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Influencing Unrealistic Optimism In Young Women's Perceived Risk Of Skin Cancer

Karen Elizabeth Vanderzanden

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INFLUENCING UNREALISTIC OPTIMISM IN YOUNG WOMEN'S PERCEIVED
RISK OF SKIN CANCER

by

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Bachelor of Arts, Creighton University, 2013

A Thesis

Submitted to the Graduate Faculty

of the

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in partial fulfillment of the requirements

for the degree of

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2015

This thesis, submitted by Karen Elizabeth Vanderzanden in partial fulfillment of the requirements for the Degree of Master of Arts from the University of North Dakota, has been read by the Faculty Advisory Committee under whom the work has been done and is hereby approved.
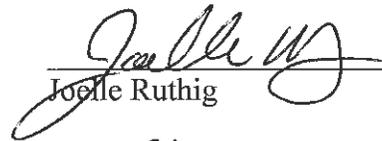
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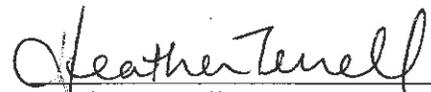
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Heather Terrell

This thesis is being submitted by the appointed advisory committee as having met all of the requirements of the School of Graduate Studies at the University of North Dakota and is hereby approved.

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July 10, 2015
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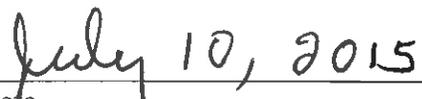
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Karen Elizabeth Vanderzanden
July 9, 2015

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This thesis is dedicated to my parents,

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for helping me get to where I am today.

ABSTRACT

Past research has shown that individuals have a strong tendency to believe that they are less likely than others to experience negative health outcomes (Weinstein, 1980). This tendency to be "unrealistically optimistic" can contribute to greater engagement in risky health behaviors, and in turn, greater actual risk of the negative health outcome. Within the current study, factors previously shown to influence unrealistically optimistic health perceptions (i.e., images of risky/protective health behavior, peer risk estimates, personal risk/protective factors) were directly manipulated to examine their effects on young women's perceived risk of developing skin cancer. Participants were 363 Caucasian women between the ages of 18 and 24 who completed an online study via MTurk. The study entailed an Image (high risk, low risk, no image) x Peer Information (given, not given) x Personal Factors List (risk, protective, none) 3 x 2 x 3 factorial design. Results showed no significant differences in risk estimates among participants who received the "unrealistic optimism diminishing" conditions vs. those who received the "unrealistic optimism enhancing" conditions, and neither group differed from those who received the control conditions. However, a significant main effect for Peer Information indicated that participants who received peer information estimated their absolute risk and comparative risk as significantly lower than those who did not view peer information. Findings from the study provide a better understanding of the factors that contribute to young women's risk perceptions regarding skin cancer.

CHAPTER I

INTRODUCTION

The way that people view their health impacts the health-related behaviors in which they engage. In particular, perceived vulnerability of suffering various negative health consequences plays a significant role in determining the likelihood of engaging in preventative behaviors in an attempt to lower susceptibility or in risky behaviors that increase susceptibility to the negative health outcome (Millstein & Halpern-Felsher, 2002). Therefore, understanding individuals' health risk perceptions has important implications for subsequent health and well-being.

The vital role of risk perceptions in understanding health-related behaviors and subsequent health is reflected in various theoretical frameworks used to predict health-related behaviors. For example, the Health Belief Model (Becker, 1974; Janz & Becker, 1984) asserts that various personal beliefs affect health behavior. One of these influential components is the belief that one is susceptible to health problems. Perceived susceptibility plays a major role in determining the types of health behaviors in which one engages. Likewise, the Theory of Reasoned Action (Fishbein & Ajzen, 1975) asserts that health behaviors can be partially predicted by an individual's attitudes, which include a subjective assessment of one's vulnerability to a health problem. The Precaution Adoption Process Model (Weinstein, 1988) explains how individuals make decisions and translate those decisions into actions. Perceived susceptibility predicts an individual's

decision to take some form of action. Individuals who believe that they are not susceptible to an illness are less likely to take precautionary actions, whereas, those who believe that they are susceptible to an illness are more likely to take preventative action (Weinstein, 1988).

Optimistic Health Risk Perceptions

As described above, perceived health risks are critical to understanding the types of health behaviors in which individuals engage. However, health risk perceptions are often inaccurate. That is, individuals tend to compare themselves to others in an excessively favorable way, believing that they are more likely than others to experience positive events and less likely than others to experience negative events (Shepperd, Klein, Waters, & Weinstein, 2013). This phenomenon is referred to as unrealistic optimism (Weinstein, 1980). The label "unrealistic" reflects the fact that it is statistically impossible for everyone to be less likely than average to experience a negative outcome or more likely than average to experience a positive outcome. Research has shown this bias to be robust in that it applies to many life domains. For example, individuals generally believe that they are less at risk than the average person to suffer from an illness (Perloff & Fetzer, 1986) or become the victim of a crime (Chapin & Coleman, 2009). Individuals also tend to believe that they are more likely than others to live a long life and to experience financial and career success (Weinstein, 1980).

