, 6) barriers to sunscreen use, 7) benefits of sun protection- preventing skin cancer, 8) benefits of sun protection- preventing photoaging, 9) attitudes toward sun protection, 10) self-efficacy, 11) susceptibility to skin cancer, 12) susceptibility to photoaging, 13) conditional susceptibility to skin cancer, 14) conditional susceptibility to photoaging, 15) severity of skin cancer, 16) severity of photoaging, and 17) anticipated regret. Two sets of items were also included to assess objective risk for developing skin cancer (Fitzpatrick, 1988; Jackson & Aiken, 2000; Rigel, Rogers, & Friedman, 1985): 18) one’s skin tone and 19) family history of skin cancer, including one’s own skin cancer history.

In addition to all core theoretical constructs, measures of anticipated emotions, both positive and negative, associated with sunscreen and sunbathing, and anticipated emotions associated with using sunscreen and sunbathing were included as *exploratory* measure. These included 18) anticipated emotions toward sunscreen use, 19) anticipated emotions toward sunbathing, and 20) decision
affect, or how one feels when imagining she has failed to protect her skin from the sun. Analyses of these measures are included in the exploratory analysis section of the results.

Finally, additional items were included in the pre-test questionnaire, consistent with their use in previous sun protection literature (e.g. Jackson & Aiken, 2000); these measures were not the primary focus of the present research and were not included in analyses reported. Among these additional items are a) knowledge items (1 – 10), b) most recent sun protection (items 29 – 33), c) normative items (items 58 – 62; 77 – 85), and d) benefits of sun tanning (items 51 – 57).

**Immediate posttest questionnaire.**

The immediate post-test questionnaire, administered immediately upon completion of the intervention materials consisted of 105 items; it is given in Appendix L. The posttest questionnaire contained every item on the pre-test questionnaire except those items that could not have changed as a function of the intervention: 1) skin tone and family history of skin cancer, 2) previous week sun exposure/protection, 3) most recent sun protection, 4) general sun protection and 5) normative items (descriptive, subjective, image).

**Tracing sheet.**

After completing the posttest questionnaire, participants were invited to complete the follow-up questionnaire two-weeks later. Participants completed the tracing sheet (see Appendix M) to provide contact information.
**Follow-up questionnaire.**

The follow-up questionnaire (see Appendix N) consisted of 59 items, assessing the following: a) demographics (year in school, ethnicity, age) b) sun exposure and sunbathing for previous week, c) sun protection for previous week, d) general sun protection behavior, e) most recent sun protection behavior, f) intentions, g) self-efficacy, h) decision affect, i) anticipated regret. A set of questions for generating the participant identification code to match pretest and posttest data to follow-up was also included.

**Emotion rating forms.**

In addition to completing the aforementioned pretest, posttest, and follow-up questionnaires, participants in the (F) and (C) conditions also completed an emotion rating form to assess their experienced emotions during the slides (in the (F) intervention condition) or the test visualization (in the (C) control condition). The descriptive information for these items for the (F) intervention condition and the (C) condition is presented in Tables 9 and 10, respectively. Those in the (F) intervention condition completed an emotion rating form after each of the 4 slide sets presented in the session. Those in the (C) condition completed the form after the stress visualization exercise. This form consisted of 2 items to assess how negative or positive they felt (9-point Likert-type scale with 0 being ‘very negative’ and 8 being ‘very positive’) and how strong their emotions were (9-point Likert-type scale with 0 being ‘no emotion’ and 8 being ‘strongest ever felt’). The form also included 9 items to assess how much of each of the
following emotions they felt: 1) amusement, 2) anger, 3) contentment, 4) disgust, 5) enthusiasm, 6) fear, 7) sadness, 8) compassion, and 9) sympathy. Each item was measured on a 9-point Likert-type scale ranging from 0 to 8, where 0 was ‘no emotion’ and 8 was ‘strongest ever felt’.

**Preliminary Analysis and Scale Score Formation**

**Examination of properties of single items.**

The distribution of responses to each item on each scale was examined. Given use of structural equation modeling, there is a need to identify items with extreme skew and/or kurtosis (West, Finch, & Curran, 1995) that pose difficulties for confirmatory maximum likelihood factor analysis. There were three items on the pre-test questionnaire that had extreme skew and kurtosis: 1) A previous behavior item, “In the past week how often did you wear a hat when you were in the sun?” had skew = 3.26 and kurtosis = 10.99. A total of 278 participants (79%) indicated they never wore a hat during the past week, 39 (11%) indicated they rarely wore a hat, and the remaining 35 (10%) indicated they wore a hat less than half the time to always. Two of the three perceived severity items were also extremely negatively skewed: the severity item, “It would be terrible to get a malignant tumor on my skin” (skew = -3.37, kurtosis = 13.41), and the severity item, “It would be terrible to have skin cancer” (skew = -3.24, kurtosis = 13.68).

**Psychometric analysis of scales.**

*Scales with fewer than three items.* There is one scale, conditional susceptibility to skin cancer, drawn from work by Jackson and Aiken (2000) that
consists of a single item. The response to this single item served as the scale score, and no psychometric analysis could be performed.

**Scales with four or more items.** The unidimensionality of each scale with at least four items was assessed with confirmatory factor analysis (CFA) in Mplus 5.2 (Muthen & Muthen, 2007). Confirmatory factor analyses were conducted on the pre-test measures with all participants’ responses (n = 352). Results of the factor analyses, including fit indices and factor loadings, are found in Table 11. Those scales that assessed both skin cancer and photoaging were submitted to a two-factor CFA in which all skin cancer items were specified to load on one factor all photoaging items, on the other factor. All scales fit their respective factor structures well, with CFIs ranging from .94 to .99. All factor loadings were significant at p < .01 at least. Generally, factor loadings were high, the exceptions being the two reverse scored items on the susceptibility to skin cancer (“I don’t need to worry about getting skin cancer until I am much older”) and susceptibility to photoaging (“I am too young to spend much time thinking that I might get wrinkles and age spots”) scales. These items had loadings of .23 and .16, respectively. These items were removed, and fit improved ($\chi^2(1) = 3.47$, ns; CFI = 1.0, SRMR = .01). These reverse scored items were thus removed from further analysis.

**Exploratory factor analysis of emotion rating forms.** Two exploratory factor analyses were conducted to assess the underlying factor structure of the discrete emotion ratings. Previous research has found that negative discrete
emotions and positive discrete emotions tend to load on separate factors (Watson, Clark & Tellegren, 1988). There were 3 negative emotions (anger, disgust, fear) and 3 positive emotions (amusement, contentment, and enthusiasm) on the emotion rating forms. There were also two emotions, compassion and sympathy, which are not easily defined as ‘negative’ or ‘positive’ (Frederickson, et al., 2003). The means, standard deviations, skew, and kurtosis of these items for those in the (F) condition and (C) condition are given in Tables 9 and 10, respectively.

As can be seen in Table 9, both amusement and enthusiasm were highly skewed for each slide set. There was no such similar skew in the control condition, as shown in Table 10. Principal axis factoring with promax (oblique) rotation in SPSS was employed to explore the factor structure of the discrete emotions scale separately for those in the (F) condition and those in the (C) condition. For the control condition (C), two factors emerged as evidenced by the scree plot. These factors accounted for 49% of the variance. As can be seen from the factor loadings presented in Table 12, for the (C) condition, amusement, contentment, enthusiasm, sympathy, and compassion load on one factor while anger, disgust, and fear load on the second factor. For the (F) condition, again two factors emerged as evidenced by the scree plot. These factors accounted for 53% percent of the variance. As seen in Table 12, for the (F) condition, amusement, contentment, and enthusiasm load on the first factor. Anger, disgust, fear, compassion, and sympathy load on the second factor. The discrepancy in the item
loadings across the two conditions may well have been driven by the extreme skew on the two items, amusement and enthusiasm, in the (F) condition. Since the factor analyses did not lead to a clear unified structure across the experimental conditions, the discrete emotions were treated individually in all analyses.

**Scale score formation.**

Means, standard deviations, number of items, and distribution information for each pre-test scale are found in Table 13. For all scales, the mean of the individual items served as the scale score. A scale score was computed for all participants who answered at least \((k - 1)\) of the \(k\) items on a scale. Missing scores on pretest scales ranged from 3 (0.01%) on the General Sun Protection scale to 1 (0.002%) on the Intentions to Sun Protect scale. For scales with missing data, the following missing values were observed: General Sun Protection scale, 3 participants did not answer 2 items; Attitudes scale, 2 participants did not answer 3 items, Barriers scale 1 participant did not answer 2 items; Intentions scale 1 participant did not answer all 5 items.

**Measures of Sun Protection and Sun Exposure Behavior**

In the present study, four sets of behavior items were included in the pretest and posttest questionnaires to assess behaviors focused on different time points: a) most recent sun protection when the participant was outside for 15 minutes, b) sun exposure over the previous week, c) sun protection over the previous week, and d) general sun protection behaviors with no time frame
specified (e.g., “I wear sunscreen with SPF 15 on my face”). The items assessing most recent sun protection were not analyzed in the present study.

**Previous week sun exposure and sunbathing.**

These two items (see Table 8) were analyzed individually and were included in an analysis of pretest equivalence by condition, and posttest differences by condition. For the analysis of posttest differences, each item was examined individually with its corresponding pretest item included as the only covariate in the analysis.

**Previous week sun protection.**

These five items (see Table 8) were analyzed individually and were included in an analysis of pretest equivalence by condition. Posttest differences by condition were also examined on each item individually, with its corresponding pretest item serving as the only covariate in the analysis.

**General sun protection behavior.**

As these seven items fit a unidimensional structure (see Table 11), a scale score was created and was included in an analysis of pretest equivalence by condition. Posttest differences by condition were examined for the scale, with the corresponding pretest scale included as the covariate in the analysis. Further, this general sun protection behavior scale served as the outcome variable of interest in all models.

**Results**
First, pretest equivalence of the three experimental conditions was examined. Next, as this was a longitudinal study, an analysis of attrition at two week follow-up was conducted. An analysis of the effect of experimental condition on constructs of theoretical interest at immediate posttest and two week follow-up was then conducted. Finally, the meditational path model found in Figure 7 was tested.

It was also of great interest to examine the effect of the experimental conditions on the additional exploratory measures included in the questionnaire, specifically: 1) barriers to using sun protection, 2) positive decision affect, and 3) negative decision affect. Finally, a new exploratory mediation model was tested to more adequately compare the mediated relationships from intervention through model constructs to outcomes for the (F) condition versus the (C) condition and for the (E) condition versus the (C) condition.

**Equivalence of Experimental Groups at Pretest**

Table 14 provides a summary of the pretest means and standard deviations on demographics, psychosocial and emotion measures, intentions, and behavioral measures as a function of condition. An examination of pretest differences of (E), (F), and (C) groups on pretest scale means and relevant demographic information was conducted with a series of one factor ANOVAs in SPSS version 18. There were no significant differences among conditions in age ($F(2, 349) = .28, p = .75$). There were also no significant differences in mean skin tone ($F(2, 344) = 2.05, p = .13$). There were no significant differences among the three conditions on any of
the pretest psychosocial or emotion scales, intentions or sun protection behavior, including both the general protection scale and the individual sun protection behaviors, sun exposure, and sunbathing performed during the previous week (observed $p$ values ranged from .226 to .996; $\eta^2$ ranged from < .001 to .01).

**Analysis of Attrition at Two Week Follow-up**

Figure 8 provides a consort diagram of participation and attrition at each time point. As mentioned previously a total of 352 participants were included in the analysis at both pretest and posttest. Of these 352, a total of 246 (70%) completed the follow-up questionnaire. There were significant differences across conditions in the extent of attrition. Greater attrition was observed in the (E) condition (41%) than in the (F) condition (30%) or the (C) condition (24%), $\chi^2(2) = 6.21$, $p = .05$. An attrition analysis by condition was conducted with two-factor non-repeated measures ANOVAs, as described by Jurs and Glass (1971), of attrition status (retained, attrited) by condition (F, E, C). Pretest variables examined were age, skin tone, and all pretest psychosocial constructs of interest. These constructs were as follows: 1) susceptibility to and severity of skin cancer and photoaging, 2) self-efficacy, 3) benefits of sun protection for preventing skin cancer and photoaging, 4) anticipated regret, 5) attitudes toward sun protection, 6) barriers to sunscreen use, 7) intentions to use sun protection, 8) individual previous week sun protection behaviors, and 9) general sun protection behavior.

There were two significant main effects of attrition. Those who completed the follow-up had significantly lower pretest perceived benefits of sunscreen at
preventing skin cancer \((M = 4.76, \text{sd} = .83)\) than those who attrited \((M = 4.95, \text{sd} = .86)\) \((F(1, 346) = 4.87, p = .03, \eta^2 = .01)\). Those who completed the follow-up also had significantly higher pretest intentions to use sunscreen \((M = 4.31, \text{sd} = 1.18)\) than those who attrited \((M = 3.89, \text{sd} = 1.39)\) \((F(1, 345) = 5.94, p = .02, \eta^2 = .02)\). Interactions between attrition status and condition would indicate differential attrition as a function of condition, undermining internal validity. There were no significant interactions between condition and attrition status on skin tone or age. Further, no significant interactions between condition and attrition status were observed for any aforementioned pretest psychosocial constructs of interest \((p \text{ values ranged from } .20 \text{ to } 1.0)\).

**Analysis of Immediate Posttest Measures**

Analyses of covariance (ANCOVAs) were conducted to assess the impact of the three experimental conditions on immediate post-test measures. Corresponding pretest measures served as the covariates for each analysis. Results of the ANCOVAs and subsequent post-hoc tests are found in Table 15. In Table 15, the adjusted posttest means and adjusted standard errors for the three conditions are reported, with corresponding pretest scores controlled. These analyses provide tests of the impact of the intervention on the putative mediators of the intervention on intentions and behavior from the theoretical model, and also of the impact of the interventions on sun protection behavior itself. In order to assess specific differences between pairs of experimental conditions, post-hoc
tests were conducted using the Bonferroni correction to control for alpha inflation due to multiple comparisons. Outcomes are organized by hypothesis.

Hypothesis 1 stated that due to the strong message of the negative effects of sun exposure (e.g., the images), it was expected that those in the full intervention (F), relative to those in the control (C) and efficacy conditions (E) would report higher levels of susceptibility to skin cancer and photoaging and severity of skin cancer and photoaging at immediate posttest, controlling for pretest. Consistent with this hypothesis, those in the (F) condition did have significantly higher rates of perceived severity of skin cancer, perceived severity of photoaging, perceived susceptibility to skin cancer, and perceived susceptibility of photoaging than those in the (C) condition. With one exception, the (E) condition had significantly higher means than those in the (C) condition for the same constructs: conditional susceptibility to photoaging, conditional susceptibility to skin cancer, susceptibility to photoaging, susceptibility to skin cancer, and severity of skin cancer. For all these scales except one, however, the F and E conditions did not differ significantly. Perceived severity of photoaging was the exception. The F condition but not the E condition led to significantly greater perception of photoaging as severe; moreover, the F condition exceeded the E condition in immediate posttest perception of photoaging severity.

Hypothesis 2 predicted that those in the (F) and (E) conditions would report higher levels of self-efficacy for sun protection and benefits of sun protection than those in the (C) condition at immediate posttest. This hypothesis
was supported. Those in the (F) and (E) conditions reported significantly higher perceptions of self-efficacy than those in the (C) condition. Further, those in the (F) and (E) conditions reported significantly higher perceptions of the benefits of sun protection at preventing skin cancer and photoaging than those in the (C) condition. It is also of interest that those in the (F) condition reported higher perceptions of self-efficacy than those in the (E) condition ($p = .06$ in Bonferroni post hoc comparison of the three conditions; $p = .03$ in a pairwise comparison of F versus E).

Hypothesis 3 predicted that those in the (F) condition, relative to the (E) and (C) conditions, would report greater anticipated regret toward failing to use sun protection and more positive attitudes toward sun protection. Consistent with this hypothesis, those in the (F) condition reported significantly higher anticipated regret and more positive attitudes toward sun protection than those in the (C) condition. Likewise, those in the (E) condition reported significantly higher anticipated regret and attitudes than those in the (C) condition. However, no significant differences were observed between the (E) and (F) conditions.

Hypothesis 4 predicted that those in the (F) intervention would report greater intentions to use sun protection than those in the (E) or (C) conditions at immediate posttest. While those in both the (F) and (E) conditions reported significantly greater intentions to use sun protection than those in the (C) condition, there was no significant difference between the (F) and (E) intervention conditions on intentions to sun protect.
Analysis of Two-week Follow-up Outcomes

Analyses of covariance (ANCOVAs) were conducted to assess the impact of the three experimental conditions on the two week follow-up measures. Pretest measures served as the covariates for each analysis. In order to assess specific differences between the experimental conditions, post-hoc tests were conducted using the Bonferroni correction. Results of the ANCOVAs and subsequent post-hoc tests are found in Table 16.

Hypothesis 5 predicted that those in the (F) condition would report greater sun protection behaviors and intentions to engage in sun protection at the follow-up than those in the (E) or (C) conditions. Those in the (F) condition reported marginally higher intentions to engage in sun protection than those in the (C) condition ($p = .08$ in Bonferroni post hoc comparison of the three conditions; $p = .02$ in a pairwise comparison of F versus C). Those in the (E) intervention condition did report significantly higher intentions to engage in sun protection than those in the (C) condition; the F and E conditions did not differ significantly.

Those in the (F) intervention condition, but not the (E) condition, did report significantly higher scores on the general sun protection scale than those in the (C) condition. An examination of the individual behaviors that comprise the general sun protection scale revealed that those in the (F) condition reported marginally higher sunscreen use on the body (adjusted $M = 3.18$, $se = .13$) than the (E) condition (adjusted $M = 2.66$, $se = .20$) ($p = .09$ in Bonferroni post hoc comparison of the three conditions; $p = .03$ in a pairwise comparison of F versus
E). Those in the (F) condition also reported marginally significantly higher attempts to stay in the shade (adjusted $M = 3.74$, se = .12) and avoiding the sun (adjusted $M = 3.41$, se = .13) than those in the (C) control condition (adjusted $M = 3.37$, se = .12; adjusted $M = 2.99$, se = .13, respectively) ($p = .08$, $p = .07$ in Bonferroni post hoc comparison, respectively; $p = .03$, $p = .03$ in planned comparison of F versus C, respectively). There was no significant difference between the (F) and (E) intervention conditions.

For specific sun protection behaviors during the previous week, both the (F) and (E) interventions reported significantly higher rates of staying in the shade than those in the (C) condition. No significant differences between the (F) and (E) conditions were observed for previous week sun protection items. There were also marginally significant differences between the (F) and (C) conditions on the previous week sunbathing item, with those in the (F) condition reporting less sunbathing (adjusted $M = 2.56$, se = .21) than those in the control condition (adjusted $M = 3.24$, se = .22) ($p = .09$ in Bonferroni post hoc comparison, $p = .07$ in planned comparison of F versus C).

Hypothesis 6 predicted that those in the (F) condition would report greater anticipated regret at the follow-up than those in the (E) or (C) conditions. This hypothesis was partially supported. Those in the (F) intervention condition tended to report higher anticipated regret than those in the (C) condition ($p = .08$ in Bonferroni post hoc comparison of the three conditions; $p = .03$ in a pairwise
Hypothesis 7 predicted that those in the (F) and (E) conditions would report greater self-efficacy for sun protection than those in the (C) condition. This hypothesis was supported with both the (F) and (E) conditions reporting significantly greater self-efficacy than those in the (C) condition.

**Examination of Proposed Mediation Model of Program Mechanisms**

The hypothesized path model found in Figure 7 was initially proposed to characterize the role of the putative mechanisms by which the full intervention (F) produced effects on behavioral outcomes relative to control (C). First, the correlational relationships among all constructs included in the hypothesized model were examined. The general model depicted in Figure 7 was then tested with 4 individual models using Mplus, version 5.2 (Muthen & Muthen, 1997). Four path models were tested to reflect the dual focus on skin cancer and photoaging (i.e., susceptibility to and severity of skin cancer and photoaging, benefits of sun protection to prevent skin cancer and photoaging), and also the two core negative emotions (i.e., fear and disgust). For all models, the general sun protection scale at the two week follow-up was used as the behavior measure. The four models were as follows: Model A, skin cancer focus with fear as mediating emotion; Model B, skin cancer focus with disgust as mediating emotion; Model C, photoaging focus with fear as mediating emotion; Model D, photoaging focus with disgust as mediating emotion.
Relationships among constructs, focus on skin cancer.

Correlations among all model constructs are reported in Table 17 with the health belief model constructs (susceptibility, severity, benefits) all targeting skin cancer. For those in the (F) condition, a composite measure of self-reported fear after each slide set was created and employed throughout modeling. Similarly, for those in the (F) condition, a composite measure of self-reported disgust after each slide set was created and employed throughout modeling. In each case, (i.e., for fear and for disgust), the composite was the mean rating of an emotion averaged across the four stimulus sets. A dichotomous variable Condition (0 = (C), 1 = (F)) was created and used to examine the effect of experimental condition on downstream emotion and psychosocial constructs in the model. Reflecting the significant impact of the (F) intervention, there was a significant correlation between condition and all health beliefs, attitudes, self-efficacy, intentions, and general sun protection.

With regard to aroused emotion, fear was related to both pretest and posttest susceptibility and severity, and to anticipated regret, but to neither attitudes, self-efficacy, benefits, intentions, nor behavior. Importantly, the composite fear measure was negatively correlated with condition ($r = -.23$), which reflects the fact that the average fear reported across the slide sets in condition (F) was lower than the fear reported in the control (C) emotional arousal condition. In contrast, disgust was positively related to condition ($r = .46$) reflecting greater aroused average disgust in condition (F) than control (C). Disgust also correlated
positively with perceived susceptibility to and severity of skin cancer and with anticipated regret. In contrast with fear, however, disgust was significantly correlated with all the constructs with which fear failed to correlate, that is, attitudes, self-efficacy, perceived benefits of sun protection to prevent skin cancer, posttest intentions, and follow-up sun protection behavior.

Both pretest and posttest perceived susceptibility of skin cancer were positively correlated with attitudes, self-efficacy, benefits, intentions, and follow-up sun protection behavior. Similarly, both pretest and posttest perceptions of severity of skin cancer were also positively correlated with attitudes, self-efficacy, benefits, intentions, and behavior. Anticipated regret was positively correlated with all constructs in the model, including susceptibility to and severity of skin cancer, attitudes, intentions, and behavior. Self-efficacy was positively correlated with intentions and behavior, as well as all other psychosocial constructs. Perceived benefits of sunscreen preventing skin cancer was also positively correlated with intentions and behavior and with all psychosocial constructs.

**Model A: Skin cancer focus and fear as negative emotion.** In Model A, based on the relationships in Table 17 and shown in Figure 9, self-reported fear experienced during the (F) or (C) condition was used as the measure of emotional arousal. Health beliefs (susceptibility, severity, and benefits) targeted skin cancer. The fit of this model was poor ($\chi^2(49) = 851.75$, $p < .001$, CFI = .42, SRMR = .21, RMSEA = .24). Paths reported here should be interpreted with great caution, given the poor fit of the overall model. There was a significant direct path from
experimental condition to follow-up general sun protection behavior, indicating that much of the impact of the F condition on general sun protection was not mediated through the putative mediators as they were specified in the model. There was also a significant relationship between intentions to use sun protection at posttest and follow-up behavior. Benefits of sun protection at preventing skin cancer did not emerge as a significant direct predictor of follow-up sun protection over and above experimental condition and intentions. The intervention predicted both self-efficacy and benefits of sun protection, which, in turn, predicted intentions to use sun protection. Neither anticipated regret, attitudes, nor fear emerged as significant predictors of intentions to sun protect, over and above self-efficacy and benefits of sun protection. It is noted that anticipated regret, attitudes, and benefits were all at least moderately correlated with both intentions and behavior; however, the stronger relationships of self-efficacy ($r = .61$) and intentions ($r = .60$) to behavior exceeded potential prediction from these three constructs.

Consistent with hypotheses, anticipated regret was a positive predictor of attitudes. Further, susceptibility to and severity of skin cancer positively predicted anticipated regret. These paths replicate relationships found in Moser and Aiken (2011). Fear did not emerge as a significant predictor of anticipated regret above and beyond susceptibility and severity. Further, fear did not significantly predict immediate posttest severity of and susceptibility to skin cancer over and above
pretest measures of susceptibility and severity. No significant predictors of fear emerged.

Finally, consistent with hypotheses and the previously reported ANOVAs of outcomes in Table 15, those in the (F) condition had significantly higher perceptions of self-efficacy and benefits of sun protection at preventing skin cancer than those in the (C) condition.

**Model B: Skin cancer focus and disgust as negative emotion.**

In Model B, based on relationships in Table 17 and shown in Figure 10, self-reported disgust experienced during the (F) or (C) conditions was used as a measure of emotional arousal. In fact, the only variable that differed between Models A and B was the emotional arousal measure, (i.e., fear in Model A was replaced with disgust in Model B with the precisely the same configuration of all constructs across the two models).

The fit of the model was poor ($\chi^2 (49) = 854.36, p < .001, \text{CFI} = .42, \text{SRMR} = .21, \text{RMSEA} = .24$). As would be expected, all the significant paths observed for Model A were also observed in Model B. Just as with fear in Model A, disgust in Model B failed to predict anticipated regret over and above perceived susceptibility to skin cancer and perceived severity of skin cancer, although both fear and disgust were significantly correlated with anticipated regret. While disgust was significantly correlated with intention to sun protect, disgust failed to predict intention above and beyond perceived benefits of sun protection and perceived self-efficacy for sun protection.
Relationships among constructs, focus on photoaging.

Correlations among all model constructs are reported in Table 18 with the health belief model constructs (susceptibility, severity, benefits) all targeting photoaging. Pretest perception of susceptibility to photoaging was positively correlated with attitudes, self-efficacy, benefits, intentions and behavior. Pretest perception of severity of photoaging was positively correlated with attitudes and benefits, but with neither self-efficacy, intentions, nor behavior. Further, pretest susceptibility to and severity of photoaging were positively associated with fear. Pretest susceptibility to photoaging was also positively correlated with disgust, but pretest severity of photoaging was not correlated with disgust. As reflected in the ANCOVAs of effects of condition on constructs, there were positive correlations between condition and posttest measures of susceptibility to and severity of photoaging, indicating that those in the (F) condition reported greater susceptibility and severity than those in the (C) condition. Both posttest susceptibility to photoaging and severity of photoaging were positively associated with fear, disgust, anticipated regret, attitudes, self-efficacy, benefits, intentions and behavior. Benefits of sunscreen at preventing photoaging was significantly positively associated with disgust but not fear. Benefits was positively correlated with anticipated regret, attitudes, self-efficacy, intentions to use sun protection, and follow-up behavior.

Model C: Photoaging as focus and fear as negative emotion.
In Model C, based on correlations reported in Table 18 and shown in Figure 11, self-reported fear experienced during the (F) or (C) conditions was used as a measure of emotional arousal. As in Model A, for those in the (F) condition, a composite measure of self-reported fear after each slide set was used. The fit of this model was poor ($\chi^2 (49) = 723.63, p < .001, \text{CFI} = .48, \text{SRMR} = .19, \text{RMSEA} = .22$). As would be expected, significant paths shown in Models A and B from intentions and intervention to follow-up behavior were also reflected in Model C. Benefits of sun protection at preventing photoaging was also a significant predictor of follow-up sun protection, in contrast with benefits of sun protection for skin cancer, which failed to predict sun protection directly. Both self-efficacy and benefits of sun protection significantly predicted intentions to use sun protection. Neither anticipated regret, attitudes, nor fear emerged as significant predictors of intentions to use sun protection over and above self-efficacy and benefits of sun protection. Susceptibility to and severity of photoaging significantly predicted anticipated regret, as susceptibility to and severity of skin cancer did in Models A and B. Also as in Models A and B, neither pretest susceptibility to and severity of photoaging significantly predicted fear. In contrast to the non-significant path from fear to severity of skin cancer in Model A, fear was a significant negative predictor of severity of photoaging. This is inconsistent with the hypothesis that fear would positively predict severity of photoaging and reflects the average greater fear reported in condition (C) than in condition (F).
Model D: Photoaging focus and disgust as negative emotion.

In Model D, found in Figure 12, self-reported disgust experienced during the (F) or (C) conditions was used as a measure of emotional arousal. Again, for those in the (F) condition, a composite measure of self-reported disgust after each slide set was created and used in the present analysis. Correlations among all model constructs are found in Table 18.

The fit of this model was poor ($\chi^2 (49) = 722.71, p < .001, \text{CFI} = .48, \text{SRMR} = .19, \text{RMSEA} = .22$). Again, as in Models A, B and C, intentions and intervention condition were both significant predictors of follow-up behavior. Further, as in Model C, benefits of sunscreen at preventing photoaging was a significant predictor of both intentions and follow-up behavior. Also, as in Model C, susceptibility to and severity of photoaging were significant predictors of anticipated regret. As with fear in Model C, disgust was a significant negative predictor of severity of photoaging, which is inconsistent with the hypothesis that increased disgust would lead to an increase in severity of photoaging. Finally, as with fear in Model C, neither pretest susceptibility to or severity of photoaging nor pretest behavior, significantly predicted disgust.

Model Respecification

Models A through D were estimated without the direct path from sun protection at pretest to sun protection at follow-up. Models A through D were respecified with the stability path for sun protection added. In each case, the fit of the model was improved, but only slightly. For Model A, fit of the revised model
was still poor ($\chi^2(48) = 847.03, p < .001, CFI = .42, SRMR = .21, RMSEA = .24$), though the slight improvement was significant ($\Delta \chi^2(1) = 4.72, p < .05$). The path from pretest sun protection to follow-up sun protection was significant ($\beta = .10, p = .03$). For Model B, which differed from Model A only in that disgust replaced fear, overall fit of the respecified model was poor ($\chi^2(48) = 849.64, p < .001, CFI = .42, SRMR = .21, RMSEA = .25$); addition of the path yielded identical change in chi square as well as the identical regression coefficient for the added path. For Model C, the added path was again significant ($\beta = .11, p = .01$). The overall fit of the model was poor ($\chi^2(48) = 717.28, p < .001, CFI = .49, SRMR = .19, RMSEA = .22$), but addition of this path did significantly improve fit ($\Delta \chi^2(1) = 6.35, p < .05$). For Model D, the added path was significant ($\beta = .10, p = .03$) and significantly improved fit, fit ($\Delta \chi^2(1) = 6.34, p < .05$). Again, overall model fit remained poor ($\chi^2(48) = 716.37, p < .001, CFI = .49, SRMR = .19, RMSEA = .22$).

**Examination of Model Fit of Full Intervention Group Only**

As an additional exploration, it was of interest to more closely examine the fit of the proposed model with for those in the full intervention condition only (n = 148). Analyses of the full intervention condition only characterize constructs that account for differential responsiveness across participants who received the full intervention. Models A through D were modified to apply to the full intervention condition by eliminating condition type (Full versus Control) as a model construct. Pretest sun protection plus pretest susceptibility to and severity
of skin cancer retained the role as predictors of fear, posttest susceptibility to and severity of skin cancer. Self-efficacy and benefits of sun protection became exogenous variables. All other relationships among constructs remained as in original models A through D in Figures 9 through 12. Following the model modification reported in the previous analyses of models A through D, the path from pretest behavior to follow-up behavior was included.

Correlations among model constructs and behavior in the full condition only are presented in Tables 19 and 20, respectively. The correlations in Tables 19 and 20 differ from those in Tables 17 and 18, which contain the data from all conditions. Tables 17 and 18 reflect between condition variation as well as within condition variation (for example, the fact that fear was higher in the control than the full condition). Tables 19 and 20 reflect only within condition variation. Of primary interest are the correlations among fear and disgust and the psychosocial constructs. The correlations reflect the relationships among threat relevant (that is, the threat of skin related damage and disease) emotions only. As seen in Table 19, fear was significantly positively correlated with all psychosocial constructs, and is particularly highly correlated with both pretest and posttest susceptibility to and severity of skin cancer, and anticipated regret. Disgust was also significantly correlated with posttest severity, susceptibility, and anticipated regret. In Table 20, similar relationships were observed, with both fear and disgust significantly correlated with posttest susceptibility to and severity of photoaging.

Model A full intervention only.
The fit of Model A (see Figure 13) with (F) intervention only was poor ($\chi^2(36) = 153.41, p < .001, \text{CFI} = .81, \text{SRMR} = .15, \text{RMSEA} = .15$). While paths must be interpreted with caution, given the poor overall fit, some results are noteworthy. The role of fear emerged in the model in Figure 13 for the full condition only. Note that fear was higher in the control condition than the full condition, (i.e., the negative relationship between condition and fear shown in Table 17). In the full condition model, pretest perceptions of susceptibility to and severity of skin cancer positively predicted fear, and fear, which in turn, positively predicted posttest susceptibility, severity, and anticipated regret. None of these relationships between fear and other constructs were observed in the model including both the intervention and control conditions (Figure 9). Thus, the relationship of fear to other constructs emerged when only the threat-relevant fear related to skin damage and cancer was included, as opposed to the model that included both threat specific fear (i.e. images of sun damage) and irrelevant fear (i.e. visualization exercise of being unprepared for an exam).

Many significant paths found in the model with both (F) and (C) conditions were retained, including the relationships among severity, susceptibility, anticipated regret, and attitudes. For the (F) condition, self-efficacy emerged as a significant predictor of follow-up sun protection ($\beta = .34, p < .001$) over intentions, which was not a significant predictor ($\beta = .03, \text{ns}$). Further, in this model, both attitudes and anticipated regret were significant predictors of intentions to sun protect. Benefits was not a significant predictor of intentions.
**Model B full intervention only.**

The fit of Model B (see Figure 14) for the (F) condition was poor ($\chi^2(36) = 153.76, p < .001, \text{CFI} = .79, \text{SRMR} = .15, \text{RMSEA} = .15$). The role of disgust emerged more clearly in the model for the full intervention. Disgust predicted both posttest perceived susceptibility to skin cancer and anticipated regret. The configuration of downstream predictors of intentions and behavior remained as in Figure 13, with self-efficacy the leading predictor of both intentions and behavior.

**Model C full intervention only.**

The fit of Model C (see Figure 15) was poor ($\chi^2(36) = 150.74, p < .001, \text{CFI} = .81, \text{SRMR} = .14, \text{RMSEA} = .15$). As in Model A (Figure 13), the role of fear in the intervention condition was clear; fear emerged as a positive predictor of both posttest susceptibility to and severity of photoaging. With the exception of benefits to sun protection, all significant paths found in Model A (Figure 13) were observed.

**Model D full intervention only.**

The fit of Model D (see Figure 16) was also poor ($\chi^2(36) = 141.23, p < .001, \text{CFI} = .81, \text{SRMR} = .14, \text{RMSEA} = .14$). The role of disgust was again clarified in this model with photoaging as the focus. Pretest susceptibility to photoaging emerged as a significant predictor of disgust. In turn, disgust positively predicted anticipated regret. Disgust had been a significant negative predictor of severity of photoaging in the model with both the full and control
conditions (Figure 12). In the present model, paths from disgust to posttest severity and susceptibility were positive, though non-significant over and above prediction from the corresponding pretest susceptibility and severity measures.

**Exploratory Analysis of Additional Measures at Immediate Posttest**

The results of these analyses are presented in Table 15. Both the (F) and (E) intervention conditions targeted factors that increased self-efficacy by reducing barriers to sun protection. Both conditions included instruction on the ease of using sunscreen and information on the inclusion of SPF 15 or higher in products that participants might already use, like moisturizers. At immediate posttest, both the (F) and (E) conditions had significantly lower barriers to using sun protection than those in the (C) condition.

Negative decision affect refers to the negative affect one feels when imagining she has failed to use sun protection. Those in the (F) condition reported significantly more negative decision affect than those in the (C) condition. No significant differences were observed between the (F) and (E) conditions or the (E) and (C) conditions. Positive decision affect refers to the positive affect one feels when imagining one has failed to use sun protection. Those in the (F) condition reported marginally significantly lower positive decision affect \((p = .10)\) than those in the (C) condition. No significant differences were observed between the (F) and (E) conditions or the (E) and (C) conditions.

**Exploratory Analysis of Additional Measures at Two-week Follow-up**
Results of these analyses are presented in Table 16. Barriers to using sun protection were not assessed at the two week follow-up. There were no significant differences among any condition on positive or negative decision affect.

**Analysis of Exploratory Mediation Model of Program Mechanisms**

As mentioned previously, the proposed model was developed to characterize the meditational pathways by which the full intervention may have worked to bring about behavioral outcomes. In particular, the proposed model compared the (F) condition to the (C) condition with respect to the relationships between relevant versus irrelevant emotion (i.e., in the F versus C conditions, respectively) on downstream psychosocial constructs. An additional general purpose of the present research was to better understand how emotion, both experienced and anticipated, can be incorporated into models of health behavior. Thus, an exploratory model integrating experienced emotion, as measured by disgust, and anticipated regret with psychosocial constructs from the health belief model (benefits, barriers, susceptibility, severity, and self-efficacy) was tested. Again, as with the examination of the proposed model, separate models focused on skin cancer and photoaging were tested. These exploratory models are presented in Figures 17 through 20 (Models E, E2, F, F2). As in the proposed model, intentions and self-efficacy at posttest were included as a direct predictor of the general sun protection behavior scale at the two-week follow-up. Further, benefits and self-efficacy were included as predictors of intentions.
Following the relationship shown in Moser & Aiken (2011), anticipated regret was also included as a predictor of intentions. Further, susceptibility and severity were included as predictors of anticipated regret (Moser & Aiken, 2011). As in the proposed model, disgust was included as a direct predictor of susceptibility, severity, and anticipated regret.

As the experimental condition (F) consisted of an emotional arousal component coupled with a message of benefits and self-efficacy, intervention condition was included as a direct predictor of disgust, self-efficacy, and benefits. Although barriers were not explicitly addressed in the intervention conditions, information on the availability and ease of using sunscreen regularly may have reduced barriers, as found in previous research (Jackson & Aiken, 2006). Thus, intervention condition was included as a predictor of barriers, which predicted intentions. Finally, as supported by previous research (Aiken, West, Reno, Woodward, & Reynolds, 1994), susceptibility and severity were included as predictors of benefits; Benefits, in turn was included as a predictor of self-efficacy. This exploratory model retained several of the core paths from the proposed model, but allowed a more focused exploration of the relationships between emotion and constructs from one established model of health behavior, the health belief model.

Two additional exploratory models examining the effect of (E) condition compared to (C) condition on downstream psychosocial constructs from the health belief model and anticipated regret were tested. These models, presented in
Figures 21 and 22 (Models G and H), are comprised of the same aforementioned paths, but do not include a measure of experienced emotion (disgust). Rather, there are direct paths from intervention (E v C) to susceptibility and severity.

**Model E, skin cancer focus.**

**Relationships among model constructs.** Correlations among model constructs are presented in Table 21 with susceptibility, severity, and benefits each targeting skin cancer. As in the previous model analysis, for those in the (F) condition, a composite measure of self-reported disgust, the mean of the disgust rating following each of the four slide sets was created and used in these exploratory models. For those in the (C) condition, self-reported disgust after the stress visualization was used in the models. A dichotomous variable Condition (0 = (C), 1 = (F)) was created and used to examine the effect of experimental condition on downstream emotion and psychosocial constructs in the model.

Condition was positively correlated with disgust, posttest susceptibility to and severity of skin cancer, anticipated regret, self-efficacy, benefits, intentions, and follow-up general sun protection scale. Further, Condition was negatively correlated with barriers to using sunscreen. Disgust was positively correlated with susceptibility to and severity of skin cancer, anticipated regret, self-efficacy, benefits, intentions, and follow-up behavior. Disgust was negatively correlated with barriers. Barriers was significantly negatively correlated with susceptibility to skin cancer, anticipated regret, self-efficacy, intentions and follow-up behavior. Susceptibility and severity were positively correlated and were each positively
correlated with anticipated regret. Further, anticipated regret was positively correlated with disgust, intentions, and follow-up behavior.

**Model fit.** The fit of Model E was poor ($\chi^2(25) = 135.15, p < .001$, CFI = .86, SRMR = .12, RMSEA = .13). An examination of modification indices reflected a large negative relationship of barriers to self-efficacy, as previously reported in Jackson and Aiken, 2000, Figure 2). This path was included (see Figure 18, Model E2), and model fit improved to ($\chi^2(24) = 66.99, p < .001$, CFI = .96, SRMR = .10, RMSEA = .08) which was a significant improvement ($\Delta \chi^2(1) = 68.16, p < .001$). Barriers significantly negatively predicted self-efficacy.

In Model E2, Figure 18, reflecting previously reported relationships of intervention to outcomes, the (F) intervention condition led to greater disgust, benefits, and self-efficacy than the (C) control condition. Further, the (F) condition led to significantly lower barriers than the (C) condition. Disgust significantly predicted both severity of and susceptibility to skin cancer as well as anticipated regret. Note that pretest susceptibility and severity were not included in the exploratory model as predictors of posttest susceptibility and severity, respectively; thus the relationship of disgust to both posttest constructs, which had not been observed in the originally proposed theoretical model, were observed here. Both susceptibility and severity significantly predicted anticipated regret. In addition, susceptibility and severity both significantly predicted benefits, which predicted self-efficacy. Both self-efficacy and anticipated regret significantly predicted intentions to sun protection. However, benefits and barriers did not
emerge as significant predicts of intentions; the configuration of relationship of barriers and self-efficacy to intention completely mirrored Jackson and Aiken (2000). Finally, both intentions and self-efficacy were significant positive predictors of general sun protection behavior at the two-week follow-up.

*Residualized change scores.* In these exploratory models (Models E through H), pretest measures are not included. As a method of controlling for these pretest measures, residualized change scores were computed by predicting each scale score from its corresponding pretest scale score with OLS regression. The raw residuals were saved and used as measurement variables in additional exploratory models (Models E2-R through H-R). A similar method has been used in previous models of sun protection (Jackson & Aiken, 2006).

**Model E2-R.** The fit of Model E2 was examined with residualized change scores (Model E2-R, see Figure 19). The fit of this model was acceptable ($\chi^2$ (24) = 79.24, $p < .001$, CFI = .90, SRMR = .09, RMSEA = .09). There were four differences observed from the previous Model E2. The path from susceptibility to skin cancer to benefits was no longer significant. Further, the path from intentions to follow-up sun protection was no longer significant. The path from anticipated regret to intentions was not significant. The path from barriers to intentions, however, was significant in this model.

As an additional exploration, a model in which a path from anticipated regret to benefits was included in lieu of allowing the residuals of anticipated regret and benefits to correlate. This path is justifiable when considering the role
of emotion in decision making, which is to motivate and guide attention toward a solution to the threat. The path was added to the model (Figure 20) and was significant ($\beta = .14, p < .05$). The fit of this model is almost identical to previous model in which correlated residuals between anticipated regret and benefits was included ($\chi^2 (24) = 79.39, p < .001, \text{CFI} = .89, \text{SRMR} = .09, \text{RMSEA} = .09$).

Thus, with the addition of this path, the relationship between anticipated regret and intentions is fully mediated by benefits. More specifically, the model includes an overall ‘unpacking’ of the threat of skin cancer into 3 components: experienced emotion, cognitions, and anticipated emotion, often referred to as a cognitive emotion. Thus, in the model, the relationship of the threat of skin cancer on intentions is mediated by benefits.

**Model F, photoaging focus.**

**Relationships among model constructs.** Correlations among model constructs are presented in Table 22 with susceptibility, severity, and benefits targeting photoaging. Correlations of susceptibility, severity, and benefits related to photoaging had the same magnitude of relationship with condition and with other model constructs (Table 22) as had the same constructs in relation to skin cancer (Table 21). As already noted in examination of differences among condition, those in the (F) condition had higher rates of susceptibility to and severity of photoaging and benefits than those in the (C) condition. Susceptibility to photoaging was significantly positively correlated with disgust, severity to photoaging, anticipated regret, benefits, self-efficacy, intentions, and general sun
protection behavior at two-week follow-up. Susceptibility was negatively correlated with barriers to use sun protection. Similarly, severity of photoaging was significantly correlated with all model constructs. Benefits was significantly positively correlated with susceptibility, severity, self-efficacy, anticipated regret, intentions, and sun protection behavior at follow-up. Benefits was not significantly correlated with barriers.

**Model fit.** The fit of Model F (Figure 21) was poor ($\chi^2 (25) = 127.03, p < .001$, CFI = .88, SRMR = .11, RMSEA = .12). As in Model E, modification indices suggested that fit would be improved if a path were included from barriers to self-efficacy. This path was included (see Figure 22, Model F2), and fit improved to ($\chi^2 (24) = 61.55, p < .001$, CFI = .95, SRMR = .09, RMSEA = .08) which was a significant improvement ($\Delta \chi^2 (1) = 65.48, p < .001$). Again, barriers emerged as a significant negative predictor of self-efficacy.

The relationships between the intervention condition and self-efficacy, disgust, and barriers seen in Model E2, were, of necessity, replicated. Additionally, all relationships that had been observed in Model E2 of health beliefs with regard to skin cancer were replicated for health beliefs related to photoaging (susceptibility, severity, benefits). In addition, of particular interest is the significant relationship between benefits of sun protection at preventing photoaging and intentions, which was not observed in Model E. However, since benefits for photoaging and benefits for skin cancer have exactly the same
correlation with intention ($r = .36$ in both cases), this difference in significance cannot be interpreted as a theoretical difference between the two types of benefits.

**Model F2-R.** As with Model E2, the fit of Model F2 was examined with residualized change scores (Model F2-R, see Figure 23). The fit of this model was acceptable ($\chi^2 (24) = 68.92, p < .001, CFI = .92, SRMR = .08, RMSEA = .08$).

There were five differences observed from the previous Model F2. The path from susceptibility to benefits was no longer significant. Likewise, the path from susceptibility to anticipated regret was not significant. As seen in Model E2-R, the path from intentions to follow-up sun protection was not significant. The path from anticipated regret to intentions was not significant, but the path from barriers to intentions was significant. It is noteworthy that perceived benefits of sun protection against skin cancer and against photoaging occupy the same role in the prediction of both intentions and self-efficacy.

As in Model E2-R, the fit of an additional exploratory model in which the correlation between anticipated regret and benefits was replaced with a path from anticipated regret to benefits was tested (Figure 24). This path was significant ($\beta = .14, p < .05$), and the fit of this model remained acceptable ($\chi^2 (24) = 68.90, p < .001, CFI = .92, SRMR = .08, RMSEA = .08$).

**Models to Examine the Difference between (E) Intervention Condition and (C) Control Condition**

Models examined, both proposed and exploratory, have thus far examined the effect of the (F) intervention condition versus the (C) control condition. It was
of great interest to explore a model comparing the effect of the (E) condition to the (C) condition on downstream psychosocial constructs from the health belief model. Figures 25 and 26 (Model G) address skin cancer, first with raw posttest scores employed (Figure 25) and then with residualized posttest scores (Figure 26). Figures 27 and 28 (Model H) address photoaging, first with raw posttest scores employed (Figure 27) and then with residualized posttest scores (Figure 28). Paths from exploratory Models E2 (Figure 18) and F2 (Figure 21) were retained. However, as no measure of disgust was included in the (E) condition, direct paths from intervention to susceptibility and severity were included.

**Model G, skin cancer focus.**

**Relationships among model constructs.** Correlations among model constructs are presented in Table 23. There were significant positive correlations between condition and posttest susceptibility to skin cancer, severity of skin cancer, anticipated regret, benefits, and intentions. There was also a significant negative correlation between condition and barriers. Significant correlations were not observed between condition and either self-efficacy or general sun protection behavior. Intentions to sun protect was significantly correlated with all model constructs. Susceptibility and severity were significantly positively correlated with anticipated regret, benefits, self-efficacy, intentions, and behavior. Benefits was also significantly positively correlated with self-efficacy, anticipated regret, intentions, and behavior.
Model fit. The fit of Model G (see Figure 25) was fair ($\chi^2(17) = 62.99, p < .001$, CFI = .90, SRMR = .10, RMSEA = .12). The (E) intervention led to greater perceptions of severity of skin cancer, susceptibility to skin cancer, and benefits than the (C) control condition. The (E) condition also led to fewer perceptions of barriers than those in the (C) condition. As self-efficacy was predicted by both benefits and barriers, prediction of self-efficacy by both benefits and barriers, there was no additional significant path from condition (E) versus (C) conditions to self-efficacy. Relationships among susceptibility to skin cancer, severity of skin cancer, anticipated regret, and benefits were all similarly retained. Further, barriers was a significant negative predictor of self-efficacy.

Model G-R. The fit of Model G was examined with the residualized change scores (Model G-R, see Figure 26). As in Models E2-R and F2-R, a path from anticipated regret to benefits, rather than allowing correlated residuals, was included. The fit of this model was poor ($\chi^2(17) = 69.54, p < .001$, CFI = .82, SRMR = .09, RMSEA = .12). Changes in four paths were observed from Model G. The paths from susceptibility and severity to benefits were no longer significant. Further, as observed in Models E2-R and F2-R, the paths from anticipated regret to intentions and from intentions to follow-up sun protection were not significant. The relationship between the threat component (susceptibility, severity, and anticipated regret) and intentions to sun protect was mediated by benefits.

Model H, photoaging focus.
**Relationships among model constructs.** Correlations between model constructs are presented in Table 24. Condition was significantly positively correlated with susceptibility to photoaging, but not severity of photoaging. Condition was also significantly correlated with benefits. Further, susceptibility to and severity of photoaging were significantly positively correlated with anticipated regret, benefits, and intentions. Susceptibility, but not barriers was also significantly positively correlated with general sun protection behavior.

**Model fit.** The fit of Model H (see Figure 27) was fair ($\chi^2$ (17) = 71.55, $p < .001$, CFI = .90, SRMR = .10, RMSEA = .13). Differences in this model from Model G, include the non-significant path from condition to severity of photoaging. All other significant paths were retained.

**Model H-R.** The fit of Model H was examined with the residualized change scores (Model H-R, see Figure 28). Again, a path from anticipated regret to benefits, rather than a correlation between residuals, was included in this model. The fit of this model was less than acceptable ($\chi^2$ (17) = 62.39, $p < .001$, CFI = .87, SRMR = .09, RMSEA = .11). There were three differences among paths from Model H. The path from susceptibility to benefits was not significant. Further, as observed in each of the previous models using residualized change scores, the paths from anticipated regret to intentions and from intentions to follow-up sun protection were not significant. The relationship between the threat components and intentions was mediated by benefits.

**Discussion**
The present research was conducted to assess the effectiveness of an intervention consisting of emotionally arousing images of damaging effects of sun exposure coupled with a strong message of the benefits of and self-efficacy for sun protection (the full condition F). The effects of this intervention on health beliefs, anticipated regret, and self-efficacy for sun protection, as well as on intentions to sun protect and follow-up sun protection, were compared to those in an intervention consisting of a self-efficacy/benefits message (the efficacy condition E), and a control condition (C).

The design of the intervention was driven by a hybrid conceptual model of the constructs that might lead to behavior change as a function of the intervention developed specifically for this research. The development of these hybrid models was informed by the health belief model (Rosenstock, 1958), the theory of planned behavior (Ajzen, 1991), social cognitive theory (Bandura, 1986), and protection motivation theory (Rogers, 1975; Rogers & Prentice-Dunn, 1997). Excluding protection motivation theory, these classic models are fundamentally cognitively based. The present research took the step of integrating emotion into the configuration of cognitively driven psychosocial constructs. This integration was based on previous work by the present author in which anticipated regret was incorporated into a hybrid model of health behavior (Moser & Aiken, 2011).

A series of models was specified characterizing how emotion and psychosocial constructs might mediate the relationship of the intervention to intentions and behavioral outcomes, specifically intentions to sun protect and...
actual sun protection. The fit of these models was examined, with attention to the interplay of cognitive factors with emotion in the prediction of outcomes.

Moving beyond the traditional models of health behavior and decision making, many of which assume decision making is a purely rational process, emotion is seen by many as a necessary component of decision making (Bechara, 2004; Damasio, 2000; Slovic, Finucane, Peters & MacGregor, 2004; Turnbull, Berry, Bowman, 2003). As such, it was of interest to develop and test these hybrid models, as researchers have increasingly called for the addition of emotion to models of health behavior (Conner et al., 2006; Cooke, Sniehotta, & Schuz, 2007; McMillan, Higgins, & Conner, 2005). The present research is novel in that it examined the relationships of both experienced and anticipated emotion with psychosocial constructs found in classic models of health behavior. Further, the roles of two discrete experienced emotions, fear and disgust, were examined separately in the models. This was of great interest, as models that have incorporated experienced emotion such as protection motivation theory (Rogers, 1975; Rogers & Prentice-Dunn, 1997) have focused solely on fear.

Modeling to examine meditational pathways that might account for differences between conditions was treated in two broad ways. First was modeling of posttest measures on all constructs across the full intervention condition and control condition, with control of pretest behavior and pretest perceived risk of skin cancer and photoaging. Second was modeling of residualized change scores across conditions, that is, the residual scores resulting
from prediction of each posttest scale score by its corresponding pretest. Including both these classes of analyses allowed for an examination of relationships between threat relevant experienced emotion and downstream psychosocial constructs as well as a model in which pretest measures were controlled for all posttest constructs rather than just sun protection behavior, susceptibility, and severity.

Distinct from the exploration of meditational pathways that might account for treatment versus control differences was an examination of relationships among emotion, psychosocial constructs, intentions and behavior in the full intervention condition only. The series of models of the full condition only characterized the differential effectiveness of the full intervention condition on participants as a function of model constructs. This modeling allowed examination of whether the level of responsiveness to the full intervention could be accounted for by the same constructs that accounted for differences in outcomes among conditions.

**Overall Effects of Intervention Condition on Immediate and Follow-Up**

Overall, compared to the (C) control condition, the (F) full intervention condition led to significantly higher perceptions of susceptibility to and severity of both skin cancer and photoaging, benefits of sun protection, self-efficacy for sun protection, anticipated regret if one failed to sun protect, and intentions to engage in sun protection. Those in the (F) full intervention also reported significantly lower perceptions of barriers toward sunscreen use at immediate
posttest than those in the (C) control condition, controlling for pretest measures. Similarly, the (E) intervention, compared to the (C) control condition, led to significantly higher perceptions of susceptibility to both skin cancer and photoaging, benefits, self-efficacy, anticipated regret, and intentions to engage in sun protection, and significantly lower perceptions of barriers toward sunscreen use. These results are not particularly surprising, given the content of the control condition, which was focused on stress reduction techniques and did not include any information about sun protection.

There were no significant differences between the (E) and (C) conditions in immediate posttest perceptions of severity of photoaging. While the (E) condition did include a definition of photoaging, no visual images were included. Previous interventions have been successful at increasing perceived severity of photoaging after showing visual images of photoaged skin (e.g. Jackson & Aiken, 2006; Mahler et al, 2006) and a visual demonstration comparing photoaged skin to an old leather bag (Jackson & Aiken, 2006). Previous research from Mahler and colleagues (2003), however, did find that information about photoaging alone did significantly increase perceived severity of photoaging. It may be that the verbal information alone about photoaging (e.g. the fact that wrinkles and age spots are caused from UV rays) provided in this present study were not sufficient at conveying the extent to which one’s skin can be damaged prematurely by the sun. Thus, while the participants in the (E) condition were provided with information about the cause of photoaging and ways to prevent it, the lack of visual
information as to the extent of photoaging and the fact that photoaging can occur in young women may explain why no significant differences were found between the (E) condition and the (C) condition.

Not only were no differences found between the (E) and (C) conditions in posttest severity of photoaging, but those in the (F) condition reported significantly higher perceptions of severity of photoaging than those in the (E) condition. Again, the visual images of photoaging in both young and older women presented in the (F) condition, which elicited emotional responses, may have also made the effects of photoaging, a relatively little known threat for a young woman, more accessible. Further, the images may have provided more information as to the extent of photoaging, and that it can occur in young women.

Recalling that the (F) and (E) conditions included exactly the same information aimed at increasing self-efficacy and perceived benefits of sun protection, it was also of great interest that those in the (F) intervention condition had marginally significantly higher perceptions of self-efficacy at immediate posttest than those in the (E) condition. Thus, those who received the emotional arousal component coupled with the self-efficacy message reported greater self-efficacy than those who did not receive the emotional arousal component. Similar results were found by Mahler and colleagues (2006), who found that participants provided with images of their own photoaging skin and a message of self-efficacy reported greater self-efficacy than those who received only the information on photoaging. There has been much research on the function of emotions at guiding
attention and serving as a motivator (e.g., Eckman, 1992; Levenson, 1999, Tooby & Cosmides, 1990). It may be that those in the (F) condition, who experienced threat specific emotional arousal, may have directed more attention to the self-efficacy message that followed the images than those in the (E) condition. This finding may also be explained by a process Leventhal (1970) referred to as ‘danger control’, in which one is motivated to attend to and comply with the message of how to reduce the threat. Further, they may have been more motivated to accept the message which may have bolstered their perceptions of their ability to protect themselves from the threat. This effect was not seen at the follow-up, when both those in the (F) and (E) conditions reported greater self-efficacy than the control condition.

At the follow-up, those in the (F) condition had significantly higher means on the general sun protection scale than those in the (C) conditions. There were no significant differences in general sun protection between the (E) and (C) conditions on general sun protection at follow-up.

**Emotions Elicited by Full Intervention and Control**

Both the full intervention and control conditions included emotional arousal components. The skin cancer, Moh’s surgery, and photoaging images presented in the full intervention were included to induce emotional arousal specific to the threat of sun damage. The visualization exercise of being late and unprepared for an important exam in the control condition was included to induce emotion irrelevant to the threat of sun damage. One interesting finding was that the
visualization exercise in the control condition elicited more fear than the images presented in the full condition. It may be that the threat of being unprepared for a test is more proximal and immediately relevant than the threat of skin cancer or photoaging. The images in the full intervention condition did elicit more disgust than the visualization exercise presented in the control condition. Both conditions, however, elicited similar average responses to the item “How positive or negative did you feel”. This highlights the benefit of including measures of discrete emotions rather than solely using measures of dimensional affect.

Path Models

In the present research, the fit of several path models was tested to examine the relationships among psychosocial constructs and both experienced and anticipated emotions. The original proposed model was tested with two discrete emotions, fear and disgust, and two potential negative outcomes of failing to sun protect, skin cancer and photoaging. As mentioned previously, much caution should be used in interpreting individual paths of these models due to overall poor fit. Models A through D (Figures 9, 10, 11, and 12) examined the mediating role of model constructs in the relationship of the intervention to outcomes in the F versus C condition, for skin cancer and then for photoaging, with fear and then disgust as the core emotional response. Intentions at posttest was a direct predictor of follow-up sun protection behavior over and above self-efficacy and benefits. In Models A though D, neither benefits nor self-efficacy emerge as significant predictors of follow-up sun protection. This is in line with classic
models such as the theory of reasoned action (Fishbein & Ajzen, 1975), which maintains that the effects of other psychosocial constructs on behavior are fully mediated by intentions. Experimental condition was also a significant direct predictor of follow-up behavior in these models, indicating that the proposed psychosocial relationships did not fully mediate the effects of condition on outcome. When the path from pretest sun protection to follow-up sun protection was included, the effect of condition on follow-up behavior remained significant. Self-efficacy and benefits were significant predictors of intentions over and above attitudes and anticipated regret in each model, though correlations among self-efficacy, attitudes, anticipated regret and intentions were strong.

In each of these four models, severity and susceptibility predicted anticipated regret, which in turn predicted attitudes. These relationships are consistent with work from Damasio (2000), which highlights the role of emotion in one’s formation of overall evaluations of a behavior or outcome as “good or bad”. Further, the paths from severity and susceptibility to anticipated regret are consistent with previous research on college women’s decisions to undergo breast augmentation (Moser & Aiken, 2011). Though many other researchers have begun to include anticipated regret in models of health behavior (e.g. Conner, et al., 2006; Cooke, et al., 2007), there has been little work modeling its antecedents. The present research provides additional evidence that one’s perceptions of susceptibility and severity of a variety of health threats (i.e. skin cancer and
photoaging) lead to an anticipated emotional response to the potential negative outcome.

The role of experienced emotion, self-reported fear and disgust, is less clear in these four models (Models A through D). Correlations between susceptibility, severity, previous sun protection behavior, and physiological arousal in the pilot study were strong, indicating those high on these pretest measures experienced stronger emotional reactions to the images of skin cancer and photoaging. Thus, paths from these pretest measures to self-reported fear and disgust were included in Models A though D. No significant paths were observed between these pretest measures of susceptibility and severity to fear or disgust in any of the models, though significant correlations were observed among disgust, susceptibility, and severity. The lack of significant paths may have been the result of the many competing predictors (experimental condition, susceptibility, severity, and previous behavior) or disgust. It should also be noted that Models A through D contain both threat specific fear and disgust in response to stimuli portraying skin cancer and photoaging in the full intervention condition and the fear and disgust generated by a scenario unrelated to skin damage (specifically being unprepared for a test) experienced by those in the control condition.

Another group of models, containing data from only those in the (F) intervention condition, offered clearer interpretation of the role of self-reported emotion. Recall that self-reported fear was greater in the control condition than in the full intervention condition. Combining the data from both the full intervention
condition and the control condition resulted in a combination of threat specific and threat irrelevant emotion. The correlations among susceptibility and severity at pretest and posttest and fear were stronger in the full intervention only (Tables 19 and 20) than with the combined data (Tables 17 and 18).

These four models (Models A through D) with data from full intervention only, (Figures 13 – 16) exhibited poor fit, so some caution should be used in interpreting the individual paths. In Figure 13 (Model A, threat of skin cancer, fear as the emotion component), there are significant paths from pretest susceptibility to and severity of skin cancer to self-reported fear. Further in this model, self-reported fear emerged as a significant predictor of posttest susceptibility to and severity of skin cancer. Similar paths were observed in Model C with data from full intervention only (Figure 15), which included fear and a photoaging focus, though a significant path from pretest severity of photoaging to fear was not observed.

The prediction of fear from pretest severity and susceptibility found in the models that only included data from the full intervention conditions are consistent with previous fear appeals research, suggesting that pre-existing beliefs about a threat lead to increased emotional responses to said threat (de Hoog, Stroebe, & de Witt, 2007). Further, the relationship between fear and intentions was mediated by susceptibility, severity, and anticipated regret. This finding is supported recent work on the effectiveness of fear appeals in reducing HIV risk behaviors, which found that the relationship between the fear appeal message and intentions was
mediated by anticipated regret (Smerecnik & Ruiter, 2010). Thus, the present research extends the findings by Smerecnik and Ruiter (2010) by not only including a self reported measure of discrete emotion, but also modeling more completely the interplay between experienced emotion, cognitions, anticipated emotions, and behavioral intentions.

Exploratory models E2 through F2 (Figures 18 and 22) again included a combination of an experimental and the control condition. In these exploratory models, the focus was shifted to include constructs from one classic model, the health belief model, and experienced and anticipated emotion. Further, in these models, disgust was included as the experienced emotion. Primary paths from the original proposed Models C & D (Figures 10 and 12) were retained, including paths from experimental condition to disgust, benefits, self-efficacy, and barriers. The threat component of the model consisted of disgust, which predicted susceptibility, severity, and anticipated regret. Anticipated regret was also predicted by susceptibility and severity. Anticipated regret, in turn, significantly predicted intentions.

Attitudes was removed from these exploratory models. Attitudes did not consistently emerge as a significant predictor of intentions in Models A through D, which included data from the full intervention and control condition. Young women may hold conflicting attitudes toward sun protection, recognizing that it prevents unwanted outcomes such as skin cancer and photoaging, along with desired outcomes of obtaining a tanned complexion. Previous research has shown
that intentions are not as easily predicted from attitudes when one holds both positive and negative evaluations of a behavior (Armitage & Conner, 2000).

In models E2 and F2 (Figures 18 and 22) the core significant relationships between experienced emotion (disgust), susceptibility, severity, anticipated regret, and intentions were maintained. This builds on previous work by Moser and Aiken (2011), which modeled the antecedents of anticipated regret; susceptibility and severity, by further unpacking the threat component to include experienced emotion (disgust) as a predictor of susceptibility, severity, and anticipated regret. Further, susceptibility and severity each significantly predict benefits of sun protection, which is consistent with previous psychosocial models (Jackson & Aiken, 2006).

Also, barriers significantly predicted self-efficacy. Although the revised health belief model (Rosenstock et al., 1988) treated barriers and self-efficacy as unrelated constructs predicting a health behavior, other models such as the Health Action Process Approach (HAPA) model (Schwarzer, 1992) combined barriers with self-efficacy to predict all stages of health behavior initiation, activation, and maintenance. Further, previous research on sun protection has found that barriers to sun screen negatively predicted self-efficacy for sun protection (Jackson & Aiken, 2000). If one feels that using sun protection is difficult due to cost and unpleasantness of sunscreen, she will not feel confident in her ability to make sunscreen use a habit.
Also of interest is the fact that the relationship between self-efficacy and behavior is not completely mediated by intentions. This is somewhat in line with previous research finding that in terms of the theory of planned behavior, there may be a direct path from perceived behavioral control, a psychosocial construct similar to self-efficacy, to behavior (Ajzen, 1991; Conner et al., 2006; McMillan et al., 2005; Smith, Terry, Manstead, Louis, Kotterman & Wolfs, 2007).

An alternative to the modeled paths of self-efficacy predicting intentions, which in turn predicted behavior, would be a model in which the relationship between intentions and self-efficacy is mediated by intentions. There has been much theoretical debate over the appropriateness of including intentions as the sole predictor of behavior as originally conceptualized by the theory of reasoned action (Ajzen, 1991; Reuter, Ziegelmann, Wiedemann, & Lipke, 2008; Sheeran, 2002; Schwarzer, 1992). Though the modified theory of planned behavior called for a direct path from perceived behavioral control to behavior, the HAPA model more fully characterizes the relationships of the psychosocial constructs that mediate the relationship between intentions to engage in a behavior and the behavior itself (Schwarzer, 1992; 2008). Thus, it may be in that in the present work, intentions to engage in sun protection occur earlier in the model, and that self-efficacy is in fact positively predicted from intentions. A model with this path specification should be tested with the present data to explore this possibility.

It should again be noted that these aforementioned exploratory models E2 and F2 (Figures 18 and 22) did not include any pretest measures of susceptibility,
severity, or previous general sun protection behavior. Thus, the fit of two additional models, which used the residualized change scores to account for stability of constructs over time, was tested (Figures 19 and 23). In these models, the path from intentions to follow-up behavior is no longer significant, but self-efficacy was a significant predictor of general sun protection. Further, the path from anticipated regret to intentions was not significant. There was however, a significant correlation between anticipated regret and benefits. Although the residuals of anticipated regret and benefits were allowed to correlate in these models, the modification indices suggested that there was additional shared variance between anticipated regret and benefits not accounted for by the model. Thus, a path from anticipated regret to benefits was included in the model to replace the correlated residuals. This path was significant in both models (Figures 20 and 24).

This path is of great interest as it allows for the relationship between the threat component (experienced emotion, susceptibility, severity, anticipated regret) and intentions to be mediated by benefits. Again, recall that the function of emotion is to guide attention and motivate behavior (e.g., Ekman, 1992; Levenson, 1999, Tooby & Cosmides, 1990). In this case, it may be that the threat component leads to increased acceptance and beliefs of the benefits of sun protection at preventing skin cancer/photoaging through sun protection.

An additional correlation, not explored with a path in any aforementioned model, was the strong positive correlation between anticipated regret and self-
efficacy. This allows this possibility to explore self-efficacy as a potential mediator of the relationship between anticipated regret and benefits. While this relationship was not tested, it may be that, as in the case with benefits, strong feelings of anticipated regret motivate individuals to mitigate the threat by increasing their beliefs that they can consistently engage in sun protection behavior, which in turn, leads to increased intentions to use sun protection.

Previous research by Bakker, Buunk, and Manstead (1997) found evidence for a moderating role of self-efficacy on the relationship between anticipated regret and behavior. In a study examining the effect of anticipated regret on condom use, they found a significant interaction such that anticipated regret predicted condom use for those who had strong beliefs of self-efficacy that they could use a condom (Bakker, et al., 1997). A mediating relationship, rather than a moderating relationship, is more consistent with the overall role of emotion as a motivator of attention. Using the data from the present research, a moderating relationship may be examined in future analyses.

Limitations

There are several limitations in the present research. First, although a longitudinal design was employed with three time points (pre-test, immediate posttest, and follow-up), the majority of the examined relationships among constructs were cross-sectional. Further, the paths examined in the present research were from models with poor fit. Thus, the relationships observed in the present research should be interpreted with extreme caution.
A second limitation was the small sample sizes, which reduced power. The small sample sizes were especially problematic, as this was a longitudinal study, and attrition rates were relatively high (30%). Thus, the sample size at follow-up was also quite small. Additionally, there was differential attrition at follow-up, such that those in the (E) condition were less likely to participate in the follow-up than the other conditions. Further, those who completed the follow-up had significantly lower perceptions of benefits at pretest than those who attrited, and also had significantly greater intentions to use sun protection at posttest than those who attrited.

Because they are at high risk of negative effects of sun exposure, the explicit population of interest for the present research was young women. This necessarily limits the generalizability of the results to young women. It may be that the relationships of emotional arousal, cognitions, intentions, and behavior would differ in populations of varying ages. Further, the specific intervention components may not be as effective for an older sample. For example, the images of sun damage may not have as strong an emotional arousal effect in older women. They may feel that there is no longer a protective benefit to using sun protection to prevent photoaging, and may not be receptive to the message. An additional limitation is the relative homogeneity of participant ethnicity in the present work. A full 62% of participants were Caucasian. It should be noted, however, that although people of other ethnic backgrounds and skin tones are not
as susceptible to skin cancer as Caucasians, morbidity rates from skin cancer are higher in these populations than Caucasians (Jackson, 2009).

**Future Directions**

In the present research, a comparison of the effects of threat specific emotional arousal to irrelevant threat emotional arousal on downstream psychosocial constructs is not possible because the control condition contained different intervention content than the full intervention condition. A future study could compare the full intervention condition to an intervention condition consisting of a threat irrelevant emotion induction coupled with an identical benefits and self-efficacy message used in the full intervention condition.

In order to examine the differential effects of proximal threats and distal threats (e.g., photoaging threat as opposed to skin cancer threat) on anticipated regret, analyses using data from the present research could be conducted. Specifically, a hierarchical regression analysis first predicting anticipated regret from susceptibility to and severity of skin cancer, then adding susceptibility to and severity of photoaging could be conducted. This analysis would add greater clarification to the antecedents of anticipated regret, specifically, whether the threat of photoaging leads to increased anticipated regret over and above skin cancer. An additional study, comparing an intervention aimed solely at photoaging to an intervention aimed solely at skin cancer, could also shed light on these relationships.

**Conclusion**
The present research aimed to better understand the effects of emotional arousal in an intervention to increase sun protection in young women. This research extends previous work on fear appeals by modeling relationships among experienced emotion, anticipated emotion, and psychosocial constructs from classic models of behavior. Further, the present work examined the role of two discrete negative emotions, fear and disgust, on downstream constructs. The results comparing the effectiveness of experimental intervention conditions on follow-up sun protection behavior provide evidence for the effectiveness of a threat relevant emotional arousal component in an intervention, coupled with a message of benefits and self-efficacy. Additionally, the models proposed and tested in the current work provide support for the addition of both experienced and anticipated emotion into models of health behavior.
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Table 1

*Means and Standard Deviations of Pretest Scales for Pilot Study*

<table>
<thead>
<tr>
<th>Scale</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previous Week Sun Protection</td>
<td>2.5</td>
<td>.80</td>
</tr>
<tr>
<td>Conditional Susceptibility- Skin Cancer</td>
<td>4.4</td>
<td>1.3</td>
</tr>
<tr>
<td>Conditional Susceptibility- Photoaging</td>
<td>4.7</td>
<td>1.3</td>
</tr>
<tr>
<td>Perceived Susceptibility- Skin Cancer</td>
<td>4.6</td>
<td>.99</td>
</tr>
<tr>
<td>Perceived Susceptibility- Photoaging</td>
<td>4.2</td>
<td>1.2</td>
</tr>
<tr>
<td>Severity- Skin Cancer</td>
<td>5.7</td>
<td>.52</td>
</tr>
<tr>
<td>Severity- Photoaging</td>
<td>5.4</td>
<td>.80</td>
</tr>
</tbody>
</table>

*Note.* The maximum possible range for previous week sun protection scales is 1-7; for all other psychological scales, from 1-6
Table 2

Correlations between IBI Difference Scores and Pretest Measures

<table>
<thead>
<tr>
<th></th>
<th>Cancer</th>
<th>Moh’s</th>
<th>Photoaging-Older</th>
<th>Photoaging-Younger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previous Week Sun</td>
<td>-.40*</td>
<td>-.37*</td>
<td>-.33*</td>
<td>-.52***</td>
</tr>
<tr>
<td>Protection Behaviors</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Susceptibility-Cancer</td>
<td>-.12</td>
<td>.29</td>
<td>-.32</td>
<td>-.32</td>
</tr>
<tr>
<td>Susceptibility-Photoaging</td>
<td>-.15</td>
<td>.12</td>
<td>-.30</td>
<td>-.31</td>
</tr>
<tr>
<td>Conditional</td>
<td>.02</td>
<td>-.12</td>
<td>-.04</td>
<td>-.17</td>
</tr>
<tr>
<td>Susceptibility-Cancer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severity-Cancer</td>
<td>-.10</td>
<td>-.16</td>
<td>-.18</td>
<td>-.07</td>
</tr>
<tr>
<td>Conditional</td>
<td>.001</td>
<td>-.21</td>
<td>-.12</td>
<td>-.18</td>
</tr>
<tr>
<td>Susceptibility-Photoaging</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severity-Photoaging</td>
<td>-.01</td>
<td>-.01</td>
<td>-.14</td>
<td>.003</td>
</tr>
</tbody>
</table>

* Note. * p < .05, ** p < .01, *** p < .001
Table 3

*Correlations between PEP Difference Scores and Pretest Measures*

<table>
<thead>
<tr>
<th></th>
<th>Cancer</th>
<th>Moh’s</th>
<th>Photoaging-Older</th>
<th>Photoaging-Younger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sun Protection</td>
<td>.10</td>
<td>-.43**</td>
<td>-.06</td>
<td>-.44**</td>
</tr>
<tr>
<td>Susceptibility - Cancer</td>
<td>.01</td>
<td>-.08</td>
<td>-.23</td>
<td>-.20</td>
</tr>
<tr>
<td>Susceptibility - Photoaging</td>
<td>-.09</td>
<td>-.15</td>
<td>-.16</td>
<td>-.07</td>
</tr>
<tr>
<td>Conditional Susceptibility - Cancer</td>
<td>.04</td>
<td>-.26</td>
<td>-.16</td>
<td>-.49**</td>
</tr>
<tr>
<td>Severity - Cancer</td>
<td>-.06</td>
<td>.004</td>
<td>-.02</td>
<td>-.05</td>
</tr>
<tr>
<td>Conditional Susceptibility - Photoaging</td>
<td>.06</td>
<td>-.24</td>
<td>-.11</td>
<td>-.33</td>
</tr>
<tr>
<td>Severity - Photoaging</td>
<td>.13</td>
<td>.04</td>
<td>-.08</td>
<td>.11</td>
</tr>
</tbody>
</table>

*Note.* *p < .05, **p < .01, ***p < .001*
Table 4

*Correlations between IBI Difference Scores and Posttest Measures*

<table>
<thead>
<tr>
<th></th>
<th>Cancer</th>
<th>Moh’s</th>
<th>Photoaging-Older</th>
<th>Photoaging-Younger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Susceptibility-Cancer</td>
<td>.03</td>
<td>-.08</td>
<td>-.08</td>
<td>-.14</td>
</tr>
<tr>
<td>Susceptibility-Photoaging</td>
<td>-.01</td>
<td>.06</td>
<td>-.03</td>
<td>-.12</td>
</tr>
<tr>
<td>Conditional Susceptibility-Cancer</td>
<td>.25</td>
<td>.12</td>
<td>.38*</td>
<td>.18</td>
</tr>
<tr>
<td>Severity- Cancer</td>
<td>.09</td>
<td>-.14</td>
<td>.09</td>
<td>.06</td>
</tr>
<tr>
<td>Conditional Susceptibility-Photoaging</td>
<td>.10</td>
<td>-.07</td>
<td>.22</td>
<td>.01</td>
</tr>
<tr>
<td>Severity-Photoaging</td>
<td>.04</td>
<td>.12</td>
<td>.20</td>
<td>.14</td>
</tr>
</tbody>
</table>

*Note.* *p* < .05, **p** < .01, ***p*** < .001

Negative correlations indicate a positive relationship between heart rate and psychosocial scales.
Table 5

*Correlations between PEP Difference Scores and Posttest Measures*

<table>
<thead>
<tr>
<th></th>
<th>Cancer</th>
<th>Moh’s</th>
<th>Photoaging-Older</th>
<th>Photoaging-Younger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Susceptibility-Cancer</td>
<td>-.01</td>
<td>.01</td>
<td>-.47**</td>
<td>-.18</td>
</tr>
<tr>
<td>Susceptibility-Photoaging</td>
<td>-.27</td>
<td>-.12</td>
<td>-.31</td>
<td>-.17</td>
</tr>
<tr>
<td>Conditional Susceptibility-Cancer</td>
<td>-.22</td>
<td>.07</td>
<td>-.28</td>
<td>-.19</td>
</tr>
<tr>
<td>Severity- Cancer</td>
<td>-.10</td>
<td>.11</td>
<td>-.32</td>
<td>-.13</td>
</tr>
<tr>
<td>Conditional Susceptibility-Photoaging</td>
<td>-.26</td>
<td>-.04</td>
<td>-.33</td>
<td>-.16</td>
</tr>
<tr>
<td>Severity-Photoaging</td>
<td>-.25</td>
<td>-.03</td>
<td>-.39*</td>
<td>-.10</td>
</tr>
</tbody>
</table>

*Note.*  *p < .05, **p < .01, ***p < .001*

Negative correlations indicate a positive relationship between sympathetic nervous system activation and psychosocial scales.
Table 6

*Correlations between IBI Difference Scores and Follow-up Measures*

<table>
<thead>
<tr>
<th></th>
<th>Cancer</th>
<th>Moh’s</th>
<th>Photoaging-Older</th>
<th>Photoaging-Younger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previous Week Sun Protection</td>
<td>-.24</td>
<td>-.13</td>
<td>-.17</td>
<td>-.25</td>
</tr>
<tr>
<td>Intentions to Sun Protect</td>
<td>-.11</td>
<td>-.01</td>
<td>-.06</td>
<td>-.21</td>
</tr>
</tbody>
</table>

*Note.* No correlations were significant at p < .05.

Negative correlations indicate a positive relationship between heart rate and intentions and behavior.
Table 7

*Correlations between PEP Difference Scores and Follow-up Measures*

<table>
<thead>
<tr>
<th></th>
<th>Cancer</th>
<th>Moh’s</th>
<th>Photoaging-Older</th>
<th>Photoaging-Younger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previous Week Sun Protection</td>
<td>-.01</td>
<td>-.37*</td>
<td>-.23</td>
<td>-.46**</td>
</tr>
<tr>
<td>Intentions to Sun Protect</td>
<td>-.02</td>
<td>-.27</td>
<td>-.22</td>
<td>-.48**</td>
</tr>
</tbody>
</table>

*Note.* * p < .05, ** p < .01, *** p < .001

Negative correlations indicate a positive relationship between sympathetic nervous system activation and intentions and behavior.
<table>
<thead>
<tr>
<th>Construct</th>
<th>Number of Items</th>
<th>Item numbers</th>
<th>Sample item</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Appendix K</td>
<td>Appendix L</td>
<td>Appendix N</td>
<td>Pretest</td>
</tr>
<tr>
<td><strong>Intentions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intentions to sun protect</td>
<td>5</td>
<td>133, 134, 135, 136, 138</td>
<td>81, 82, 83, 84, 86</td>
<td>34, 35, 36, 37, 39</td>
</tr>
<tr>
<td><strong>Behavior</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General sun protection</td>
<td>7</td>
<td>123 - 129</td>
<td>N/A</td>
<td>19 – 25</td>
</tr>
<tr>
<td>Previous week face protection</td>
<td>2</td>
<td>21, 23</td>
<td>N/A</td>
<td>8, 10</td>
</tr>
<tr>
<td>Previous week body protection</td>
<td>2</td>
<td>20, 24</td>
<td>N/A</td>
<td>9, 11</td>
</tr>
<tr>
<td>Construct</td>
<td>Number of Items</td>
<td>Item numbers</td>
<td>Sample item</td>
<td>Cronbach’s Alpha</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-----------------</td>
<td>--------------</td>
<td>------------------------------------------------------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Appendix K</td>
<td>Appendix L</td>
<td>Appendix N</td>
</tr>
<tr>
<td>Previous week shade</td>
<td>1</td>
<td>1</td>
<td>12</td>
<td>N/A</td>
</tr>
<tr>
<td>Previous week sun exposure</td>
<td>1</td>
<td>18</td>
<td>N/A</td>
<td>6</td>
</tr>
<tr>
<td>Previous week sunbathing</td>
<td>1</td>
<td>19</td>
<td>N/A</td>
<td>7</td>
</tr>
<tr>
<td>Psychological Measures</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barriers to sunscreen use</td>
<td>7</td>
<td>103 - 109</td>
<td>51 - 57</td>
<td>N/A</td>
</tr>
<tr>
<td>Construct</td>
<td>Number of Items</td>
<td>Item numbers</td>
<td>Sample item</td>
<td>Cronbach’s Alpha</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>-----------------</td>
<td>--------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Benefits of sun protection - preventing skin cancer</td>
<td>4</td>
<td>95 - 98 58 - 61 N/A</td>
<td>If people protected themselves from the sun, they wouldn’t be as likely to get skin cancer.</td>
<td>.76 .85</td>
</tr>
<tr>
<td>Benefits of sun protection - preventing photoaging</td>
<td>4</td>
<td>99 - 102 62 - 65 N/A</td>
<td>If people protected themselves from the sun, they wouldn’t age so fast.</td>
<td>.87 .91</td>
</tr>
<tr>
<td>Attitudes toward sun protection</td>
<td>6</td>
<td>86a - 87c 74a - 75c 40 - 47</td>
<td>For me, wearing sunscreen would be Bad-Good</td>
<td>.89 .93</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>8</td>
<td>115 - 122 66 - 73 40 - 47</td>
<td>Use sunscreen even when I am feeling too lazy to bother with it</td>
<td>.92 .94 .95</td>
</tr>
<tr>
<td>Susceptibility – Cancer</td>
<td>3</td>
<td>38 - 40 10 - 12 N/A</td>
<td>The possibility of getting skin cancer worries me.</td>
<td>.66 .60</td>
</tr>
<tr>
<td>Susceptibility – Photoaging</td>
<td>3</td>
<td>41 - 43 13 - 15 N/A</td>
<td>The possibility of getting wrinkles or age spots worriesme.</td>
<td>.53 .59</td>
</tr>
<tr>
<td>Severity – Cancer</td>
<td>3</td>
<td>44 - 46 16 - 18 N/A</td>
<td>It would be terrible to have skin cancer.</td>
<td>.78 .89</td>
</tr>
<tr>
<td>Severity – Photoaging</td>
<td>4</td>
<td>47 - 50 19 - 22 N/A</td>
<td>It would be terrible to have wrinkles from the sun on my face.</td>
<td>.87 .92</td>
</tr>
<tr>
<td>Construct</td>
<td>Number of Items</td>
<td>Item numbers</td>
<td>Sample item</td>
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<tr>
<td></td>
<td></td>
<td>Appendix K</td>
<td>Appendix L</td>
<td>Appendix N</td>
</tr>
<tr>
<td><strong>Emotion Measures</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anticipated Regret</td>
<td>5</td>
<td>110 - 114</td>
<td>1 - 5</td>
<td>55 - 59</td>
</tr>
<tr>
<td>Decision Affect Positive</td>
<td>3</td>
<td>88, 90, 93</td>
<td>44, 46, 49</td>
<td>48, 50, 53</td>
</tr>
<tr>
<td>Decision Affect Negative</td>
<td>4</td>
<td>89, 91, 92, 94</td>
<td>45, 47, 48, 50</td>
<td>49, 51, 52, 54</td>
</tr>
<tr>
<td><strong>Personal and Family History</strong></td>
<td></td>
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<tr>
<td>Objective Risk (Skin Tone)</td>
<td>1</td>
<td>11</td>
<td>N/A</td>
<td>N/A</td>
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<tr>
<td>Family History of Skin Cancer</td>
<td>7</td>
<td>12 - 18</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Construct</td>
<td>Number of Items</td>
<td>Item numbers</td>
<td>Sample item</td>
<td>Cronbach’s Alpha</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-----------------</td>
<td>--------------</td>
<td>-----------------------------------------------------------------------------</td>
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<tr>
<td></td>
<td></td>
<td>Appendix K</td>
<td>Appendix L</td>
<td>Appendix N</td>
</tr>
<tr>
<td><strong>Additional Measures</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge</td>
<td>10</td>
<td>1 - 10</td>
<td>96 - 105</td>
<td>N/A</td>
</tr>
<tr>
<td>Sun exposure</td>
<td>2</td>
<td>19 - 20</td>
<td>N/A</td>
<td>6 - 7</td>
</tr>
<tr>
<td>Tanning Salon Use</td>
<td>1</td>
<td>26</td>
<td>N/A</td>
<td>13</td>
</tr>
<tr>
<td>Sunburn</td>
<td>1</td>
<td>27</td>
<td>N/A</td>
<td>14</td>
</tr>
<tr>
<td>Benefits of tanning</td>
<td>7</td>
<td>51 - 57</td>
<td>23 - 29</td>
<td>N/A</td>
</tr>
<tr>
<td>Conditional Susceptibility – Cancer</td>
<td>1</td>
<td>34</td>
<td>6</td>
<td>N/A</td>
</tr>
<tr>
<td>Conditional Susceptibility – Photoaging</td>
<td>3</td>
<td>35 - 37</td>
<td>7 - 9</td>
<td>N/A</td>
</tr>
<tr>
<td>Construct</td>
<td>Number of Items</td>
<td>Item numbers</td>
<td>Sample item</td>
<td>Cronbach’s Alpha</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>-----------------</td>
<td>--------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Anticipated Emotions Toward SPF – Positive</td>
<td>4</td>
<td>63, 65, 67,</td>
<td>N/A If I use sunscreen I will feel happy.</td>
<td>.82  .84  N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>69</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>30, 31, 33, 35</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Anticipated Emotions Toward SPF – Negative</td>
<td>3</td>
<td>64, 66, 68</td>
<td>N/A If I use sunscreen I will feel sad.</td>
<td>.79  .84  N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>32, 34, 36</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anticipated Emotions Toward Sunbathing – Positive</td>
<td>4</td>
<td>70, 72, 74,</td>
<td>N/A If I sunbathe, I will feel happy.</td>
<td>.89  .84  N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>76</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>37, 49, 41, 43</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anticipated Emotions Toward Sunbathing – Negative</td>
<td>3</td>
<td>71, 73, 75</td>
<td>N/A If I sunbathe, I will feel sad.</td>
<td>.80  .90  N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>38, 40, 42</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sunscreen Purchase</td>
<td>1</td>
<td>28</td>
<td>N/A During the past week, did you buy a sunscreen with an SPF of 15 or higher?</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construct</td>
<td>Number of Items</td>
<td>Item numbers</td>
<td>Sample item</td>
<td>Cronbach’s Alpha</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-----------------</td>
<td>--------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Most recent sun protection behavior</td>
<td>5</td>
<td>29 - 33</td>
<td>N/A 26 - 30 Think of the most recent time you were outdoors for a 15 minute period or more. Did you wear sunscreen with SPF 15 or higher on your face?</td>
<td>N/A</td>
</tr>
<tr>
<td>Descriptive Norms</td>
<td>5</td>
<td>58 - 62</td>
<td>N/A N/A To what extent do your friends protect their skin from the sun by staying in the shade?</td>
<td>N/A</td>
</tr>
<tr>
<td>Injunctive Norms</td>
<td>4</td>
<td>77 - 80</td>
<td>N/A N/A It would be ok with my friends if I sunbathed.</td>
<td>N/A</td>
</tr>
<tr>
<td>Image Norms</td>
<td>5</td>
<td>81 - 85</td>
<td>N/A N/A It seems that society wants people to be tan and attractive.</td>
<td>N/A</td>
</tr>
<tr>
<td>Intentions to sunbathe</td>
<td>3</td>
<td>130-132</td>
<td>76 -79 N/A I intend to maintain a tanned complexion by sunbathing.</td>
<td>N/A</td>
</tr>
<tr>
<td>Stress-Knowledge Items</td>
<td>3</td>
<td>139 - 140</td>
<td>87 - 89 N/A What is the definition of stress?</td>
<td>N/A</td>
</tr>
<tr>
<td>Stress Reduction Techniques</td>
<td>6</td>
<td>142 - 147</td>
<td>90 - 95 N/A I have healthy ways of coping when I feel nervous or “stressed”</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Table 9

Descriptive Statistics for Self-reported Emotions During Slide Sets in the Full Condition (n=148)

<table>
<thead>
<tr>
<th>Item</th>
<th>Photoaging- Young</th>
<th>Photoaging- Older</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>1) How negative or positive did you feel(^1)?</td>
<td>3.31</td>
<td>1.16</td>
</tr>
<tr>
<td>2) How strong were the emotions you felt(^2)?</td>
<td>3.55</td>
<td>1.48</td>
</tr>
<tr>
<td>3) Amusement(^2)</td>
<td>.47</td>
<td>.97</td>
</tr>
<tr>
<td>4) Anger</td>
<td>.63</td>
<td>1.0</td>
</tr>
<tr>
<td>5) Contentment</td>
<td>1.26</td>
<td>1.51</td>
</tr>
<tr>
<td>6) Disgust</td>
<td>2.46</td>
<td>1.67</td>
</tr>
<tr>
<td>7) Enthusiasm</td>
<td>.36</td>
<td>.83</td>
</tr>
<tr>
<td>8) Fear</td>
<td>2.55</td>
<td>2.03</td>
</tr>
<tr>
<td>9) Sadness</td>
<td>2.47</td>
<td>1.98</td>
</tr>
<tr>
<td>10) Compassion</td>
<td>2.24</td>
<td>1.88</td>
</tr>
<tr>
<td>11) Sympathy</td>
<td>2.84</td>
<td>1.99</td>
</tr>
</tbody>
</table>

Note. Responses to photoaging stimuli are given in the first section; responses to skin cancer and Moh’s surgery, in the second section.

\(^1\) Item 1 was measured on 9-point Likert-type scale 0 = Very Negative, 8 = Very Positive
\(^2\) Items 2 – 11 were measured on 9-point Likert-type scale 0 = No Emotion, 8 = Strongest Ever Felt

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Table 9 *Continued*

<table>
<thead>
<tr>
<th>Item</th>
<th>M</th>
<th>SD</th>
<th>Skew</th>
<th>Kurtosis</th>
<th>M</th>
<th>SD</th>
<th>Skew</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) How negative or positive did you feel?</td>
<td>1.88</td>
<td>1.32</td>
<td>.28</td>
<td>-.34</td>
<td>1.33</td>
<td>1.35</td>
<td>.87</td>
<td>.13</td>
</tr>
<tr>
<td>2) How strong were the emotions you felt?</td>
<td>4.98</td>
<td>1.70</td>
<td>-.47</td>
<td>.03</td>
<td>5.81</td>
<td>1.87</td>
<td>-.75</td>
<td>-.06</td>
</tr>
<tr>
<td>3) Amusement</td>
<td>.18</td>
<td>.83</td>
<td>6.51</td>
<td>46.7</td>
<td>.19</td>
<td>1.01</td>
<td>6.81</td>
<td>49.4</td>
</tr>
<tr>
<td>4) Anger</td>
<td>.80</td>
<td>1.60</td>
<td>2.27</td>
<td>4.51</td>
<td>1.10</td>
<td>2.15</td>
<td>2.00</td>
<td>2.78</td>
</tr>
<tr>
<td>5) Contentment</td>
<td>.52</td>
<td>1.13</td>
<td>2.41</td>
<td>5.17</td>
<td>.35</td>
<td>1.00</td>
<td>3.72</td>
<td>15.3</td>
</tr>
<tr>
<td>6) Disgust</td>
<td>4.88</td>
<td>2.12</td>
<td>-.20</td>
<td>-.79</td>
<td>5.76</td>
<td>2.18</td>
<td>-.99</td>
<td>.26</td>
</tr>
<tr>
<td>7) Enthusiasm</td>
<td>.28</td>
<td>1.03</td>
<td>5.19</td>
<td>30.5</td>
<td>.24</td>
<td>.97</td>
<td>5.64</td>
<td>36.9</td>
</tr>
<tr>
<td>8) Fear</td>
<td>3.70</td>
<td>2.33</td>
<td>.06</td>
<td>-.89</td>
<td>4.67</td>
<td>2.56</td>
<td>-.40</td>
<td>-.97</td>
</tr>
<tr>
<td>9) Sadness</td>
<td>3.42</td>
<td>2.49</td>
<td>.17</td>
<td>-1.04</td>
<td>4.36</td>
<td>2.71</td>
<td>-.21</td>
<td>-1.19</td>
</tr>
<tr>
<td>10) Compassion</td>
<td>2.89</td>
<td>2.37</td>
<td>.40</td>
<td>-.91</td>
<td>3.95</td>
<td>2.78</td>
<td>-.07</td>
<td>-1.34</td>
</tr>
<tr>
<td>11) Sympathy</td>
<td>3.93</td>
<td>2.50</td>
<td>-.04</td>
<td>-1.04</td>
<td>5.01</td>
<td>2.65</td>
<td>-.47</td>
<td>-1.11</td>
</tr>
</tbody>
</table>
Table 10

Descriptive Statistics for Self-reported Emotions during Control Condition (n=131)

<table>
<thead>
<tr>
<th>Item</th>
<th>Stress Visualization</th>
<th>M</th>
<th>SD</th>
<th>Skew</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) How negative or positive did you feel?³</td>
<td>2.60</td>
<td>1.68</td>
<td>.82</td>
<td>.78</td>
<td></td>
</tr>
<tr>
<td>2) How strong were the emotions you felt?⁴</td>
<td>4.32</td>
<td>1.43</td>
<td>-.26</td>
<td>.24</td>
<td></td>
</tr>
<tr>
<td>3) Amusement⁴</td>
<td>1.40</td>
<td>1.63</td>
<td>.93</td>
<td>-.35</td>
<td></td>
</tr>
<tr>
<td>4) Anger</td>
<td>2.76</td>
<td>1.79</td>
<td>.03</td>
<td>-.76</td>
<td></td>
</tr>
<tr>
<td>5) Contentment</td>
<td>1.63</td>
<td>1.68</td>
<td>.94</td>
<td>.16</td>
<td></td>
</tr>
<tr>
<td>6) Disgust</td>
<td>2.11</td>
<td>1.87</td>
<td>.51</td>
<td>-.57</td>
<td></td>
</tr>
<tr>
<td>7) Enthusiasm</td>
<td>1.17</td>
<td>1.41</td>
<td>.99</td>
<td>-.05</td>
<td></td>
</tr>
<tr>
<td>8) Fear</td>
<td>4.32</td>
<td>1.94</td>
<td>-.30</td>
<td>-.33</td>
<td></td>
</tr>
<tr>
<td>9) Sadness</td>
<td>3.82</td>
<td>2.05</td>
<td>-.38</td>
<td>-.51</td>
<td></td>
</tr>
<tr>
<td>10) Compassion</td>
<td>1.50</td>
<td>1.62</td>
<td>.86</td>
<td>-.25</td>
<td></td>
</tr>
<tr>
<td>11) Sympathy</td>
<td>2.05</td>
<td>1.85</td>
<td>.60</td>
<td>-.57</td>
<td></td>
</tr>
</tbody>
</table>

³ Item 1 was measured on 9-point Likert-type scale 0 = Very Negative, 8 = Very Positive
⁴ Items 2 – 11 were measured on 9-point Likert-type scale 0 = No Emotion, 8 = Strongest Ever Felt
Table 11 *Scale Items, Loadings, and Measures of Fit from Confirmatory Factor Analyses*

<table>
<thead>
<tr>
<th>Scale</th>
<th>Items</th>
<th>Standardized Loading</th>
<th>$\chi^2$ (df, n)</th>
<th>CFI, SRMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intentions to sun protect</td>
<td>I plan to use sunscreen on a regular basis.</td>
<td>.90</td>
<td>17.95 (3, 351)</td>
<td>.98, .02</td>
</tr>
<tr>
<td></td>
<td>I plan to use sunscreen with at least SPF 15 on my face.</td>
<td>.81</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I plan to use sunscreen with at least SPF 15 on my body.</td>
<td>.80</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I plan to use sunscreen with at least SPF 15 on my face when I am at the beach or pool.</td>
<td>.66</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I plan to use sunscreen with at least SPF 15 on my body when I am at the beach or pool.</td>
<td>.49</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General sun protection behavior</td>
<td>I use sunscreen with an SPF of at least 15 on my face when I am in the sun.</td>
<td>.61</td>
<td>86.11 (10, 352)</td>
<td>.94, .08</td>
</tr>
<tr>
<td></td>
<td>I use sunscreen with an SPF of at least 15 on my body when I am in the sun.</td>
<td>.73</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I wear protective clothing like a long sleeve shirt or pants when I am in the sun.</td>
<td>.47</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I stay in the shade as much as possible when I am outdoors.</td>
<td>.45</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I try to avoid direct sunlight as much as possible.</td>
<td>.44</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I use sunscreen with an SPF of at least 15 on my face when I am sunbathing.</td>
<td>.55</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I use sunscreen with an SPF of at least 15 on my body when I am sunbathing.</td>
<td>.73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scale</td>
<td>Items</td>
<td>Standardized Loading</td>
<td>$\chi^2$ (df, n)</td>
<td>CFI, SRMR</td>
</tr>
<tr>
<td>------------------------</td>
<td>----------------------------------------------------------------------</td>
<td>----------------------</td>
<td>-----------------</td>
<td>-----------</td>
</tr>
<tr>
<td>Barriers to sunscreen use</td>
<td>How likely is it that the cost of sunscreen would keep you from using it?</td>
<td>.37</td>
<td>39.09 (12, 352)</td>
<td>.97, .03</td>
</tr>
<tr>
<td></td>
<td>How likely is it that having to carry sunscreen with you would keep you from using it?</td>
<td>.66</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>How likely is it that having to remember to apply sunscreen would keep you from using it?</td>
<td>.69</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>How likely is it that sunscreen smells unpleasant would keep you from using it?</td>
<td>.53</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>How likely is it that the nuisance of sunscreen would you from using it?</td>
<td>.76</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>How likely is it that sunscreen feels unpleasant would keep you from using it?</td>
<td>.66</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>How likely is it that having to reapply sunscreen would keep you from using it?</td>
<td>.83</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 11. *Continued*

<table>
<thead>
<tr>
<th>Scale</th>
<th>Items</th>
<th>Standardized Loading</th>
<th>$\chi^2$ (df, n) CFI, SRMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benefits of sun protection</td>
<td>Wearing sunscreen with an SPF of at least 15 when I am in the sun would reduce my chances of getting skin cancer.</td>
<td>.96, .04</td>
<td>81.06 (19, 352)</td>
</tr>
<tr>
<td></td>
<td>Whether or not a person develops skin cancer is related to how frequently they use sunscreen while spending time in the sun.</td>
<td>.59</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If people protected themselves from the sun, they wouldn’t be as likely to get skin cancer.</td>
<td>.78</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If more people used sunscreen with an SPF of at least 15 regularly, there would be fewer cases of skin cancer.</td>
<td>.83</td>
<td></td>
</tr>
<tr>
<td>Photoaging</td>
<td>If more people used sunscreen with an SPF of at least 15 regularly, people would look younger longer.</td>
<td>.84</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If people protected themselves from the sun, they wouldn't age so fast.</td>
<td>.83</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wearing sunscreen with an SPF of at least 15 when I am in the sun will reduce my chances of getting age spots and wrinkles.</td>
<td>.82</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Whether or not a person develops age spots and wrinkles is related to how frequently they wear sunscreen while spending time in the sun.</td>
<td>.69</td>
<td></td>
</tr>
<tr>
<td>Scale</td>
<td>Items</td>
<td>Standardized Loading</td>
<td>$\chi^2$ (df, n)</td>
</tr>
<tr>
<td>-------------</td>
<td>-----------------------------------------------------------------------</td>
<td>----------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>Whether or not you currently use sunscreen with SPF 15+, please rate how confident you are that you could really do each of the things consistently:</td>
<td></td>
<td>86.15 (18, 352)</td>
</tr>
<tr>
<td></td>
<td>Use sunscreen while in the sun even if I am not going to be out long.</td>
<td>.77</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Use sunscreen on the exposed parts of my body (not just my face) when I am in the sun.</td>
<td>.67</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Use sunscreen while doing outdoor activities in the winter.</td>
<td>.69</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Use sunscreen on every part of my body that is not covered by clothing.</td>
<td>.72</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Use sunscreen every day, even when I am not planning on spending time in the sun.</td>
<td>.84</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Make using sunscreen a part of my daily routine like brushing my teeth.</td>
<td>.86</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Use sunscreen even when I am feeling too lazy to bother with it.</td>
<td>.84</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Use sunscreen while doing outdoor activities other than sunbathing (e.g. working outdoors, playing sports)</td>
<td>.60</td>
<td></td>
</tr>
</tbody>
</table>
Table 11 *Continued*

<table>
<thead>
<tr>
<th>Scale</th>
<th>Items</th>
<th>Standardized Loading</th>
<th>$\chi^2$ (df, n) CFI, SRMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Susceptibility</td>
<td>The possibility of skin cancer worries me.</td>
<td>.75</td>
<td>17.68 (7, 352) .98, .03</td>
</tr>
<tr>
<td>Cancer</td>
<td>Whenever I hear of a friend, relative, or public figure getting skin cancer, it makes me realize I could get it too.</td>
<td>.90</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I don’t need to worry about getting skin cancer until I am much older (reverse scored).</td>
<td>.23</td>
<td></td>
</tr>
<tr>
<td>Photoaging</td>
<td>I am too young to spend much time thinking that I might get wrinkles and age spots (reverse scored).</td>
<td>.16</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Whenever I see somebody who has a lot of wrinkles or age spots, it makes me realize that I could get them too.</td>
<td>.80</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The possibility of getting age spots or wrinkles worries me.</td>
<td>.76</td>
<td></td>
</tr>
</tbody>
</table>

5 This item was removed from subsequent analysis due to low factor loading.
6 This item was removed from subsequent analysis due to low factor loading.
<table>
<thead>
<tr>
<th>Scale</th>
<th>Items</th>
<th>Standardized Loading</th>
<th>$\chi^2$ (df, n)</th>
<th>CFI, SRMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severity</td>
<td></td>
<td></td>
<td>34.22 (13, 352)</td>
<td>.99, .03</td>
</tr>
<tr>
<td>Cancer</td>
<td>It would be terrible to get a malignant tumor on my skin.</td>
<td>.51</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Getting skin cancer would severely affect my life.</td>
<td>.68</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>It would be terrible to have skin cancer.</td>
<td>.62</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Photoaging</td>
<td>I would be terrible to look older than I really am due to too much sun exposure.</td>
<td>.78</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>It would be terrible to have age spots from the sun on my face.</td>
<td>.81</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>It would be terrible to have wrinkles from the sun on my face.</td>
<td>.85</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Getting wrinkles and age spots due to premature aging from the sun would severely affect my personal life.</td>
<td>.80</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 11 Continued

<table>
<thead>
<tr>
<th>Scale</th>
<th>Items</th>
<th>Standardized Loading</th>
<th>$\chi^2$ (df, n)</th>
<th>CFI, SRMR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Anticipated Regret</strong></td>
<td>If I failed to protect myself from the sun:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I would regret it.</td>
<td>.88</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I would think it was the wrong decision.</td>
<td>.91</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I would protect myself from the sun if I had to do it over again.</td>
<td>.82</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I would think, “Failing to protect myself from the sun did me a lot of harm”,</td>
<td>.82</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I would think that failing to use sun protection was a foolish decision.</td>
<td>.81</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Attitudes toward sun protection</strong></td>
<td>For me, wearing sunscreen everyday would be:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bad - Good</td>
<td>.60</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dumb – Smart</td>
<td>.46</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Negative - Positive</td>
<td>.53</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>For me, protecting my skin from the sun would be:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bad – Good</td>
<td>.88</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dumb - Smart</td>
<td>.82</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Negative - Positive</td>
<td>.89</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 12

*Factor Loadings of Emotion Rating Form for Control (C) and Full intervention (F) Conditions*

<table>
<thead>
<tr>
<th>Items</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 1</th>
<th>Factor 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amuse</td>
<td>.704</td>
<td>-.020</td>
<td>-.005</td>
<td>.575</td>
</tr>
<tr>
<td>Anger</td>
<td>.145</td>
<td>.730</td>
<td>.483</td>
<td>.313</td>
</tr>
<tr>
<td>Content</td>
<td>.636</td>
<td>-.048</td>
<td>-.126</td>
<td>.700</td>
</tr>
<tr>
<td>Disgust</td>
<td>.137</td>
<td>.590</td>
<td>.567</td>
<td>.111</td>
</tr>
<tr>
<td>Enthus</td>
<td>.793</td>
<td>.089</td>
<td>.125</td>
<td>.656</td>
</tr>
<tr>
<td>Fear</td>
<td>-.152</td>
<td>.870</td>
<td>.855</td>
<td>-.099</td>
</tr>
<tr>
<td>Sad</td>
<td>-.074</td>
<td>.863</td>
<td>.954</td>
<td>-.039</td>
</tr>
<tr>
<td>Compassion</td>
<td>.707</td>
<td>-.004</td>
<td>.698</td>
<td>-.015</td>
</tr>
<tr>
<td>Sympathy</td>
<td>.586</td>
<td>-.006</td>
<td>.864</td>
<td>-.055</td>
</tr>
</tbody>
</table>

*Note.* Principal axis factor with promax (oblique) rotation
Table 13

*Descriptive Information for Scales/Items at Pretest (n=352)*

<table>
<thead>
<tr>
<th>Scale or Item</th>
<th>n</th>
<th>Observed Range</th>
<th>Mean</th>
<th>SD</th>
<th>Skew</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previous Week: Sun exposure</td>
<td>352</td>
<td>2-13</td>
<td>7.66</td>
<td>2.27</td>
<td>-.03</td>
<td>-.003</td>
</tr>
<tr>
<td>Previous Week: Sunbathing</td>
<td>349</td>
<td>1-13</td>
<td>3.49</td>
<td>2.92</td>
<td>.83</td>
<td>-.36</td>
</tr>
<tr>
<td>Previous Week: Use sunscreen on face</td>
<td>352</td>
<td>1-7</td>
<td>3.57</td>
<td>2.45</td>
<td>.25</td>
<td>-1.65</td>
</tr>
<tr>
<td>Previous Week: Use sunscreen on body</td>
<td>352</td>
<td>1-7</td>
<td>1.97</td>
<td>1.49</td>
<td>1.84</td>
<td>2.86</td>
</tr>
<tr>
<td>Previous Week: Wear a hat</td>
<td>352</td>
<td>1-7</td>
<td>1.44</td>
<td>1.13</td>
<td>3.33</td>
<td>11.56</td>
</tr>
<tr>
<td>Previous Week: Wear protective clothes</td>
<td>352</td>
<td>1-7</td>
<td>2.24</td>
<td>1.57</td>
<td>1.29</td>
<td>.84</td>
</tr>
<tr>
<td>Previous Week: Stay in shade</td>
<td>352</td>
<td>1-7</td>
<td>3.38</td>
<td>1.66</td>
<td>.40</td>
<td>-.83</td>
</tr>
<tr>
<td>General Sun Protection scale</td>
<td>349</td>
<td>1-5.86</td>
<td>3.36</td>
<td>1.15</td>
<td>-.14</td>
<td>-.63</td>
</tr>
<tr>
<td>Susceptibility- Photoaging</td>
<td>352</td>
<td>1-6</td>
<td>3.97</td>
<td>1.31</td>
<td>-.31</td>
<td>-.54</td>
</tr>
<tr>
<td>Susceptibility- Cancer</td>
<td>352</td>
<td>1-6</td>
<td>3.99</td>
<td>1.30</td>
<td>-.39</td>
<td>-.63</td>
</tr>
<tr>
<td>Severity- Photoaging</td>
<td>352</td>
<td>1-6</td>
<td>5.13</td>
<td>.87</td>
<td>-1.30</td>
<td>2.11</td>
</tr>
<tr>
<td>Severity- Cancer</td>
<td>352</td>
<td>1-6</td>
<td>5.61</td>
<td>.67</td>
<td>-2.80</td>
<td>11.16</td>
</tr>
<tr>
<td>Benefits of sunscreen-Photoaging</td>
<td>352</td>
<td>1-6</td>
<td>4.53</td>
<td>1.01</td>
<td>-.35</td>
<td>-.15</td>
</tr>
<tr>
<td>Benefits of sunscreen-Cancer</td>
<td>352</td>
<td>2-6</td>
<td>4.82</td>
<td>.84</td>
<td>-.61</td>
<td>.03</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>352</td>
<td>1-6</td>
<td>3.03</td>
<td>1.23</td>
<td>.55</td>
<td>-.31</td>
</tr>
<tr>
<td>Barriers to using sunscreen</td>
<td>351</td>
<td>1-5.86</td>
<td>3.23</td>
<td>1.15</td>
<td>-.09</td>
<td>- .65</td>
</tr>
<tr>
<td>Attitudes toward sun protection</td>
<td>350</td>
<td>2.17-6</td>
<td>5.15</td>
<td>.88</td>
<td>-.92</td>
<td>.19</td>
</tr>
<tr>
<td>Anticipated Regret</td>
<td>352</td>
<td>1-6</td>
<td>4.18</td>
<td>1.31</td>
<td>-.39</td>
<td>-.66</td>
</tr>
<tr>
<td>Decision Affect Positive-failing to use sunscreen</td>
<td>352</td>
<td>1-5.33</td>
<td>2.47</td>
<td>1.11</td>
<td>.34</td>
<td>-.85</td>
</tr>
<tr>
<td>Decision Affect Negative-failing to use sunscreen</td>
<td>352</td>
<td>1-6</td>
<td>2.55</td>
<td>1.25</td>
<td>.40</td>
<td>-.68</td>
</tr>
<tr>
<td>Intentions to Protect</td>
<td>351</td>
<td>1-6</td>
<td>4.18</td>
<td>1.26</td>
<td>-.53</td>
<td>-.49</td>
</tr>
</tbody>
</table>

*Note.* The maximum possible range for previous week sun exposure is 1 – 13; for all previous week sun protection scales is 1-7; for all other psychological scales, from 1-6.
Table 14

Means and Standard Deviations of Pretest Measures by Condition

<table>
<thead>
<tr>
<th>Scale</th>
<th>(F) n=148</th>
<th></th>
<th>(E) n=73</th>
<th></th>
<th>(C) n=131</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Previous Week: Sun exposure</td>
<td>7.86</td>
<td>2.18</td>
<td>7.49</td>
<td>2.33</td>
<td>7.54</td>
<td>2.32</td>
</tr>
<tr>
<td>Previous Week: Sunbathing</td>
<td>3.57</td>
<td>3.04</td>
<td>3.18</td>
<td>2.57</td>
<td>3.56</td>
<td>2.97</td>
</tr>
<tr>
<td>Previous Week: Use sunscreen on face</td>
<td>3.56</td>
<td>2.49</td>
<td>3.58</td>
<td>2.49</td>
<td>3.59</td>
<td>2.41</td>
</tr>
<tr>
<td>Previous Week: Use sunscreen on body</td>
<td>1.97</td>
<td>1.53</td>
<td>1.95</td>
<td>1.32</td>
<td>1.99</td>
<td>1.53</td>
</tr>
<tr>
<td>Previous Week: Wear a hat</td>
<td>1.44</td>
<td>1.11</td>
<td>1.41</td>
<td>.96</td>
<td>1.47</td>
<td>1.24</td>
</tr>
<tr>
<td>Previous Week: Wear protective clothes</td>
<td>2.24</td>
<td>1.64</td>
<td>2.14</td>
<td>1.44</td>
<td>2.31</td>
<td>1.56</td>
</tr>
<tr>
<td>Previous Week: Stay in shade</td>
<td>3.51</td>
<td>1.76</td>
<td>3.26</td>
<td>1.48</td>
<td>3.31</td>
<td>1.63</td>
</tr>
<tr>
<td>General Protection</td>
<td>3.41</td>
<td>1.14</td>
<td>3.33</td>
<td>1.17</td>
<td>3.32</td>
<td>1.17</td>
</tr>
<tr>
<td>Susceptibility- Photoaging</td>
<td>3.99</td>
<td>1.34</td>
<td>4.14</td>
<td>1.29</td>
<td>3.85</td>
<td>1.29</td>
</tr>
<tr>
<td>Susceptibility- Cancer</td>
<td>3.99</td>
<td>1.32</td>
<td>4.14</td>
<td>1.32</td>
<td>3.92</td>
<td>1.27</td>
</tr>
<tr>
<td>Severity- Photoaging</td>
<td>5.06</td>
<td>.97</td>
<td>5.15</td>
<td>.84</td>
<td>5.19</td>
<td>.75</td>
</tr>
<tr>
<td>Severity- Cancer</td>
<td>5.63</td>
<td>.70</td>
<td>5.63</td>
<td>.55</td>
<td>5.57</td>
<td>.71</td>
</tr>
<tr>
<td>Benefits of sunscreen- Photoaging</td>
<td>4.52</td>
<td>.94</td>
<td>4.49</td>
<td>1.06</td>
<td>4.56</td>
<td>1.06</td>
</tr>
<tr>
<td>Benefits of sunscreen- Cancer</td>
<td>4.82</td>
<td>.80</td>
<td>4.80</td>
<td>.91</td>
<td>4.82</td>
<td>.87</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>2.98</td>
<td>1.14</td>
<td>2.82</td>
<td>1.14</td>
<td>3.19</td>
<td>1.36</td>
</tr>
<tr>
<td>Barriers to using sunscreen</td>
<td>3.25</td>
<td>1.18</td>
<td>3.27</td>
<td>1.06</td>
<td>3.20</td>
<td>1.17</td>
</tr>
<tr>
<td>Attitudes toward sun protection</td>
<td>5.19</td>
<td>.83</td>
<td>5.09</td>
<td>1.01</td>
<td>5.13</td>
<td>.85</td>
</tr>
<tr>
<td>Anticipated Regret</td>
<td>4.26</td>
<td>1.31</td>
<td>4.05</td>
<td>1.45</td>
<td>4.15</td>
<td>1.23</td>
</tr>
<tr>
<td>Decision Affect Positive- Failing to use sunscreen</td>
<td>2.40</td>
<td>1.11</td>
<td>2.43</td>
<td>1.12</td>
<td>2.58</td>
<td>1.12</td>
</tr>
<tr>
<td>Decision Affect Negative- Failing to use sunscreen</td>
<td>2.62</td>
<td>1.27</td>
<td>2.36</td>
<td>1.19</td>
<td>2.58</td>
<td>1.27</td>
</tr>
<tr>
<td>Intentions to Protect</td>
<td>4.19</td>
<td>1.24</td>
<td>4.04</td>
<td>1.34</td>
<td>4.26</td>
<td>1.24</td>
</tr>
</tbody>
</table>

Note. The maximum possible range for previous week sun exposure is 1 – 13; for all previous week sun protection scales is 1-7; for all other psychological scales, from 1-6
Table 15. *Immediate Posttest Differences by Condition, Controlling for Pretest Means.*

<table>
<thead>
<tr>
<th>Scale</th>
<th>Adjusted Means (standard error)</th>
<th>Immediate Posttest df, F, p</th>
<th>Eta square, Adjusted for pretest</th>
<th>Pairwise comparisons p values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Group F</td>
<td>Group E</td>
<td>Group C</td>
<td>F vs E</td>
</tr>
<tr>
<td>Susceptibility- Photoaging</td>
<td>4.59 (.07)</td>
<td>4.59 (.11)</td>
<td>4.23 (.08)</td>
<td>(2, 348), 6.71 p &lt; .001</td>
</tr>
<tr>
<td>Susceptibility- Skin Cancer</td>
<td>4.76 (.07)</td>
<td>4.74 (.10)</td>
<td>4.35 (.08)</td>
<td>(2, 348), 8.57, p &lt; .001</td>
</tr>
<tr>
<td>Severity- Photoaging</td>
<td>5.43 (.06)</td>
<td>5.16 (.09)</td>
<td>5.01 (.07)</td>
<td>(2, 348), 11.44, p &lt; .001</td>
</tr>
<tr>
<td>Severity- Skin Cancer</td>
<td>5.63 (.05)</td>
<td>5.65 (.07)</td>
<td>5.32 (.05)</td>
<td>(2, 348), 10.39, p &lt; .001</td>
</tr>
<tr>
<td>Attitudes toward SPF/Sun Protection</td>
<td>5.46 (.05)</td>
<td>5.43 (.08)</td>
<td>5.17 (.06)</td>
<td>(2, 346), 7.58, p = .001</td>
</tr>
<tr>
<td>Benefits SPF- Prevent Photoaging</td>
<td>5.28 (.05)</td>
<td>5.33 (.08)</td>
<td>4.63 (.06)</td>
<td>(2, 347), 43.51, p &lt; .001</td>
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<td>Benefits SPF-Prevent Cancer</td>
<td>5.44 (.05)</td>
<td>5.40 (.07)</td>
<td>4.79 (.05)</td>
<td>(2, 347), 43.71, p &lt; .001</td>
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*Note.* Adjusted means and adjusted standard errors are reported. The Bonferroni correction was employed for posthoc pairwise comparisons.
Table 15 *Continued*

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<td>Group C</td>
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<td>Anticipated regret</td>
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<td>4.71(.08)</td>
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<td>(2, 348), 12.34 p &lt; .001</td>
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<td>Self-Efficacy</td>
<td>4.11(.07)</td>
<td>3.82(.10)</td>
<td>2.99(.08)</td>
<td>(2, 347), 58.13 p &lt; .001</td>
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<td>Barriers to using SPF</td>
<td>2.76 (.06)</td>
<td>2.68 (.09)</td>
<td>3.13(.07)</td>
<td>(2, 347), 11.84 p &lt; .001</td>
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<tr>
<td>Decision Affect- Negative</td>
<td>3.08(.09)</td>
<td>2.97(.13)</td>
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<td>Decision Affect- Positive</td>
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<td>1.83(1.0)</td>
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<td>4.86(.08)</td>
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Table 16 *Two-week Follow-up Differences by Condition, Controlling for Pretest Means*

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*Note.* Adjusted means and adjusted standard errors are reported. The Bonferroni correction was employed for posthoc pairwise comparisons.
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Table 17 *Correlations among Model A and B Constructs Including Skin Cancer Related Health Beliefs*

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*Note.* *p < .05, **p < .01, ***p < .001; Pre- and posttest: Condition C, n=131, Condition F, n= 148; Follow-up: Condition C, n = 107, Condition F, n = 101.
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*Note.* *p < .05,* **p < .01,* ***p < .001; Pre- and posttest: Condition C, n=131, Condition F, n= 148; Follow-up: Condition C, n = 107, Condition F, n = 101.
Table 19  Correlations among Model A and B Constructs Including Skin Cancer Related Health Beliefs (Full Only)

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Note. * p < .05, ** p < .01, *** p < .001; Pre- and posttest: Condition F only, n= 148 Follow-up: n = 101.
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**Note.** * p < .05, ** p < .01, *** p < .001; Pre- and posttest: Condition F only, n= 148 Follow-up n = 101.
Table 21 Correlations among Constructs for Exploratory Model E, Health Belief Model Constructs and Emotion: (F) versus (C)

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Note. * p < .05, ** p < .01, *** p < .001; Pre- and posttest: Condition C, n = 131, Condition F, n = 148; Follow-up: Condition C, n = 107, Condition F, n = 101.
### Table 22. Correlations among Constructs for Exploratory Model F, Health Belief Model Constructs and Emotion: (F) versus (C)

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**Note.** * p < .05, ** p < .01, *** p < .001; Pre- and posttest: Condition C, n=131, Condition F, n= 148; Follow-up: Condition C, n = 107, Condition F, n = 101.
Table 23 Correlations among Constructs for Exploratory Model G, Health Belief Model Constructs: (E) versus (C).

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Note. * p < .05, ** p < .01, *** p < .001; Pre- and posttest: Condition C, n=131, Condition E, n= 73; Follow-up: Condition C, n = 107, Condition E, n = 45
Table 24 Correlations Among Constructs for Exploratory Model H, Health Belief Model Constructs: (E) versus (C).

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Note. * p < .05, ** p < .01, *** p < .001; Pre- and posttest: Condition C, n=131, Condition E, n=73; Follow-up: Condition C, n = 107, Condition E, n = 45
a. Classic Health Belief Model (Rosenstock, 1974).

b. Revised Health Belief Model (Rosenstock et al, 1988).

Figure 1. Health belief model and revised health belief model.
Figure 4. Social Cognitive Theory (Bandura, 1986).
Figure 5. Protection Motivation Theory (Rogers, 1983)
Self-Reported Fear During Slide Sets

Figure 6. Self-Reported fear in pilot study to each slide set
Figure 7. Proposed mediational model of effect of intervention on experienced emotion, anticipated emotion, and psychosocial constructs.
Figure 8. CONSORT model of participation and attrition.
Figure 9. Model A: Mediational Model of Effects of Full Intervention Condition vs Control Condition for Sun Protection against Skin Cancer with Fear as Emotional Arousal
Figure 10. Model B. Mediational Model of Effects of Full Intervention Condition vs Control Condition for Sun Protection against Skin Cancer with Disgust as Emotional Arousal.
Figure 11. Model C. Mediational Model of Effects of Full Intervention Condition vs Control Condition for Sun Protection against Photoaging with Fear as Emotional Arousal
Figure 12. Model D. Mediational Model of Effects of Full Intervention Condition vs Control Condition for Sun Protection against Photoaging with Disgust as Emotional Arousal.
Figure 13. Model A with (F) intervention condition only: Mediational Model of Effects of Full Intervention Condition for Sun Protection against Skin Cancer with Fear as Emotional Arousal.
Figure 14. Model B with (F) intervention condition only: Mediation Model of Effects of Full Intervention Condition for Sun Protection against Skin Cancer with Disgust as Emotional Arousal.
Figure 15. Model C with (F) intervention condition only: Mediational Model of Effects of Full Intervention Condition for Sun Protection against Photoaging with Fear as Emotional Arousal.
Figure 16. Model D with (F) intervention condition only: Mediational Model of Effects of Full Intervention Condition for Sun Protection against Photoaging with Disgust as Emotional Arousal
Figure 17. Exploratory Model E. Exploratory Model of Effects of Full Intervention Condition vs Control Condition for Sun Protection against Skin Cancer with Disgust as Emotional Arousal
Figure 18. Exploratory Model E2. Exploratory Model of Effects of Full Intervention Condition vs Control Condition for Sun Protection against Skin Cancer with Disgust as Emotional Arousal with Additional Path From Barriers to Self-Efficacy
**Posttest**

Figure 19. Exploratory Model E2 with Residualized Change Scores: Exploratory Model of Effects of Full Intervention Condition vs Control Condition for Sun Protection against Skin Cancer with Disgust as Emotional Arousal with Additional Path From Barriers to Self-Efficacy.
Figure 20. Exploratory Model E2 with Residualized Change Scores:. Exploratory Model of Effects of Full Intervention Condition vs Control Condition for Sun Protection against Skin Cancer with Disgust as Emotional Arousal with Additional Path From Barriers to Self-Efficacy and Anticipated Regret to Benefits.
Figure 21. Exploratory Model F. Exploratory Model of Effects of Full Intervention Condition vs Control Condition for Sun Protection against Photoaging with Disgust as Emotional Arousal.
Figure 22. Exploratory Model F2. Exploratory Model of Effects of Full Intervention Condition vs Control Condition for Sun Protection against Photoaging with Disgust as Emotional Arousal with Path from Barriers to Self-Efficacy.
Figure 23. Exploratory Model F2 with Residualized Change Scores:. Exploratory Model of Effects of Full Intervention Condition vs Control Condition for Sun Protection against Photoaging with Disgust as Emotional Arousal with Path from Barriers to Self-Efficacy
Figure 24. Exploratory Model F2 with Residualized Change Scores: Exploratory Model of Effects of Full Intervention Condition vs Control Condition for Sun Protection against Photoaging with Disgust as Emotional Arousal with Path from Barriers to Self-Efficacy and Anticipated Regret to Benefits
Figure 25. Exploratory Model G. Exploratory Model of Effects of Efficacy Only (E) Condition vs Control Condition for Sun Protection against Skin Cancer.
Figure 26. Exploratory Model G with Residualized Change Scores. Exploratory Model of Effects of Efficacy Only (E) Condition vs Control Condition for Sun Protection against Skin Cancer with Path from Anticipated Regret to Photoaging
Figure 27. Exploratory Model H. Exploratory Model of Effects of Efficacy Only (E) Condition vs Control Condition for Sun Protection against Photoaging
Figure 28. Exploratory Model H with Residualized Change Scores. Exploratory Model of Effects of Efficacy Only (E) Condition vs Control Condition for Sun Protection against Photoaging with Path from Anticipated Regret to Benefits.
APPENDIX A

IRB APPROVAL PAGE FOR PILOT STUDY
To: Michelle Shibley  
From: Carol Johnston, Chair Biosci IRB  
Date: 09/18/2009  
Committee Action: Amendment to Approved Protocol  
Approval Date: 09/18/2009  
Review Type: Expedited F12  
IRB Protocol #: 0804003898  
Study Title: Physiological Response to Images Depicting the Damaging Effects of the Sun  
Expiration Date: 04/20/2010

The amendment to the above-referenced protocol has been APPROVED following Expedited Review by the Institutional Review Board. This approval does not replace any departmental or other approvals that may be required. It is the Principal Investigator’s responsibility to obtain review and continued approval of ongoing research before the expiration noted above. Please allow sufficient time for reapproval. Research activity of any sort may not continue beyond the expiration date without committee approval. Failure to receive approval for continuation before the expiration date will result in the automatic suspension of the approval of this protocol on the expiration date. Information collected following suspension is unapproved research and cannot be reported or published as research data. If you do not wish continued approval, please notify the Committee of the study termination.

This approval by the Biosci IRB does not replace or supersede any departmental or oversight committee review that may be required by institutional policy.

Adverse Reactions: If any untoward incidents or severe reactions should develop as a result of this study, you are required to notify the Biosci IRB immediately. If necessary a member of the IRB will be assigned to look into the matter. If the problem is serious, approval may be withdrawn pending IRB review.

Amendments: If you wish to change any aspect of this study, such as the procedures, the consent forms, or the investigators, please communicate your requested changes to the Biosci IRB. The new procedure is not to be initiated until the IRB approval has been given.

Please retain a copy of this letter with your approved protocol.
Physiological Response to Pictures Questionnaire

Thank you for participating in this research project on college women and sun exposure. Please answer the following questions to the best of your ability. Please just tell us what best describes you. Please do not answer in a way you might think we want you to answer—answer in a way that shows how you really feel. Thank you.

Please write your initials followed by the numeric month and day of your birth, for example, because my name is Stephanie Moser and I was born on January 12, mine would be sm0112

______________________________

PREVIOUS SUN PROTECTION BEHAVIOR

1. In the past week, how often did you use sunscreen with sun protection factor (SPF) 15 or higher on your face when you were in the sun?
   (1) never
   (2) rarely
   (3) less than half of the time
   (4) about half of the time
   (5) more than half of the time
   (6) almost all of the time
   (7) always

2. In the past week, how often did you use sunscreen with SPF 15 or higher on every exposed part of your body when you were in the sun?
   (1) never
   (2) rarely
   (3) less than half of the time
   (4) about half of the time
   (5) more than half of the time
   (6) almost all of the time
   (7) always

3. In the past week, how often did you wear a hat when you were in the sun?
   (1) never
   (2) rarely
   (3) less than half of the time
   (4) about half of the time
   (5) more than half of the time
   (6) almost all of the time
   (7) always

4. In the past week, how often did you wear protective clothing to cover your body like a long sleeved shirt and long pants or skirt when you were in the sun?
   (1) never
   (2) rarely
5. In the past week, how often did you try to stay in the shade when you were outdoors?
(1) never
(2) rarely
(3) less than half of the time
(4) about half of the time
(5) more than half of the time
(6) almost all of the time
(7) always

CONDITIONAL SUSCEPTIBILITY

For the following items, imagine that you never take any action to protect yourself from the sun (i.e., you never use sunscreen, never wear any protective clothing). Please respond to each statement by circling the appropriate number on the scale provided.

6. If you don't use sun protection, how susceptible do you feel you are to skin cancer?
   not at all 1 2 3 4 5 6 very highly susceptible

7. If you don't use sun protection, how susceptible do you feel you are to getting age spots?
   not at all 1 2 3 4 5 6 very highly susceptible

8. If you don't use sun protection, how susceptible do you feel your skin is to getting wrinkles?
   not at all 1 2 3 4 5 6 very highly susceptible

9. If you don't use sun protection, how susceptible do you feel your skin is to sun damage?
   not at all 1 2 3 4 5 6 very highly susceptible

SKIN CANCER & PHOTOAGING WORRY

Please indicate whether you disagree or agree with each statement by circling the appropriate number on the scale provided.

10. The possibility of skin cancer strongly disagree 1 2 3 4 5 6 strongly agree

11. Whenever I hear of a friend or relative (or public figure) getting skin cancer, it make me realize that I could get it too. strongly disagree 1 2 3 4 5 6 strongly agree

12. I don't need to worry about getting skin
199

cancer until I am much older.  strongly disagree  1  2  3  4  5  6  strongly agree

13. I am too young to spend much time thinking that I might get wrinkles and age spots. strongly disagree  1  2  3  4  5  6  strongly agree

14. Whenever I see somebody who has a lot of wrinkles or age spots, it makes me realize that I could get them too. strongly disagree  1  2  3  4  5  6  strongly agree

15. The possibility of getting wrinkles or age spots worries me. strongly disagree  1  2  3  4  5  6  strongly agree

SEVERITY OF SKIN CANCER AND PHOTAGING

16. It would be terrible to get a malignant tumor on my skin. strongly disagree  1  2  3  4  5  6  strongly agree

17. Getting skin cancer would severely affect my life. strongly disagree  1  2  3  4  5  6  strongly agree

18. It would be terrible to have skin cancer. strongly disagree  1  2  3  4  5  6  strongly agree

19. It would be terrible to look older than I really am due to too much sun-exposure. strongly disagree  1  2  3  4  5  6  strongly agree

20. It would be terrible to have age spots from the sun on my face. strongly disagree  1  2  3  4  5  6  strongly agree

21. It would be terrible to have wrinkles from the sun on my face. strongly disagree  1  2  3  4  5  6  strongly agree

22. Getting wrinkles and age spots due to premature aging from the sun would severely affect my personal life. strongly disagree  1  2  3  4  5  6  strongly agree
APPENDIX C

IMAGES OF SKIN CANCER, MOH'S SURGERY, SUN BURNS, and

PHOTOAGING
Neutral
SUNBURN
PHOTOAGING-YOUNG
SKIN CANCER
MOH'S SURGERY
APPENDIX D

POSTTEST QUESTIONNAIRE FOR PILOT STUDY
POST-TEST QUESTIONNAIRE FOR PILOT STUDY

Thank you for participating in this research project on women’s health issues. Please answer the following questions to the best of your ability. Please just tell us what best describes you. Please do not answer in a way you might think we want you to answer—answer in a way that shows how you really feel. Thank you.

Please write your initials followed by the numeric month and day of your birth, for example, because my name is Stephanie Moser and I was born on January 12, mine would be sm0112

______________________________

ANTICIPATED REGRET

For the following item, please indicate whether you disagree or agree with each statement by circling the appropriate number on the scale provided. For this question, please imagine you have been exposed to the sun and have not used any sun protection. Imaging how you would feel if you failed to protect your skin from the sun.

If I don’t protect my skin from the sun:

1. I would regret it. strongly disagree 1 2 3 4 5 6 strongly agree

CONDITIONAL SUSCEPTIBILITY TO SKIN CANCER & PHOTOAGING

For the following items, imagine that you never take any action to protect yourself from the sun (i.e., you never use sunscreen, never wear any protective clothing). Please respond to each statement by circling the appropriate number on the scale provided.

2. If you don’t use sun protection, how susceptible do you feel you are to skin cancer? not at all susceptible 1 2 3 4 5 6 very highly susceptible

3. If you don’t use sun protection, how susceptible do you feel you are to getting age spots? not at all susceptible 1 2 3 4 5 6 very highly susceptible

4. If you don’t use sun protection, how susceptible do you feel your skin is to getting wrinkles? not at all susceptible 1 2 3 4 5 6 very highly susceptible

5. If you don’t use sun protection, how susceptible do you feel your skin is to sun damage? not at all susceptible 1 2 3 4 5 6 very highly susceptible

SKIN CANCER WORRY AND PHOTOAGING WORRY

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Please indicate whether you disagree or agree with each statement by circling the appropriate number on the scale provided.

6. The possibility of skin cancer worries me.
   strongly disagree 1 2 3 4 5 6 strongly agree
   1 2 3 4 5 6 strongly agree

7. Whenever I hear of a friend or relative (or public figure) getting skin cancer, it makes me realize that I could get it too.
   strongly disagree 1 2 3 4 5 6 strongly agree

8. I don't need to worry about getting skin cancer until I am much older.
   strongly disagree 1 2 3 4 5 6 strongly agree

9. I am too young to spend much time thinking that I might get wrinkles and age spots.
   strongly disagree 1 2 3 4 5 6 strongly agree

10. Whenever I see somebody who has a lot of wrinkles or age spots, it makes me realize that I could get them too.
    strongly disagree 1 2 3 4 5 6 strongly agree

11. The possibility of getting wrinkles or age spots worries me.
    strongly disagree 1 2 3 4 5 6 strongly agree

SKIN CANCER AND PHOTAING SEVERITY

12. It would be terrible to get a malignant tumor on my skin.
    strongly disagree 1 2 3 4 5 6 strongly agree

13. Getting skin cancer would severely affect my life.
    strongly disagree 1 2 3 4 5 6 strongly agree

14. It would be terrible to have skin cancer.
    strongly disagree 1 2 3 4 5 6 strongly agree

15. It would be terrible to look older than I really am due to too much sun-exposure.
    strongly disagree 1 2 3 4 5 6 strongly agree

16. It would be terrible to have age spots from the sun on my face.
    strongly disagree 1 2 3 4 5 6 strongly agree

17. It would be terrible to have wrinkles from
the sun on my face. strongly disagree 1 2 3 4 5 6 strongly agree

18. Getting wrinkles and age spots due to premature aging from the sun would severely affect strongly disagree 1 2 3 4 5 6 strongly agree my personal life.

INTENTIONS TO SUN PROTECT

Below are some questions about your future behavior. Please respond to each statement by circling the appropriate number on the scale provided.

19. I plan to use sunscreen on a regular strongly disagree 1 2 3 4 5 6 strongly agree basis.

20. I plan to always use a sunscreen with an SPF of at least 15 on my face. strongly disagree 1 2 3 4 5 6 strongly agree

21. I plan to always use a sunscreen with an SPF of at least 15 on my body. strongly disagree 1 2 3 4 5 6 strongly agree

22. I plan to use sunscreen on all exposed areas of my body when I am at the beach or the pool. strongly disagree 1 2 3 4 5 6 strongly agree

23. I probably won’t use sunscreen on my face. strongly disagree 1 2 3 4 5 6 strongly agree

24. I plan to always use sunscreen on my face when I am at the beach or the pool. strongly disagree 1 2 3 4 5 6 strongly agree
APPENDIX E

SELF REPORTED EMOTION RATING FORM
EMOTION RATING FORM

Participant Code___________ Slide Set #___________

1) Please indicate how positive or negative you felt while watching the slides.

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2) How strong were the emotions you felt while watching the slides?

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3) Please indicate how strongly you felt each emotion while watching the slides.

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APPENDIX F

FOLLOW-UP INTERVIEW FOR PILOT STUDY
Follow-Up Interview for Pilot Study

SUN PROTECTION BEHAVIOR

1. In the past week, how often did you use sunscreen with sun protection factor (SPF) 15 or higher on your face when you were in the sun?
   (1) never
   (2) rarely
   (3) less than half of the time
   (4) about half of the time
   (5) more than half of the time
   (6) almost all of the time
   (7) always

2. In the past week, how often did you use sunscreen with SPF 15 or higher on every exposed part of your body when you were in the sun?
   (1) never
   (2) rarely
   (3) less than half of the time
   (4) about half of the time
   (5) more than half of the time
   (6) almost all of the time
   (7) always

3. In the past week, how often did you wear a hat when you were in the sun?
   (1) never
   (2) rarely
   (3) less than half of the time
   (4) about half of the time
   (5) more than half of the time
   (6) almost all of the time
   (7) always

4. In the past week, how often did you wear protective clothing to cover your body like a long sleeved shirt and long pants or skirt when you were in the sun?
   (1) never
   (2) rarely
   (3) less than half of the time
   (4) about half of the time
   (5) more than half of the time
   (6) almost all of the time
   (7) always

5. In the past week, how often did you try to stay in the shade when you were outdoors?
   (1) never
   (2) rarely
   (3) less than half of the time
   (4) about half of the time
   (5) more than half of the time
   (6) almost all of the time
   (7) always

INTENTIONS TO SUN PROTECT
Below are some questions about your future behavior. Please respond to each statement by circling the appropriate number on the scale provided.

6. I plan to use sunscreen on a regular basis.  strongly disagree 1 2 3 4 5 6 strongly agree

7. I plan to always use a sunscreen with an SPF of at least 15 on my face.  strongly disagree 1 2 3 4 5 6 strongly agree

8. I plan to always use a sunscreen with an SPF of at least 15 on my body.  strongly disagree 1 2 3 4 5 6 strongly agree

9. I plan to use sunscreen on all exposed areas of my body when I am at the beach or the pool.  strongly disagree 1 2 3 4 5 6 strongly agree

10. I probably won't use sunscreen on my face.  strongly disagree 1 2 3 4 5 6 strongly agree

11. I plan to always use sunscreen on my face when I am at the beach or the pool.  strongly disagree 1 2 3 4 5 6 strongly agree
APPENDIX G

IRB APPROVAL PAGE FOR INTERVENTION STUDY
To: Leona Allen  
PSY

From: Mark Roosa, Chair  
Soc Beh IRB

Date: 03/26/2010

Committee Action: Amendment to Approved Protocol

Approval Date: 03/26/2010

Review Type: Expedited F12

IRB Protocol #: 100004714

Study Title: Intervention to Increase Sun Protection in Young Women Through Use of Emotionally Arousing Images

Expiration Date: 01/28/2011

The amendment to the above-referenced protocol has been APPROVED following Expedited Review by the Institutional Review Board. This approval does not replace any departmental or other approvals that may be required. It is the Principal Investigator's responsibility to obtain review and continued approval of ongoing research before the expiration noted above. Please allow sufficient time for reapproval. Research activity of any sort may not continue beyond the expiration date without committee approval. Failure to receive approval for continuation before the expiration date will result in the automatic suspension of the approval of this protocol on the expiration date. Information collected following suspension is unsupervised research and cannot be reported or published as research data. If you do not wish continued approval, please notify the Committee of the study termination.

This approval by the Soc Beh IRB does not replace or supersede any departmental or oversight committee review that may be required by institutional policy.

Adverse Reactions: If any untoward incidents or severe reactions should develop as a result of this study, you are required to notify the Soc Beh IRB immediately. If necessary, the member of the IRB will be assigned to look into the matter. If the problem is serious, approval may be withdrawn pending IRB review.

Amendments: If you wish to change any aspect of this study, such as the procedures, the consent forms, or the investigators, please communicate your requested changes to the Soc Beh IRB. The new procedure is not to be initiated until the IRB approval has been given.

Please retain a copy of this letter with your approved protocol.
# FULL INTERVENTION CONDITION SCRIPT

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
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</tr>
<tr>
<td>Introduction (continued)</td>
<td>We’re here today to talk about the potential damaging effects of the sun. During this presentation you will be looking at some images of sun damaged skin and skin cancers. You will also view some images of the removal of skin cancer, called Moh’s surgery. You will also see some images of photoaging of skin.</td>
</tr>
<tr>
<td>Description of Photoaging</td>
<td>Photoaging is defined as the aging of the skin due to sun exposure. Up to 90% of skin aging, such as wrinkles and brown spots, is a result of sun exposure. Damage to the skin may appear underneath the surface of the skin long before it shows up as wrinkles and brown spots. By using a special camera with an infrared lens, we can see the underlying layers of skin. Sun damage appears in these pictures as brown spots and splotches.</td>
</tr>
<tr>
<td>Description of Image Presentation</td>
<td>During this part of the presentation, you will watch several sets of slides on the screen in front of you. There will be 4 slide sets. These sets of slides will show some of the damaging effects of sun exposure. It is important that you watch the slides carefully. Some of the slide sets may be graphic and disturbing. If at any time you find a slide set too distressing, you may cover your eyes or leave the room, whichever you feel most comfortable doing. If you choose to leave the room, the research</td>
</tr>
</tbody>
</table>
assistant will come get you when this part of the presentation is over.

We are interested in how these slides make you feel. After each set of slides, we ask that you please complete this brief questionnaire about the different emotions you may have felt while watching the slides.

During this part of the presentation, we ask that you remain quite and not speak to your neighbors. Does anyone have any questions? Ok we will begin.

**Emotion**

Presentation of slides, Photoaging in Young Women, Photoaging in Older Women, Skin Cancer, Moh’s Surgery. 6 images will be presented for 15 seconds in each set. After each set, participants will complete the emotion/arousal rating form.

(Allow 10 minutes for presentation of slides and emotion rating form)

**Response Efficacy**

Now, we’re going to talk about ways to prevent sun damage and skin cancer. **The main point I’d like to convey is that it’s not too late to protect your skin from the sun.** There are some recommendations that experts make with regard to how to protect yourself from the sun. Basically, experts recommend that the best way to prevent over-exposure to the sun is to avoid the sun entirely. This means always walking in the shade, limiting outdoor activities to those in the early morning or late evening, and not scheduling classes or activities between 10am and 2pm. Experts say that if you can’t avoid the sun entirely, the next best thing is to wear protective clothing every time you are out in the sun. By protective clothing we mean always wearing a long-sleeve shirt, long pants or skirt, and a wide brimmed hat when outdoors. The third recommendation is to wear a sunscreen with a sun protection factor (or “SPF”) of 15 or higher whenever we’re outdoors.

**Response Efficacy-Sun Screen**

The use of a sunscreen with SPF 15 or higher can prevent sunburns, and if used regularly, sunscreen can greatly reduce your chances of getting skin cancer. At your age it is not too late to begin wearing sun screen! So if you start wearing sunscreen today, you can prevent a lot of damage to your skin in the future. And even if
you’ve done some damage to your skin, the effects of sun exposure are reversible. Using sun screen is an excellent way to protect ourselves from the sun’s harmful rays.

| Information - SPF | You’ve probably noticed that sunscreen comes in a variety of brands and types. Sunscreen is characterized by its SPF, or sun protection factor. SPF tells you how much longer you can stay in the sun with sunscreen than without sunscreen. The National Cancer Institute recommends that you choose sunscreen that has an SPF of at least 15. A sunscreen with an SPF of 15 means that you can stay in the sun 15 times longer than you usually could without burning. So, if your skin usually burns after 20 minutes in the sun, SPF 15 will allow you to stay in the sun for 300 minutes, or for 5 hours, before your skin burns.

The SPF is related to the percentage of sun’s rays that are absorbed by sunscreen. However, protection from the sun does not increase proportionally with the designated SPF number. A sunscreen with SPF 2 absorbs 50% of the sun’s rays. A sunscreen with SPF 15 absorbs 93% of the sun’s rays. So you can see that the difference between an SPF 15 and an SPF 30 is not much—only 4% more absorption, but the difference between an SPF 2 product and an SPF 15 product is a great deal, 43%.

| Response- Efficacy Information- UVA & UVB rays | You’ve probably heard the terms UVA and UVB. These refer to different types of rays in the sun. Both can damage the skin and cause skin cancer. All sunscreens block UVB rays. In fact, SPF is related to the proportion of UVB rays that are blocked by the sunscreen. But only some block UVA rays. You should use a sunscreen that blocks out both; these are called “broad-spectrum” sunscreens. By the way, tanning salons claim that they are safe because they have only UVA rays but they are not safe. UVA rays cause skin cancer and photoaging.

| Self-Efficacy- Using Sunscreen Appropriately | Now, let’s talk about using sunscreen. It is very important to know that sunscreens should be applied a good 20-30 minutes before you go in the sun. They should be applied liberally to the skin – slather the parts that will be exposed to the sun. In addition, if you are
| **Self-Efficacy-Making Sunscreen a Habit** | People often say that sunscreen is a nuisance or that it is hard to remember to apply. We spoke with some people who use sunscreen daily and asked how they do it. Their answer was simple: make sunscreen use a daily habit, just like brushing your teeth. **You can do this- it’s easy!** I myself have made sunscreen use a daily habit. I keep my sunscreen bottle next to the sink and apply it right after I wash my face each morning. Even if I don’t anticipate being in the sun, I still apply sunscreen, just to stay in the habit and be protected in case I do end up outside.

Just like regular moisturizer, sunscreen comes in a separate formula for faces only. If you usually wear a facial moisturizer, you should try to find a good facial moisturizer that you like that has an SPF of 15 too – many common moisturizers now come with an SPF 15 version that doesn’t cost any more than the original version. And if you wear makeup, many brands now come with SPF versions of foundation.

It’s easy to keep a small bottle of sunscreen in your purse or book bag for the times when you are outdoors for long periods of time- you can get the little one-ounce bottles in any local drug store for about a dollar. |
| **Self-Efficacy – Making sunscreen use a daily habit, visualization technique** | We want to demonstrate how easy it is to make sunscreen use a daily habit. One way to do this is to visualize, or create a mental picture in your head, of getting sunscreen and using it on a daily basis.

**Visualization Script Attached**

(Pass out Visualization worksheet-Attached) First, please write down where you usually shop for toiletries like toothpaste and Kleenex. This is where you will purchase your sunscreen. Make a note to yourself to pick up a bottle of sunscreen the next time you are there. Next, please write down where you keep things like moisturizer, toothpaste, etc. This could be a bathroom counter, a shelf in the medicine cabinet, whatever. This is where you will keep your sunscreen, so that you will remember to use it every time you get ready in the mornings. Now, please think of a bag that you carry |
regularly like a backpack or purse that you keep stuff like tampons or aspirin in. This is where you will keep a travel size bottle of sunscreen, so that if you get caught outside in the glaring sun, you can apply it and feel secure that your skin is not being damaged by the sun.

<table>
<thead>
<tr>
<th>Post-Test Questionnaire</th>
<th>Before you go, we would like to thank you for participating in our program. As the last part of the program, we’d like you to complete one more questionnaire. This questionnaire contains some questions we asked before, but we’d like to have your impressions after seeing the program. (Allow 5 minutes for completion of questionnaire)</th>
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<td>Conclusion and Completion of Contact Sheet</td>
<td>Also, in 2 weeks, we’d like to email you to answer a few more questions about your behavior and experiences. Please complete this contact sheet with your information so that we may contact you in 2 weeks. To maintain confidentiality, you need to turn in this last page separately from your questionnaire. If you have any questions, please feel free to ask. Thank you so much for your help and participation. You’ve been great. Also, we will be conducting more women’s health programs in the future, so we ask that you not discuss the contents of this program with anybody who might participate in the next few weeks.</td>
</tr>
</tbody>
</table>
EMOTION RATING FORM-INTERVENTION

Participant Code___________ Slide Set #___________

1) Please indicate how positive or negative you felt while watching the slides.
   0       1       2       3       4       5       6       7       8
   Very Negative               Neutral               Very Positive

2) How strong were the emotions you felt while watching the slides?
   0       1       2       3       4       5       6       7       8
   No Emotion                Strongest ever felt

3) Please indicate how strongly you felt each emotion while watching the slides.

   a) Amusement/humor
      No Emotion
      0       1       2       3       4       5       6       7       8
      Strongest ever felt

   b) Anger
      No Emotion
      0       1       2       3       4       5       6       7       8
      Strongest ever felt

   c) Contentment
      No Emotion
      0       1       2       3       4       5       6       7       8
      Strongest ever felt

   d) Disgust
      No Emotion
      0       1       2       3       4       5       6       7       8
      Strongest ever felt

   e) Enthusiasm
      No Emotion
      0       1       2       3       4       5       6       7       8
      Strongest ever felt

   f) Fear
      No Emotion
      0       1       2       3       4       5       6       7       8
      Strongest ever felt

   g) Sadness
      No Emotion
      0       1       2       3       4       5       6       7       8
      Strongest ever felt

   h) Compassion
      No Emotion
      0       1       2       3       4       5       6       7       8
      Strongest ever felt

   i) Sympathy
      No Emotion
      0       1       2       3       4       5       6       7       8
      Strongest ever felt
APPENDIX I

EFFICACY ONLY CONDITION SCRIPT AND PROCEDURE
### COMPONENT

#### Introduction
Hello, I’m Stephanie Moser and I’m a graduate student in Dr. Leona Aiken’s lab. We’re conducting a series of presentations on different issues that are relevant to women’s health. As part of my work, I gather information from women about these health issues. I use the information to design new presentations.

#### Pre-Test Questionnaire
Before we begin the program, I would like you to fill out a survey as completely as possible. Your answers are strictly confidential, and you don’t have to answer any question you do not wish to answer. When you are finished, please turn the questionnaire over. We’re doing a number of different programs, so some of the questions you see on this questionnaire may not relate to the presentation I will be doing.

(Allow approximately 15 minutes to complete the questionnaire).

#### Introduction (continued)
We’re here today to talk about ways to protect yourself from the potentially damaging effects of the sun. You may know that skin cancer is caused from over-exposure to the sun. You may not know that photoaging is also caused by over-exposure to the sun’s rays. Photoaging is defined as the aging of the skin due to sun exposure. Up to 90% of skin aging, such as wrinkles and brown spots, is a result of sun exposure. Damage to the skin may appear underneath the surface of the skin long before it shows up as wrinkles and brown spots.

#### Response Efficacy-Benefits
Now, we’re going to talk about ways to prevent sun damage and skin cancer. The main point I’d like to convey is that it’s not too late to protect your skin from the sun. There are some recommendations that experts make with regard to how to protect yourself from the sun. Basically, experts recommend that the best way to prevent over-exposure to the sun is to avoid the sun entirely. This means always walking in the shade, limiting outdoor activities to those in the early morning or late evening, and not scheduling classes or activities between 10am and 2pm. Experts say that if you can’t avoid the sun entirely, the next best thing is to wear
protective clothing every time you are out in the sun. By protective clothing we mean always wearing a long-sleeve shirt, long pants or skirt, and a wide brimmed hat when outdoors. The third recommendation is to wear a sunscreen with a sun protection factor (or “SPF”) of 15 or higher whenever we’re outdoors.

**Response Efficacy**

**BENEFITS- Sun Screen**

The use of a sunscreen with SPF 15 or higher can prevent sunburns, and if used regularly, sunscreen can greatly reduce your chances of getting skin cancer. At your age it is not too late to begin wearing sun screen! So if you start wearing sunscreen today, you can prevent a lot of damage to your skin in the future. And even if you’ve done some damage to your skin, the effects of sun exposure are reversible. Using sun screen is an excellent way to protect ourselves from the sun’s harmful rays.

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**Response Efficacy**

**BENEFITS**

**Information- UVA & UVB rays**

You’ve probably heard the terms UVA and UVB. These refer to different types of rays in the sun. Both can damage the skin and cause skin cancer. **All sunscreens block UVB rays. In fact, SPF is related to the**
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| Self-Efficacy- Using Sunscreen Appropriately | Now, let’s talk about using sunscreen. It is very important to know that sunscreens should be applied a good 20-30 minutes before you go in the sun. They should be applied liberally to the skin – slather the parts that will be exposed to the sun. In addition, if you are swimming or sweating a lot, you should reapply sunscreen at least every two hours and should look for a sunscreen that says it is waterproof. |
| Self-Efficacy-Making Sunscreen a Habit | People often say that sunscreen is a nuisance or that it is hard to remember to apply. We spoke with some people who use sunscreen daily and asked how they do it. Their answer was simple: make sunscreen use a daily habit, just like brushing your teeth. You can do this- it’s easy! I myself have made sunscreen use a daily habit. I keep my sunscreen bottle next to the sink and apply it right after I wash my face each morning. Even if I don’t anticipate being in the sun, I still apply sunscreen, just to stay in the habit and be protected in case I do end up outside. Just like regular moisturizer, sunscreen comes in a separate formula for faces only. If you usually wear a facial moisturizer, you should try to find a good facial moisturizer that you like that has an SPF of 15 too – many common moisturizers now come with an SPF 15 version that doesn’t cost any more than the original version. And if you wear makeup, many brands now come with SPF versions of foundation. It’s easy to keep a small bottle of sunscreen in your purse or book bag for the times when you are outdoors for long periods of time- you can get the little one-ounce bottles in any local drug store for about a dollar. |
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Visualization technique | getting sunscreen and using it on a daily basis.
Visualization Script | Attached
Visualization Worksheet | (Pass out Visualization worksheet-Attached) First, please write down where you usually shop for toiletries like toothpaste and Kleenex. This is where you will purchase your sunscreen. Make a note to yourself to pick up a bottle of sunscreen the next time you are there. Next, please write down where you keep things like moisturizer, toothpaste, etc. This could be a bathroom counter, a shelf in the medicine cabinet, whatever. This is where you will keep your sunscreen, so that you will remember to use it every time you get ready in the mornings. Now, please think of a bag that you carry regularly like a backpack or purse that you keep stuff like tampons or aspirin in. This is where you will keep a travel size bottle of sunscreen, so that if you get caught outside in the glaring sun, you can apply it and feel secure that your skin is not being damaged by the sun.
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APPENDIX J

CONTROL CONDITION SCRIPT AND PROCEDURE
# CONTROL CONDITION SCRIPT

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</tr>
<tr>
<td>Introduction (continued)</td>
<td>We’re here today to talk about stress and relaxation. We will talk about what stress is and will identify some healthy techniques for managing stress. You'll identify some of your own stressors and stress symptoms, and hopefully identify some new ways to prevent stress overload, and to manage stress. College can be very stressful, especially if this is your first year. So it's very useful to learn how to deal with stress so that you can perform better in school and be a happier person.</td>
</tr>
<tr>
<td>Emotion</td>
<td>First, I’d like you to close your eyes for a moment while I walk you through a visualization exercise. I’d like you to imagine you are walking into your most difficult class of the semester. Today, you will be taking your final exam for the class. You know that in order to get a good grade in the course, you have to score above 93% on the exam, which is comprised of two essay questions. Because of your work schedule, you had to stay up until 3:00am cramming for the test, and were only able to cover half of the questions on the study guide. Since you stayed up so late, you’ve overslept and had to run across campus to get to the classroom. As you walk in 5 minutes late, your heart starts racing and your palms start sweating. The</td>
</tr>
</tbody>
</table>
professor glares at you as he hands you your exam. You take your seat and look at the two questions on the exam. You feel panic set in as you realize you have no idea how to answer either of the questions.

<table>
<thead>
<tr>
<th>Emotion Rating Form</th>
<th>Now, please open your eyes and complete the questionnaire in front of you, which asks how you felt while imaging this scenario. (Allow 3 minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defining Stress</td>
<td>Stress can be defined as any change in the environment or as one's reaction to that change. The things that cause us stress are usually referred to as our stressors. A stressor is a specific stress, as in &quot;my biggest stressor is rush hour traffic.&quot; Most people agree that a stressor for one person may not be a stressor for another person. That's why at this point, I'd like you to take a couple of minutes to think about the stressors in your life. I'm going to pass around a pink worksheet and I want you to be as specific as possible in thinking about the top stressors in your life. Next, I'm going to talk about what happens to our bodies when we experience stress. The stress response is the physiological response that your body has when it encounters stress. You don't need to answer out loud, but think about what happens in your body when something startles you. For example, think about what happens to your body if a friend comes up behind you and scares you, or if you narrowly avoid an accident on the freeway. Does your heart race? Do your muscles tense up? Does your throat tighten up? Does your blood pressure increase? Do you perspire? These physical symptoms are your stress response. It is important to recognize the signs and symptoms that you experience when you are under stress, such as tense muscles, insomnia, illness, distracted thinking, or foot tapping, to name a few. Next I'm going to pass around this blue colored worksheet so that you can identify some of the symptoms you experience. On the first page in each of the bubbles, some common symptoms of stress are listed. Please take a pen or a pencil to complete questions number 1-2 on this handout. &lt;Give time to complete sheet&gt;</td>
</tr>
</tbody>
</table>
As you can see, stress may affect all aspects of our wellness. It can affect us emotionally, mentally, and physically. The reason I wanted you to think about some of your stressors and to think about the symptoms you experience when you’re under stress is that sometimes it's difficult to recognize these symptoms as being associated with stress. Our bodies and minds have a wonderful capacity to adapt to the things that stress us over a period of time until the signs and symptoms may even seem normal to us. It's important to remember that signs and symptoms are the body's way of telling us to be attentive to the effects of stress on our minds and bodies. Stress that is continuous or that builds up over time can have serious consequences for your health and your overall quality of life.

<table>
<thead>
<tr>
<th>Reducing Stress-Biofeedback</th>
</tr>
</thead>
</table>
| Another way to determine your stress level so you can better manage your stress is to practice biofeedback. This is paying attention to the physical symptoms of your body. When you are under stress, blood flow to the vital organs increases, while blood flow to the hands and feet decreases. A simple technique to measure blood flow to the hands is called a biodot. Biodots measure the change in temperature when the blood flow is redirected from the hands during stress to the vital organs. <Hand out biodots and chart> Please take a biodot and place it on the hand you use the least. It is placed between the thumb and forefinger like this <demonstrate biodots>. The chart will provide you a temperature guide based on color changes. What colors do you have? In theory, the warmer your hands are, the less stress you are experiencing because your hands are maintaining good blood flow which will keep them warmer. The warmer colors are in the top range of the chart with turquoise, blue, and violet. The cooler colors are black, amber, and yellow. Green is a middle range color and you can see by the handout that green has been assigned the status of normal. This is not a highly scientific way to measure stress, however it does assist some individuals in recognizing a change. For example, if I were taking an exam, my biodot would probably be black. On the other hand, if I were watching TV my biodot would be blue. I am able to recognize that watching TV is a pleasurable activity that is stress-
| Introduction on ways to reduce stress | We all experience stress in life. Believe it or not, stress can actually be good for you. It can actually improve our performance. For example, being stressed about school can motivate you to study and achieve the grades you want; being strapped for money can motivate you to work harder; experiencing stress in a relationship can motivate you to develop better communication skills. But, many times, stress causes us to be overwhelmed. If we get too "used" to being under a lot of stress our "threshold" for stress inches up and up until we think that feeling overwhelmed or exhausted is normal. If you can't stop the stress response, it's important to learn techniques to deal with the stress once it has occurred. There are some harmful things people can do to reduce stress, such as drink too much alcohol, smoke, and drug use. However, while these can make people feel better in the short-term, they generally make people feel worse in the long-term.

There are many healthier ways to reduce stress. Some ways that people can learn to relax using breathing exercises, meditation, yoga, visualization, time management, and physical activity. Much like different things act as stressors for different people, different techniques work better to reduce stress for different people.

Some techniques to reduce the anxiety that occurs with stress will be ones that you can incorporate in your own lives. For example, the Student Recreation Complex on campus offers various yoga, meditation, and exercise classes. Another thing you can do in your everyday life is to get enough sleep at night. These are some of the longer term changes you can make in your life to manage stress. |
| Ways to reduce stress- breathing technique | Today I'm going to talk about a couple of short-term techniques for relaxation you can use when you have a couple of free minutes, for example, when sitting in class. One technique that has been found to benefit many individuals is abdominal breathing. Let me demonstrate what this is. Place one hand on your chest... |
and one hand on your abdomen and breathe normally. Which hand moves the most? How many of you noticed that the hand on your chest moved the most? How many of you noticed that the hand on your abdomen moved the most? When you emphasize abdominal breathing you should see your abdomen move out when you inhale and move back in when you exhale. <demonstrate this> Obviously, either kind of breathing is adequate to keep you alive, but the kind of breathing that enhances relaxation is abdominal breathing. People typically aren't aware of how they breathe and it's not something they think about. But, if you're able to incorporate abdominal breathing into your day, you might see a reduction in your total level of anxiety.

| Ways to reduce stress-visualization | Another technique that has been found to be helpful is the use of imagery or visualization. In other words, daydreaming. When you create a mental picture, your body can actually respond as if it were a real experience. Let's try a simple exercise to see how this works. I would like to get comfortable and close your eyes and I will be asking you to imagine different things for the next few minutes.

Imagine that you are walking across campus, and it is very hot outside. You decide to get a cool glass of water with a lemon slice in it. See yourself leaving campus and go into your dorm or house. See yourself walking through the front door. Walk to your refrigerator and take out a cold pitcher of water and pour yourself a glass of water. Take out a lemon and a knife. Pick up the lemon and look at the yellow color. As you turn the lemon over you will notice a green stamp on it. Feel the rough, waxy texture of the lemon. Now, cut the lemon into wedges. Pick up one wedge and smell the lemony smell. Squeeze the wedge between your fingers into the glass of water and notice how it sprays. Now, take the lemon wedge and place it in your mouth and take a big bite. You can open your eyes now. How many of you were able to: 1. see yourself walking through the front door? 2. see yourself pouring the glass of water? 3. taste the lemon? Some of you may have been able to experience the same physiological response to your thoughts about the lemon as you would have if you had actually bitten a lemon. |
wedge. Our bodies respond to our thoughts in varying degrees. This simple exercise was an example of imagination in its simplest form. If you can make your body respond to the image of a lemon wedge, it should also be possible for you to make your body respond to the image of a relaxing activity. This is something you can try on your own. The next time you are experiencing stress, take a minute and imagine yourself doing something relaxing like lying on a raft in the pool, reading a book, walking through the woods, whatever is a relaxing activity for you.

<table>
<thead>
<tr>
<th>Ways to reduce stress- putting them into practice</th>
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<tbody>
<tr>
<td>Let's take a minute to put this all together. I want you to get comfortable (as comfortable as you can in these desk chairs). Keep your biodot on your finger, paying attention to what color it is right now. Then, I want you to spend the next couple of minutes with your eyes closed, practicing your abdominal breathing and trying to use visualization. Try to breathe deeply through your abdomen and visualize yourself in a place or doing something you find relaxing. When the time is up, I'll let everyone know and you can see if your biodot changed color at all from this simple exercise.</td>
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<tr>
<th>Conclusion</th>
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<tr>
<td>If you can learn to manage our stress through the three key concepts, identifying our stressors, recognizing personal signs and symptoms, and then identifying healthy techniques that we are comfortable with to manage the stress then you can start taking responsibility for our health and wellness. Your stressor sheet, the symptom sheet, and the biodots are yours to take home with you. There is information on the back of your symptom sheet on other, more specific ways to reduce stress for you to take home with you.</td>
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<tr>
<th>Post-test questionnaire</th>
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<tr>
<td>Thank you very much for your help and participation today. For the last part of our program, we'd like you to complete one more questionnaire. This questionnaire contains a portion of the questions we asked before. Keep in mind that we're doing a number of programs on women's health, so the questions you get may not have been that relevant to today's presentation.</td>
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<th>Completion of</th>
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<tr>
<td>Also, in 2 weeks, we'd like to email you to answer a few</td>
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</table>
contact sheet  more questions about your behavior and experiences. Please complete this contact sheet with your information so that we may contact you in 2 weeks. To maintain confidentiality, you need to turn in this last page separately from your questionnaire. If you have any questions, please feel free to ask. Thank you so much for your help and participation. You’ve been great. Also, we will be conducting more women’s health programs in the future, so we ask that you not discuss the contents of this program with anybody who might participate in the next few weeks.
EMOTION RATING FORM-CONTROL

Participant Code___________ Slide Set #___________

1) Please indicate how positive or negative you felt while during the visualization exercise.

<table>
<thead>
<tr>
<th>Rating</th>
<th>Very Negative</th>
<th>Neutral</th>
<th>Very Positive</th>
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<tbody>
<tr>
<td>0</td>
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</table>

2) How strong were the emotions you felt during the visualization exercise?

<table>
<thead>
<tr>
<th>Rating</th>
<th>No Emotion</th>
<th>Strongest ever felt</th>
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</table>

3) Please indicate how strongly you felt each emotion during the visualization exercise

<table>
<thead>
<tr>
<th>Emotion</th>
<th>Rating</th>
<th>No Emotion</th>
<th>Strongest ever felt</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Amusement/humor</td>
<td>0 1 2 3 4 5 6 7 8</td>
<td>No Emotion</td>
<td>Strongest ever felt</td>
</tr>
<tr>
<td>b) Anger</td>
<td>0 1 2 3 4 5 6 7 8</td>
<td>No Emotion</td>
<td>Strongest ever felt</td>
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<tr>
<td>c) Contentment</td>
<td>0 1 2 3 4 5 6 7 8</td>
<td>No Emotion</td>
<td>Strongest ever felt</td>
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<tr>
<td>d) Disgust</td>
<td>0 1 2 3 4 5 6 7 8</td>
<td>No Emotion</td>
<td>Strongest ever felt</td>
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<tr>
<td>e) Enthusiasm</td>
<td>0 1 2 3 4 5 6 7 8</td>
<td>No Emotion</td>
<td>Strongest ever felt</td>
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<tr>
<td>f) Fear</td>
<td>0 1 2 3 4 5 6 7 8</td>
<td>No Emotion</td>
<td>Strongest ever felt</td>
</tr>
<tr>
<td>g) Sadness</td>
<td>0 1 2 3 4 5 6 7 8</td>
<td>No Emotion</td>
<td>Strongest ever felt</td>
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<tr>
<td>h) Compassion</td>
<td>0 1 2 3 4 5 6 7 8</td>
<td>No Emotion</td>
<td>Strongest ever felt</td>
</tr>
<tr>
<td>i) Sympathy</td>
<td>0 1 2 3 4 5 6 7 8</td>
<td>No Emotion</td>
<td>Strongest ever felt</td>
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APPENDIX K

PRETEST QUESTIONNAIRE FOR INTERVENTION
PRE-TEST QUESTIONNAIRE FOR INTERVENTION TO INCREASE SUN PROTECTION

Thank you for participating in this research project on women’s health issues. Please answer the following questions to the best of your ability. Please just tell us what best describes you. Please do not answer in a way you might think we want you to answer—answer in a way that shows how you really feel. Thank you.

Please write your initials followed by the numeric month and day of your birth, for example, because my name is Stephanie Moser and I was born on January 12, mine would be sm0112

KNOWLEDGE

1. Skin cancer affects about ____% of Americans who live to age 65.
   a) 5-10
   b) 25
   c) 40-50
   d) 90

2. The National Cancer Institute recommends a sunscreen with an SPF rating of ____.
   a) 10
   b) 15
   c) 30
   d) 55

3. A sunscreen with an SPF rating of 15
   a) means that most people can stay out in the sun for 15 minutes without risk of sunburn.
   b) has 3 times as much sun blocking agent as a sunscreen with an SPF of 5.
   c) means that skin covered by the sunscreen can be exposed to ultraviolet rays for 15 times longer than skin with no sunscreen.
   d) affords adequate protection against ultraviolet rays for up to 6 hours.

PLEASE CIRCLE EITHER “TRUE” or “FALSE”

4. True or false: Sunscreens should be applied immediately before going out into the sun

5. True or false: Suntanning in a tanning booth is a safe way to tan.

6. True or false: SPF on a sunscreen stands for "skin protecting function."

7. True or false: The difference in protection between an SPF 15 sunscreen and an SPF 34 sunscreen is not much, but the difference between an SPF 2 sunscreen and an SPF 15 sunscreen is a great deal.

8 True or false: You should look for a sunscreen that offers both UVA and UVB protection.

PLEASE CIRCLE YOUR RESPONSE

9. Which is not a way to prevent over-exposure to the sun?
a. use of sunscreen with SPF 15 or higher
b. examination of your skin carefully for signs of new moles
c. avoidance of the sun entirely
d. use of protective clothing like a long-sleeved shirt and a wide-brimmed hat

10. What percent of all aging has been attributed to photoaging?
   a. 25%
   b. 50%
   c. 75%
   d. 90%

SKIN TYPE – Measure of Objective Risk

11. Please indicate your skin type below. Read each description carefully and pick the one that best describes you.
   (1) very fair skin, freckles; blonde or red hair; skin always burns easily, never tans
   (2) fair skin; blonde, red, or brown hair; skin always burns easily, tans minimally
   (3) brown hair and eyes; skin burns moderately, tans gradually and uniformly (light brown)
   (4) light brown skin, dark hair and eyes; skin burns minimally, always tans well
       (moderate brown)
   (5) brown skin; dark eyes and hair; skin rarely burns, tans profusely (dark brown)
   (6) brown-black skin; dark eyes and hair; skin never burns, deeply pigmented (black)

FAMILY HISTORY - Measure of Objective Risk

12. Has your mother ever been diagnosed with skin cancer?   (1) Yes   (2) No   (3) Don't Know
13. Has your father ever been diagnosed with skin cancer?   (1) Yes   (2) No   (3) Don't Know
14. Have any of your siblings ever been diagnosed with skin cancer?   (1) Yes   (2) No   (3) Don't Know
15. Have any of your grandparents ever been diagnosed with skin cancer?   (1) Yes   (2) No   (3) Don't Know
16. Have any of your aunts or uncles ever been diagnosed with skin cancer?   (1) Yes   (2) No   (3) Don't Know
17. Have any other family members ever been diagnosed with skin cancer?   (1) Yes   (2) No   (3) Don't Know
18. Have you ever been diagnosed with skin cancer?   (1) Yes   (2) No
PREVIOUS SUN EXPOSURE

19. In the past week, approximately how many minutes/hours did you spend in the sunshine?

(1) 0 hours/week
(2) 1-15 minute/week
(3) 15-30 minutes/week
(4) 30-60 minutes/week
(5) 1 hour/week
(6) 2 hours/week
(7) 3-5 hours / week
(8) 5-7 hours/week
(9) 8-10 hours/week
(10) 11-15 hours/week
(11) 16-20 hours/week
(12) 21-25 hours/week
(13) more than 25 hours /week

20. In the past week, approximately how many minutes/hours did you sunbathe?

(1) 0 hours/week
(2) 1-15 minute/week
(3) 15-30 minutes/week
(4) 30-60 minutes/week
(5) 1 hour/week
(6) 2 hours/week
(7) 3-5 hours / week
(8) 5-7 hours/week
(9) 8-10 hours/week
(10) 11-15 hours/week
(11) 16-20 hours/week
(12) 21-25 hours/week
(13) more than 25 hours /week

PREVIOUS SUN PROTECTION

21. In the past week, how often did you use sunscreen with sun protection factor (SPF) 15 or higher on your face when you were in the sun?

(1) never
(2) rarely
(3) less than half of the time
(4) about half of the time
(5) more than half of the time
(6) almost all of the time
(7) always

22. In the past week, how often did you use sunscreen with SPF 15 or higher on every exposed part of your body when you were in the sun?

(1) never
(2) rarely
(3) less than half of the time
(4) about half of the time
(5) more than half of the time
23. In the past week, how often did you wear a hat when you were in the sun?
   (1) never
   (2) rarely
   (3) less than half of the time
   (4) about half of the time
   (5) more than half of the time
   (6) almost all of the time
   (7) always

24. In the past week, how often did you wear protective clothing to cover your body like a long sleeved shirt and long pants or skirt when you were in the sun?
   (1) never
   (2) rarely
   (3) less than half of the time
   (4) about half of the time
   (5) more than half of the time
   (6) almost all of the time
   (7) always

25. In the past week, how often did you try to stay in the shade when you were outdoors?
   (1) never
   (2) rarely
   (3) less than half of the time
   (4) about half of the time
   (5) more than half of the time
   (6) almost all of the time
   (7) always

26. During the past MONTH, how many visits did you make to a tanning salon?
   visits

27. During the past MONTH, did you get a sunburn, where your skin turned at all red?
   (1) Yes       (2) No

28. During the past week, did you buy a sunscreen with a sun protection factor 15 or higher?
   (1) Yes       (2) No

**MOST RECENT SUN PROTECTION**

For these next few questions, think back to the most recent time you were outdoors during the day for a 15 minute period or more. This could be when you were walking to class, playing a sport, or even having coffee outdoors, for example.

29. When you were outside for this 15 minute period, did you wear sunscreen with sun protection factor 15 or higher on your face?
   (1) Yes
   (2) No
30. When you were outside for this 15 minute period, did you wear sunscreen with sun
(1) Yes
protection factor 15 or higher on every exposed part of your body?
(2) No

31. When you were outside for this 15 minute period, did you cover your body with
(1) Yes
protective clothing like a long-sleeved shirt and long pants or skirt to shield you from the sun?
(2) No

32. When you were outside for this 15 minute period, did you wear a hat to shield your
(1) Yes
face from the sun?
(2) No

33. When you were outside for this 15 minute period, did you try to stay in the shade to
(1) Yes
avoid the sun?
(2) No

**CONDITINAL SUSCEPTIBILITY TO SKIN CANCER AND PHOTOAGING**

For the following items, imagine that you never take any action to protect yourself
from the sun (i.e., you never use sunscreen, never wear any protective clothing).
Please respond to each statement by circling the appropriate number on the scale
provided.

34. If you don't use sun protection, how highly susceptible do you feel you are to skin cancer?
   (not at all) 1 2 3 4 5 6 very susceptible

35. If you don't use sun protection, how highly susceptible do you feel you are to getting age spots?
   (not at all) 1 2 3 4 5 6 very susceptible

36. If you don't use sun protection, how highly susceptible do you feel your skin is to getting wrinkles?
   (not at all) 1 2 3 4 5 6 very susceptible

37. If you don't use sun protection, how highly susceptible do you feel your skin is to sun damage?
   (not at all) 1 2 3 4 5 6 very susceptible
Please indicate whether you disagree or agree with each statement by circling the appropriate number on the scale provided.

SKIN CANCER AND PHOTOAGING WORRY

38. The possibility of skin cancer worries me. strongly disagree 1 2 3 4 5

6 strongly agree

39. Whenever I hear of a friend, relative or public figure getting skin cancer, it makes me realize that I could get it too. strongly disagree 1 2 3 4 5

6 strongly agree

40. I don't need to worry about getting skin cancer until I am much older. strongly disagree 1 2 3 4 5

6 strongly agree

41. I am too young to spend much time thinking that I might get wrinkles and age spots. strongly disagree 1 2 3 4 5

6 strongly agree

42. Whenever I see somebody who has a lot of wrinkles or age spots, it makes me realize that I could get them too. strongly disagree 1 2 3 4 5

6 strongly agree

43. The possibility of getting wrinkles or age spot worries me. strongly disagree 1 2 3 4 5

6 strongly agree

SEVERITY OF SKIN CANCER AND PHOTOAGING

44. It would be terrible to get a malignant tumor on my skin. strongly disagree 1 2 3 4 5

6 strongly agree

45. Getting skin cancer would severely affect my life. strongly disagree 1 2 3 4 5 6

strongly agree

46. It would be terrible to have skin cancer. strongly disagree 1 2 3 4 5 6

strongly agree

47. It would be terrible to look older than I really am due to too much sun-exposure. strongly disagree 1 2 3 4 5 6

strongly agree

48. It would be terrible to have age spots from the sun on my face. strongly disagree 1 2 3 4 5 6

strongly agree
49. It would be terrible to have wrinkles from the sun on my face. strongly disagree 1 2 3 4 5 6 strongly agree

50. Getting wrinkles and age spots due to premature aging from the sun would severely affect my personal life. strongly disagree 1 2 3 4 5 6 strongly agree

POSITIVE OUTCOME EXPECTATIONS OF TANNING

Below are a few reasons why people sunbathe. Please indicate whether you agree or disagree with each statement by circling the appropriate number on the scale provided.

51. I feel more attractive with a tan. strongly disagree 1 2 3 4 5 6 strongly agree

52. A sun-tanned person looks healthier. strongly disagree 1 2 3 4 5 6 strongly agree

53. Having a tan makes my skin look better. strongly disagree 1 2 3 4 5 6 strongly agree

54. A sun-tanned person looks more attractive. strongly disagree 1 2 3 4 5 6 strongly agree

55. A tan makes me feel better about myself. strongly disagree 1 2 3 4 5 6 strongly agree

56. I feel healthier with a tan. strongly disagree 1 2 3 4 5 6 strongly agree

57. I have more self-confidence with a tan. strongly disagree 1 2 3 4 5 6 strongly agree

Below are some questions that refer to the sunbathing habits of people you know. Please respond to each statement by circling the appropriate number on the scale provided.

DESCRIPTIVE NORM

58. How often do your friends sunbathe? never 1 2 3 4 5 very often

249
59. How often do your friends wear protective clothing, like a shirt or a hat, when in the sun? never 1 2 3 4 5 6 very often

60. How often do your friends use sunscreen with a sun protection factor (SPF) never 1 2 3 4 5 6 very often of at least 15 when they are in the sun?

61. To what extent do your friends protect their skin from the sun by staying in the shade? not at all 1 2 3 4 5 very much

62. Most of my friends are tan strongly disagree 1 2 3 4 5 strongly agree

ANTICIPATED EMOTIONS- SUNSCREEN USE

For the following items, please indicate whether you disagree or agree with each statement by circling the appropriate number on the scale provided.

63. If I use sunscreen, I will feel happy. strongly disagree 1 2 3 4 5 6 strongly agree

64. If I use sunscreen, I will feel sad. strongly disagree 1 2 3 4 5 6 strongly agree

65. If I use sunscreen, I will feel excited. strongly disagree 1 2 3 4 5 6 strongly agree

66. If I use sunscreen, I will feel disappointed. strongly disagree 1 2 3 4 5 6 strongly agree

67. If I use sunscreen, I will feel content. strongly disagree 1 2 3 4 5 6 strongly agree

68. If I use sunscreen, I will feel embarrassed. strongly disagree 1 2 3 4 5 6 strongly agree

69. If I use sunscreen, I will feel proud. strongly disagree 1 2 3 4 5 6 strongly agree

ANTICIPATED EMOTIONS- SUNBATHING

For the following items, please indicate whether you disagree or agree with each statement by circling the appropriate number on the scale provided.

70. If I sunbathe, I will feel happy. strongly disagree 1 2 3 4 5 6 strongly agree

71. If I sunbathe, I will feel sad. strongly disagree 1 2 3 4 5 6 strongly agree
72. If I sunbathe, I will feel excited. strongly disagree 1 2 3 4 5 6
   strongly agree

73. If I sunbathe, I will feel disappointed. strongly disagree 1 2 3 4 5 6 strongly
   agree

74. If I sunbathe, I will feel content. strongly disagree 1 2 3 4 5 6 strongly
   agree

75. If I sunbathe, I will feel embarrassed. strongly disagree 1 2 3 4 5 6 strongly
   agree

76. If I sunbathe, I will feel proud. strongly disagree 1 2 3 4 5 6 strongly
   Agree

For the following items, please indicate whether you disagree or agree with each statement by circling the appropriate number on the scale provided.

INJUNCTIVE NORM

77. It would be OK with my friends if I sunbathed. strongly disagree 1 2 3 4 5
   6 strongly agree

78. My friends think I should wear sunscreen with an SPF of at least 15 when I am in the sun.
   strongly disagree 1 2 3 4 5
   6 strongly agree

79. Most of my friends feel that I look better with a tan strongly disagree 1 2 3 4 5
   6 strongly agree

80. My friends would disapprove of my getting a tan. strongly disagree 1 2 3 4 5
   6 strongly agree

IMAGE NORMS

For the following items, please indicate whether you disagree or agree with each statement by circling the appropriate number on the scale provided.

81. People in the media (celebrities, movie stars) always seem to have a suntan. strongly disagree 1 2 3 4 5
   6 strongly agree

82. I believe that there is a trend towards paler models. strongly disagree 1 2 3 4 5
   6 strongly agree

83. I think that to be a successful TV star, you
should have a suntan.                      strongly disagree 1 2 3 4 5
6 strongly agree

84. It seems that society wants people to be
tanned and attractive.                     strongly disagree 1 2 3 4 5
6 strongly agree

85. I can think of many TV stars who are
pale and attractive                        strongly disagree 1 2 3 4 5
6 strongly agree

ATTITUDES

86. For me, wearing sunscreen everyday would be:

   Bad  1  2  3  4  5  6 Good
   Dumb 1  2  3  4  5  6 Smart
   Negative 1  2  3  4  5  6 Positive

87. For me, wearing protecting my skin from the sun everyday would be:

   Bad  1  2  3  4  5  6 Good
   Dumb 1  2  3  4  5  6 Smart
   Negative 1  2  3  4  5  6 Positive

Please answer the following questions about how you feel when you think about
exposing your skin to the sun without using any sun protection:

When I think about exposing my skin to sun without sun protection, I feel:

88. happy                              not at all 1 2 3 4 5 6 very much
89. angry                              not at all 1 2 3 4 5 6 very much
90. excited                            not at all 1 2 3 4 5 6 very much
91. nervous                            not at all 1 2 3 4 5 6 very much
92. afraid                              not at all 1 2 3 4 5 6 very much
93. content                            not at all 1 2 3 4 5 6 very much
94. disgusted                          not at all 1 2 3 4 5 6 very much
Below are some beliefs people have about sun protection, that is, about protecting themselves from exposure to the sun. Please indicate whether you disagree or agree with each statement by circling the appropriate number on the scale provided.

95. Wearing sunscreen with an SPF of at least 15 regularly when I am in the sun would strongly disagree
   strongly disagree 1 2 3 4 5 strongly agree reduce my chances of getting skin cancer.
   strongly agree

96. Whether or not a person develops skin cancer is related to how frequently they use strongly disagree
   strongly disagree 1 2 3 4 5 strongly agree sunscreen while spending time in the sun.
   strongly agree

97. If people protected themselves from the sun, they wouldn't be as likely to get skin cancer. strongly disagree
   strongly disagree 1 2 3 4 5 strongly agree
   strongly agree

98. If more people used sunscreen with an SPF of at least 15 regularly, there would be strongly disagree
   strongly disagree 1 2 3 4 5 strongly agree fewer cases of skin cancer.
   strongly agree

99. If more people used sunscreen with an SPF of at least 15 regularly, people would strongly disagree
   strongly disagree 1 2 3 4 5 strongly agree look younger longer.
   strongly agree

100. If people protected themselves from the sun, they wouldn't age so fast. strongly disagree
     strongly disagree 1 2 3 4 5 strongly agree
     strongly agree

101. Wearing sunscreen with an SPF of at least 15 regularly when I am in the sun will strongly disagree
     strongly disagree 1 2 3 4 5 strongly agree reduce my chances of getting age spots and wrinkles.
     strongly agree

102. Whether or not a person develops age spots and wrinkles is related to how frequently they use sunscreen while spending time in the sun. strongly disagree
     strongly disagree 1 2 3 4 5 strongly agree
     strongly agree

Please indicate the likelihood that the following factors would keep you from using sunscreen.

103. How likely is it that the cost of very unlikely to keep me from using sunscreen very likely to
     very likely to keep me from using sunscreen keep me from using sunscreen
     keep me from using sunscreen
104. How likely is it that having to carry sunscreen with you would keep you from using sunscreen?

very unlikely to 1 2 3 4 5

very likely to 6

105. How likely is it that having to remember to apply sunscreen would keep you from using sunscreen?

very unlikely to 1 2 3 4 5

very likely to 6

106. How likely is it that sunscreen smells unpleasant would keep you from using sunscreen?

very unlikely to 1 2 3 4 5 6

very likely to

107. How likely is it that the nuisance of sunscreen would keep you from using sunscreen?

very unlikely to 1 2 3 4 5 6

very likely to

108. How likely is it that sunscreen feels unpleasant would keep you from using sunscreen?

very unlikely to 1 2 3 4 5 6

very likely to

109. How likely is it that having to reapply sunscreen would keep you from using sunscreen?

very unlikely to 1 2 3 4 5 6

very likely to

For the following items, please indicate whether you disagree or agree with each statement by circling the appropriate number on the scale provided. For these questions, please imagine you have been exposed to the sun and have not used any sun protection. Imaging how you would feel if you failed to protect your skin from the sun.

If I failed to protect my skin from the sun:

110. I would regret it. strongly disagree 1 2 3 4 5 6

strongly agree

111. I would think that it was
the wrong decision. strongly disagree 1 2 3 4 5 6
strongly agree

112. I would protect myself from the sun if I had to do it over again. strongly disagree 1 2 3 4 5 6
strongly agree

113. I would think “Failing to protect my skin from the sun did me a lot of harm”. strongly disagree 1 2 3 4 5 6
strongly agree

114. I would think that failing to use sun protection was a foolish decision. strongly disagree 1 2 3 4 5 6
strongly agree

**Whether or not you currently use sunscreen with SPF 15+, please rate how confident you are that you could really do each of the things consistently.**

115. Use sunscreen while in the sun even certain if I am not going to be out long. I could do consistently
I'm certain 1 2 3 4 5 6
I could not do
this consistently
this

116. Use sunscreen on the exposed parts certain of my body (not just my face) when I am could do in the sun. consistently
I'm certain 1 2 3 4 5 6
I could not do
this consistently
this

117. Use sunscreen while doing outdoor certain activities in the winter. could do consistently
I'm certain 1 2 3 4 5 6
I could not do
this consistently
this

118. Use sunscreen on every part of my certain body that is not covered by clothing. could do consistently
I'm certain 1 2 3 4 5 6
I could not do
this consistently
this

119. Use sunscreen everyday, even when certain I am not planning on spending time could do
I'm certain 1 2 3 4 5 6
I could not do
I
in the sun.
consistently

120. Make using sunscreen a part of my
certain
daily routine like brushing my teeth.
could do
consistently

<table>
<thead>
<tr>
<th>I'm certain</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<tbody>
<tr>
<td>I could not do</td>
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</table>

121. Use sunscreen even when I am feeling
too lazy to bother with it.
could do
consistently

<table>
<thead>
<tr>
<th>I'm certain</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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</thead>
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<tr>
<td>I could not do</td>
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</table>

122. Use sunscreen while doing outdoor
certain
activities other than sunbathing (e.g.,
could do
working outdoors, playing sports)
consistently

<table>
<thead>
<tr>
<th>I'm certain</th>
<th>1</th>
<th>2</th>
<th>3</th>
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<th>5</th>
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</thead>
<tbody>
<tr>
<td>I could not do</td>
<td></td>
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</tbody>
</table>

Please respond to each statement by circling the appropriate number on the scale provided.

123. I use sunscreen with an SPF of at least 15 on my
face when I am in the sun.
the time

<table>
<thead>
<tr>
<th>never</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>all the time</td>
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</table>

124. I use sunscreen with an SPF of at least 15 on my
body when I am in the sun.
all the time

<table>
<thead>
<tr>
<th>never</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<tr>
<td>all the time</td>
<td></td>
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</table>

125. I wear protective clothing like a t-shirt or pants
when I am in the sun.
the time

<table>
<thead>
<tr>
<th>never</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<tbody>
<tr>
<td>all the time</td>
<td></td>
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</table>

126. I stay in the shade as much as possible when I
am outdoors.
the time

<table>
<thead>
<tr>
<th>never</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
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<tr>
<td>all the time</td>
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</tbody>
</table>

127. I try to avoid direct sunlight as much as possible.
the time

<table>
<thead>
<tr>
<th>never</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>all the time</td>
<td></td>
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</tbody>
</table>

128. I use sunscreen with an SPF of at least 15 on my
face when I am sunbathing.
the time

<table>
<thead>
<tr>
<th>never</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>all the time</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
129. I use sunscreen with an SPF of at least 15 on my body when I am sunbathing. all the time
never 1 2 3 4 5 6

Below are some questions about your future behavior. Please respond to each statement by circling the appropriate number on the scale provided.

130. I plan to avoid sunbathing in the future. strongly disagree 1 2 3 4 5 6
strongly agree

131. I intend to maintain a tanned complexion by sunbathing. strongly disagree 1 2 3 4 5 6
strongly agree

132. I will sunbathe in the future. strongly disagree 1 2 3 4 5 6
strongly agree

133. I plan to use sunscreen on a regular basis. strongly disagree 1 2 3 4 5 6
strongly agree

134. I plan to always use a sunscreen with an SPF of at least 15 on my face. strongly disagree 1 2 3 4 5 6
strongly agree

135. I plan to always use a sunscreen with an SPF of at least 15 on my body. strongly disagree 1 2 3 4 5 6
strongly agree

136. I plan to use sunscreen on all exposed areas of my body when I am at the beach or the pool. strongly disagree 1 2 3 4 5 6
strongly agree

137. I probably won't use sunscreen on my face. strongly disagree 1 2 3 4 5 6
strongly agree

138. I plan to always use sunscreen on my face when I am at the beach or the pool. strongly disagree 1 2 3 4 5 6
strongly agree

We would like to see how much you know about stress, and the reactions your body has to stress. Please answer the following by circling the appropriate number that you think represents the correct answer.

139. What is the definition of stress?
   a. when something negative happens in your life
   b. anytime something unexpected happens

   257
c. any change the body has to adapt to
d. a feeling of being tense in response to a negative situation

140. Which of the following is/are techniques to reduce stress?
a. drinking alcohol
b. meditation
c. relaxation techniques
d. all of the above

141. Which of the following is/are a symptoms of stress?
a. lowered sex drive
b. bad temper
c. negative self-talk
d. forgetfulness
e. all of the above

The following questions ask about your ability to deal with stressful situations.

142. I have healthy ways of coping when I am upset because of something that happened unexpectedly.

Strongly disagree 1 2 3 4 5 6 Strongly Agree

143. I have healthy ways of coping when I feel I am unable to control the important things in your life.

Strongly disagree 1 2 3 4 5 6 Strongly Agree

144. I have healthy ways of coping when I feel nervous or “stressed”.

Strongly disagree 1 2 3 4 5 6 Strongly Agree

145. I have healthy ways of coping when I feel things are not going my way.

Strongly disagree 1 2 3 4 5 6 Strongly Agree

146. I have healthy ways of coping when I feel I am unable to control irritations in my life.

Strongly disagree 1 2 3 4 5 6 Strongly Agree

147. I have healthy ways of coping when I feel difficulties were piling up so high I cannot overcome them.

Strongly disagree 1 2 3 4 5 6 Strongly Agree

Demographic information:

148. Please tell us your age in years ________________

149. What race or ethnicity best describes you ________________

150. Please tell us your current year in school ________________
APPENDIX L

POSTTEST QUESTIONNAIRE
POST-TEST QUESTIONNAIRE FOR INTERVENTION TO INCREASE SUN PROTECTION

Thank you for participating in this research project on women’s health issues. Please answer the following questions to the best of your ability. Please just tell us what best describes you. Please do not answer in a way you might think we want you to answer—answer in a way that shows how you really feel. Thank you.

Please write your initials followed by the numeric month and day of your birth, for example, because my name is Stephanie Moser and I was born on January 12, mine would be sm0112

____________________________________

CONDITIONAL SUSCEPTIBILITY
For the following items, imagine that you never take any action to protect yourself from the sun (i.e., you never use sunscreen, never wear any protective clothing). Please respond to each statement by circling the appropriate number on the scale provided.

1. If you don’t use sun protection, how highly susceptible do you feel you are to skin cancer?

   not at all 1 2 3 4 5 6 very susceptible

2. If you don’t use sun protection, how highly susceptible do you feel you are to getting age spots?

   not at all 1 2 3 4 5 6 very susceptible

3. If you don’t use sun protection, how highly susceptible do you feel your skin is to getting wrinkles?

   not at all 1 2 3 4 5 6 very susceptible

4. If you don’t use sun protection, how highly susceptible do you feel your skin is to sun damage?

   not at all 1 2 3 4 5 6 very susceptible

SEVERITY

Please indicate whether you disagree or agree with each statement by circling the appropriate number on the scale provided.

261
5. It would be terrible to get a malignant tumor on my skin. strongly disagree 1 2 3 4 5 6 strongly agree

6. Getting skin cancer would severely affect my life. strongly disagree 1 2 3 4 5 6 strongly agree

7. It would be terrible to have skin cancer. strongly disagree 1 2 3 4 5 6 strongly agree

8. It would be terrible to look older than I really am due to too much sun-exposure. strongly disagree 1 2 3 4 5 6 strongly agree

9. It would be terrible to have age spots from the sun on my face. strongly disagree 1 2 3 4 5 6 strongly agree

10. It would be terrible to have wrinkles from the sun on my face. strongly disagree 1 2 3 4 5 6 strongly agree

12. Getting wrinkles and age spots due to premature aging from the sun would severely affect my personal life. strongly disagree 1 2 3 4 5 6 strongly agree

ANTICIPATED REGRET

For the following items, please indicate whether you disagree or agree with each statement by circling the appropriate number on the scale provided. For these questions, please imagine you have been exposed to the sun and have not used any sun protection. Imaging how you would feel if you failed to protect your skin from the sun.

If I don’t protect my skin from the sun:

13. I would regret it. strongly disagree 1 2 3 4 5 6 strongly agree

14. I would think that it was the wrong decision. strongly disagree 1 2 3 4 5 6 strongly agree

15. I would protect myself from the sun if I had to do it over again. strongly disagree 1 2 3 4 5 6 strongly agree

16. I would think “Failing to protect my
skin from the sun did me a lot of harm”.  strongly disagree 1 2 3 4 5 6
strongly agree

17. I would think that failing to use sun protection was a wise decision.  strongly disagree 1 2 3 4 5 6
strongly agree

ATTITUDES

18. For me, wearing sunscreen everyday would be:

<table>
<thead>
<tr>
<th></th>
<th>Bad</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dumb</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>Smart</td>
</tr>
<tr>
<td></td>
<td>Negative</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>Positive</td>
</tr>
</tbody>
</table>

19. For me, wearing protecting my skin from the sun everyday would be:

<table>
<thead>
<tr>
<th></th>
<th>Bad</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Good</th>
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<td>6</td>
<td>Smart</td>
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<tr>
<td></td>
<td>Negative</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>Positive</td>
</tr>
</tbody>
</table>

BENEFITS- RESPONSE-EFFICACY

Below are some beliefs people have about sun protection, that is, about protecting themselves from exposure to the sun. Please indicate whether you disagree or agree with each statement by circling the appropriate number on the scale provided.

20. Wearing sunscreen with an SPF of strongly
at least 15 regularly when I am in the sun strongly
would reduce my chances of getting skin cancer.

<table>
<thead>
<tr>
<th></th>
<th>strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
</table>

21. Whether or not a person develops skin cancer strongly
is related to how frequently they use strongly
agreesunscreen while spending time in the sun.

<table>
<thead>
<tr>
<th></th>
<th>strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
</table>

22. If people protected themselves from the sun, strongly
they wouldn't be as likely to get skin strongly
agree cancer.

<table>
<thead>
<tr>
<th></th>
<th>strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
</table>

23. If more people used sunscreen with an SPF of strongly

263
at least 15 regularly, there would be fewer cases of skin cancer.  
agree disagree 1 2 3 4 5 6
24. If more people used sunscreen with an SPF of at least 15 regularly, people would agree strongly
more younger longer. disagree 1 2 3 4 5 6
25. If people protected themselves from the sun, strongly
they wouldn't age so fast. agree strongly
26. Wearing sunscreen with an SPF of at least 15 regularly when I am in the sun will strongly
reduce my chances of getting age spots and wrinkles. disagree 1 2 3 4 5 6
27. Whether or not a person develops age spots and wrinkles is related to how frequently they use sunscreen while spending time in the sun. strongly
agree disagree 1 2 3 4 5 6
28. Use sunscreen while in the sun even certain if I am not going to be out long. do I'm certain 1 2 3 4 5 6 I'm certain do not do this consistently this
certainly
29. Use sunscreen on the exposed parts certain of my body (not just my face) when I am in the sun. consistently I'm certain 1 2 3 4 5 6 I'm certain do not do this consistently this
certainly
30. Use sunscreen while doing outdoor certain activities in the winter. do I'm certain 1 2 3 4 5 6 I'm certain do not do this consistently this
certainly
31. Use sunscreen on every part of my certain I'm certain 1 2 3 4 5 6 I'm certain

SELF-EFFICACY

Whether or not you currently use sunscreen with SPF 15+, please rate how confident you are that you could really do each of the things consistently.

28. Use sunscreen while in the sun even certain if I am not going to be out long. do I'm certain 1 2 3 4 5 6 I'm certain do not do this consistently this
certainly
29. Use sunscreen on the exposed parts certain of my body (not just my face) when I am in the sun. consistently I'm certain 1 2 3 4 5 6 I'm certain do not do this consistently this
certainly
30. Use sunscreen while doing outdoor certain activities in the winter. do I'm certain 1 2 3 4 5 6 I'm certain do not do this consistently this
certainly
31. Use sunscreen on every part of my certain I'm certain 1 2 3 4 5 6 I'm certain

264
body that is not covered by clothing. I could not do this consistently I could do this consistently

32. Use sunscreen everyday, even when certain I am not planning on spending time do in the sun. I'm certain 1 2 3 4 5 6 I'm not consistent I could not do this consistently I could do this consistently

33. Make using sunscreen a part of my certain daily routine like brushing my teeth. I'm certain 1 2 3 4 5 6 I'm consistent I could not do this consistently I could do this consistently

34. Use sunscreen even when I am feeling certain too lazy to bother with it. I'm certain 1 2 3 4 5 6 I'm consistent I could not do this consistently I could do this consistently

35. Use sunscreen while doing outdoor certain activities other than sunbathing (e.g., working outdoors, playing sports) I'm certain 1 2 3 4 5 6 I'm consistent I could not do this consistently I could do this consistently

INTENTIONS

Below are some questions about your future behavior. Please respond to each statement by circling the appropriate number on the scale provided.

36. I plan to avoid sunbathing in the future. strongly disagree 1 2 3 4 5 6

37. I intend to maintain a tanned complexion by sunbathing. strongly disagree 1 2 3 4 5 6

38. I will sunbathe in the future. strongly disagree 1 2 3 4 5 6

39. I plan to use sunscreen on a regular basis. strongly disagree 1 2 3 4 5 6
40. I plan to always use a sunscreen with an SPF of at least 15 on my face.  
   strongly disagree 1 2 3 4 5 6  
   strongly agree

41. I plan to always use a sunscreen with an SPF of at least 15 on my body.  
   strongly disagree 1 2 3 4 5 6  
   strongly agree

42. I plan to use sunscreen on all exposed areas of my body when I am at the beach or the pool.  
   strongly disagree 1 2 3 4 5 6  
   strongly agree

43. I probably won’t use sunscreen on my face.  
   strongly disagree 1 2 3 4 5 6  
   strongly agree

44. I plan to always use sunscreen on my face when I am at the beach or the pool.  
   strongly disagree 1 2 3 4 5 6  
   strongly agree

We would like to see how much you know about stress, and the reactions your body has to stress. Please answer the following by circling the appropriate number that you think represents the correct answer.

45. What is the definition of stress?  
   a. when something negative happens in your life  
   b. anytime something unexpected happens  
   c. any change the body has to adapt to  
   d. a feeling of being tense in response to a negative situation

46. Which of the following is/are techniques to reduce stress?  
   a. drinking alcohol  
   b. meditation  
   c. relaxation techniques  
   d. all of the above

47. Which of the following is/are a symptoms of stress?  
   a. lowered sex drive  
   b. bad temper  
   c. negative self-talk  
   d. forgetfulness  
   e. all of the above

The following questions ask you about your thoughts and feelings during the past month. For each question, you will respond how often you thought or felt a certain way. The best way to deal with these questions is to answer them fairly quickly, don’t count the number of times you felt a certain way. Simply circle the alternative that seems like a reasonable estimate.
48. In the last month, how often have you been upset because of something that happened unexpectedly?

Never  1  2  3  4  5  6 Very Often

49. In the last month, how often have you felt you were unable to control the important things in your life?

Never  1  2  3  4  5  6 Very Often

50. In the last month, how often have you felt nervous or “stressed”?

Never  1  2  3  4  5  6 Very Often

51. In the last month, how often have you felt things were going your way?

Never  1  2  3  4  5  6 Very Often

52. In the last month, how often have you been able to control irritations in your life?

Never  1  2  3  4  5  6 Very Often

53. In the last month, how often have you felt difficulties were piling up so high you could not overcome them?

Never  1  2  3  4  5  6 Very Often
APPENDIX M

TRACING SHEET
Stephanie Moser, Graduate Student, Psychology (Dr. Leona Aiken, Advisor)
Email: Stephanie.Moser@asu.edu

We would like to contact you in 2 weeks to gather a small amount of information related to this project. The questionnaire will take approximately 10 minutes of your time. It is very important to this research project that we will be able to contact you and we appreciate your providing the following information so that we can reach you again.

THE INFORMATION WE REQUEST IS COMPLETELY CONFIDENTIAL AND WILL NEVER BE COMBINED WITH YOUR ANSWERS TO OUR QUESTIONNAIRES.

Name (please print)
_______________________________________________________

Initials followed by the numeric month and day of your birth
____________________

Please write the name of the High School you attended
________________________________

Spring 2010 INFORMATION UNTIL MAY 2010

Primary telephone number _________________________________(home, work, cell)

Second telephone number _________________________________(home, work, cell)

Best email address ____________________________ Do you check this email daily
Yes No

Address
________________________________________________________________
________________________________________________________________

Summer 2010 INFORMATION UNTIL JULY 2010

Primary telephone number _________________________________(home, work, cell)
Second telephone number ___________________________(home, work, cell)

Best email address ___________________________ Do you check this email daily
Yes No

Address
________________________________________________________________
________________________________________________________________

Date Of Scheduled Email
APPENDIX N

FOLLOW-UP QUESTIONNAIRE
FOLLOW-UP QUESTIONNAIRE

1. Please enter your first and last initial followed by the numeric month and day of your birth.

2. Please enter the name of your high school.

3. Please indicate your year in school
   (1) Freshman
   (2) Sophomore
   (3) Junior
   (4) Senior
   (5) Recent graduate

4. Please enter your ethnicity.

5. Please enter your age.

SUN EXPOSURE/SUNBATHING
6. In the past week, approximately how many minutes/hours did you spend in the sunshine?
   (1) 0 hours/week
   (2) 1-15 minute/week
   (3) 15-30 minutes/week
   (4) 30-60 minutes/week
   (5) 1 hour/week
   (6) 2 hours/week
   (7) 3-5 hours / week
   (8) 5-7 hours/week
   (9) 8-10 hours/week
   (10) 11-15 hours/week
   (11) 16-20 hours/week
   (12) 21-25 hours/week
   (13) more than 25 hours /week

7. In the past week, approximately how many minutes/hours did you sunbathe?
   (1) 0 hours/week
   (2) 1-15 minute/week
   (3) 15-30 minutes/week
   (4) 30-60 minutes/week
   (5) 1 hour/week
   (6) 2 hours/week
   (7) 3-5 hours / week
   (8) 5-7 hours/week
   (9) 8-10 hours/week
   (10) 11-15 hours/week
   (11) 16-20 hours/week
   (12) 21-25 hours/week
   (13) more than 25 hours /week

SUN PROTECTION BEHAVIOR
8. In the past week, how often did you use sunscreen with sun protection factor (SPF) 15 or higher on your face when you were in the sun?
   (1) never
   (2) rarely
   (3) less than half of the time
   (4) about half of the time
   (5) more than half of the time
   (6) almost all of the time
   (7) always

9. In the past week, how often did you use sunscreen with SPF 15 or higher on every exposed part of your body when you were in the sun?
   (1) never
   (2) rarely
   (3) less than half of the time
   (4) about half of the time
   (5) more than half of the time
   (6) almost all of the time
   (7) always

10. In the past week, how often did you wear a hat when you were in the sun?
    (1) never
    (2) rarely
    (3) less than half of the time
    (4) about half of the time
    (5) more than half of the time
    (6) almost all of the time
    (7) always

11. In the past week, how often did you wear protective clothing to cover your body like a long sleeved shirt and long pants or skirt when you were in the sun?
    (1) never
    (2) rarely
    (3) less than half of the time
    (4) about half of the time
    (5) more than half of the time
    (6) almost all of the time
    (7) always

12. In the past week, how often did you try to stay in the shade when you were outdoors?
    (1) never
    (2) rarely
    (3) less than half of the time
    (4) about half of the time
    (5) more than half of the time
    (6) almost all of the time
    (7) always

13. During the past week, how many visits did you make to a tanning salon?
    visits

14. During the past week, did you get a sunburn, where your skin turned all red?
    (1) Yes         (2) No
15. During the past week, did you buy a sunscreen with a sun protection factor 15 or higher?  
(1) Yes  (2) No

16. In the past week, have you read any information on skin cancer or sun protection?  
(1) Yes  (2) No

17. If yes, what did you read?

18. In the past week, have you and your friends discussed sun protection, skin cancer, or photaging?  
(1) Yes  (2) No

GENERAL SUN PROTECTION

19. I use sunscreen with an SPF of at least 15 on my face when I am in the sun.  
   never 1 2 3 4 5 6 all the time

20. I use sunscreen with an SPF of at least 15 on my body when I am in the sun.  
   never 1 2 3 4 5 6 all the time

21. I wear protective clothing like a t-shirt or pants when I am in the sun.  
   never 1 2 3 4 5 6 all the time

22. I stay in the shade as much as possible when I am outdoors.  
   never 1 2 3 4 5 6 all the time

23. I try to avoid direct sunlight as much as possible.  
   never 1 2 3 4 5 6 all the time

24. I use sunscreen with an SPF of at least 15 on my face when I am sunbathing.  
   never 1 2 3 4 5 6 all the time

25. I use sunscreen with an SPF of at least 15 on my body when I am sunbathing.  
   never 1 2 3 4 5 6 all the time

MOST RECENT SUN PROTECTION

For these next few questions, think back to the most recent time you were outdoors during the day for a 15 minute period or more. This could be when you were walking to class, playing a sport, or even having coffee outdoors, for example.

26. When you were outside for this 15 minute period, did you wear sunscreen with sun
(1) Yes
27. When you were outside for this 15 minute period, did you wear sunscreen with sun protection factor 15 or higher on your face?
(1) Yes
(2) No

28. When you were outside for this 15 minute period, did you cover your body with protective clothing like a long-sleeved shirt and long pants or skirt to shield you from the sun?
(1) Yes
(2) No

29. When you were outside for this 15 minute period, did you wear a hat to shield your face from the sun?
(1) Yes
(2) No

30. When you were outside for this 15 minute period, did you try to stay in the shade to avoid the sun?
(1) Yes
(2) No

INTENTIONS

Below are some questions about your future behavior. Please respond to each statement by circling the appropriate number on the scale provided.

31. I plan to avoid sunbathing in the future
strongly disagree  1  2  3  4  5  6
strongly agree

32. I intend to maintain a tanned complexion by sunbathing.
strongly disagree  1  2  3  4  5  6
strongly agree

33. I will sunbathe in the future.
strongly disagree  1  2  3  4  5  6
strongly agree

34. I plan to use sunscreen on a regular basis.
strongly disagree  1  2  3  4  5  6
strongly agree

35. I plan to always use a sunscreen with an SPF of at least 15 on my face.
strongly disagree  1  2  3  4  5  6
strongly agree

36. I plan to always use a sunscreen with an SPF of at least 15 on my body.
strongly disagree  1  2  3  4  5  6
strongly agree

37. I plan to use sunscreen on all exposed
areas of my body when I am at the beach or the pool.

38. I probably won't use sunscreen on my face.
   strongly disagree 1 2 3 4 5 6

39. I plan to always use sunscreen on my face when I am at the beach or the pool.
   strongly disagree 1 2 3 4 5 6

SELF-EFFICACY

40. Use sunscreen while in the sun even if I am not going to be out long.
   I'm certain 1 2 3 4 5 6 I'm certain
   I could not do this consistently this

41. Use sunscreen on the exposed parts of my body (not just my face) when I am in the sun.
   I'm certain 1 2 3 4 5 6 I'm certain
   I could not do this consistently this

42. Use sunscreen while doing outdoor activities in the winter.
   I'm certain 1 2 3 4 5 6 I'm certain
   I could not do this consistently this

43. Use sunscreen on every part of my body that is not covered by clothing.
   I'm certain 1 2 3 4 5 6 I'm certain
   I could not do this consistently this

44. Use sunscreen everyday, even when I am not planning on spending time in the sun.
   I'm certain 1 2 3 4 5 6 I'm certain
   I could not do this consistently this
45. Make using sunscreen a part of my daily routine like brushing my teeth. I'm certain 1 2 3 4 5 6 I'm certain consistently
     I could not do this consistently
     I could do this consistently

46. Use sunscreen even when I am feeling too lazy to bother with it. I'm certain 1 2 3 4 5 6 I'm certain consistently
     I could not do this consistently
     I could do this consistently

47. Use sunscreen while doing outdoor activities other than sunbathing (e.g., working outdoors, playing sports) I'm certain 1 2 3 4 5 6 I'm certain consistently
     I could not do this consistently
     I could do this consistently

DECISION AFFECT

Please answer the following questions about how you feel when you think about exposing your skin to the sun without using any sun protection:

When I think about exposing my skin to sun without sun protection, I feel:

48. happy not at all 1 2 3 4 5 6 very much
49. angry not at all 1 2 3 4 5 6 very much
50. excited not at all 1 2 3 4 5 6 very much
51. nervous not at all 1 2 3 4 5 6 very much
52. afraid not at all 1 2 3 4 5 6 very much
53. content not at all 1 2 3 4 5 6 very much
54. disgusted not at all 1 2 3 4 5 6 very much

ANTICIPATED REGRET

For the following items, please indicate whether you disagree or agree with each statement by circling the appropriate number on the scale provided. For these questions, please imagine you have been exposed to the sun and have not used any sun protection. Imaging how you would feel if you failed to protect your skin from the sun.
If I failed to protect my skin from the sun:

55. I would regret it.  strongly disagree 1 2 3 4 5 6
   strongly agree

56. I would think that it was
   the wrong decision.  strongly disagree 1 2 3 4 5 6
   strongly agree

57. I would protect myself from the sun if
   I had to do it over again.  strongly disagree 1 2 3 4 5 6
   strongly agree

58. I would think “Failing to protect my skin
   from the sun did me a lot of harm”.  strongly disagree 1 2 3 4 5 6
   strongly agree

59. I would think that failing to use sun
   protection was a foolish decision.  strongly disagree 1 2 3 4 5 6
   strongly agree