Regarding perceptions of health and safety risks, Rutter, Quine, and Albery (1998) assessed the presence of unrealistic optimism among motorcyclists who completed a questionnaire about their own personal perceptions of risk, their driving

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behavior, and their history of motor accidents. Overall, participants believed that they were less at risk than other motorcyclists of being involved in a motorcycle accident. In other research, Weinstein, Lyon, Sandman, and Cuite (1998) examined unrealistic optimism in relation to perceived risk of radon exposure. Homeowners were informed of the risk of radon and encouraged to perform home radon testing as a safety precaution. They were then asked about their attitudes toward home radon testing and the perceived likelihood of finding radon in their own homes. Even when informed that the likelihood of finding radon in their homes was high (73%), homeowners consistently displayed unrealistic optimism by rating their own risk as lower than others.

In a more recent study, Weinstein, Marcus, and Moser (2005) tested the presence of unrealistic optimism through phone interviews with smokers. The results indicated that smokers tended to underestimate their risk of cancer compared to non-smoking individuals. Smokers also believed that they had a lower risk for lung cancer compared to other smokers. Together, this past research shows a strong tendency towards unrealistic optimism regarding one's risk of suffering a negative health or safety event.

Often believing that they are invincible and will "live forever," young adults are particularly optimistic when estimating their future health. This tendency has been observed both when they compare themselves to a similar peer, referred to as comparative optimism (Weinstein, 1980), as well as when they estimate their own risk independent of a comparative target. In a pivotal study, college students were asked to estimate their likelihood, compared to the average student in their class, of experiencing various positive and negative life events (Weinstein, 1980). Results indicated that the

students believed they were more likely than others to experience positive events and less likely than others to experience negative events.

Another study conducted by Weinstein (1984) found the same tendency for younger individuals to be unrealistically optimistic regarding their health. Groups of college students rated themselves as being at significantly lower risk than their classmates for experiencing various health problems including drug addiction, alcoholism, heart attack, gum disease, and diabetes. These findings support the assertion that young adults are generally optimistic regarding their health risks.

The Impact of Unrealistically Optimistic Health Risk Perceptions

In some instances, being overly optimistic is adaptive. Taylor and Brown (1988) noted that individuals with depression and low self-esteem often do not have optimistic views about life. Therefore, being unrealistically optimistic may serve as a protective factor against depression and negative mental states. Similarly, Gibbons (1986) found that moods of depressed individuals improved when they viewed themselves as better off than others. The benefits of unrealistic optimism are also evident when comparing people who report being happy versus those who feel distressed. Happy individuals are more likely to hold unrealistically optimistic beliefs about various aspects of their lives (Alloy & Ahrens, 1987). For these reasons, being overly optimistic may be an important component of living a happier life.

Regarding health risk perceptions, Shiloh, Wade, Roberts, Alford, and Biesecker (2013) examined the relationship between risk perceptions and worry for eight different diseases. They found that individuals who are optimistic about their likelihood of

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experiencing illnesses (i.e., viewed their risk as low) generally experience less worry. Likewise, Lipkus et al. (2000) found that perceived risk of developing breast cancer is related to worry. Thus, being overly optimistic can be beneficial by reducing one's worry about health risks.

Despite the potential benefits, unrealistic optimism can also have negative consequences. In particular, individuals who are unrealistically optimistic about their health risks may be more likely to engage in risky, unhealthy behaviors (Weinstein, 1983). Generally, these individuals deny the possibility of experiencing negative consequences, which leads them to act in dangerous ways (Gerrard, Gibbons, Benthin, & Hessling, 1996). For example, individuals who are unrealistically optimistic about their chances of experiencing a car accident may exceed the speed limit or not wear a seatbelt. These risky behaviors may ultimately increase one's risk of experiencing negative outcomes.

Additional evidence for the detrimental effects of unrealistic optimism comes from a study by Dillard, Midboe, and Klein (2009) that focused on college students who were unrealistically optimistic about their chances of experiencing negative consequences related to alcohol. Students were tracked for a two-year period to determine how often they experienced negative events related to alcohol consumption. Those who initially displayed unrealistic optimism, subsequently experienced more negative events (e.g., had a hangover, required medical treatment, etc.) over the two year period. These results show the potential negative consequences of holding unrealistically optimistic beliefs. Likewise, McCaul, Branstetter, Schroeder, and Glasgow (1996) found that women who

underestimated their likelihood of developing breast cancer were less likely to undergo mammographic screening. In this case, unrealistic optimism contributed to a lack of engaging in preventative health behaviors.

An explanation for why individuals tend to believe that they are less at risk than others for experiencing negative health outcomes is because they focus on their own protective factors that contribute to a lower risk, while disregarding the fact that others likely have access to the same protective factors (Weinstein, 1983). A study involving smokers and nonsmokers showed evidence of the negative effects of unrealistic optimism. Smokers were twice as likely as nonsmokers to doubt they would die from smoking, even if they smoked for 30 years or more (Arnett, 2000). Smokers were also more likely than nonsmokers to believe that they would not become addicted and could quit at any time. The smokers perceived themselves as less vulnerable to addiction, which likely contributed to their decision to engage in the unhealthy behavior of smoking. These results highlight the potential dangers of unrealistic optimism in regards to one's health and well-being.

Altering Unrealistic Optimism in Health Risk Perceptions

Because of the potentially harmful consequences of unrealistic optimism, researchers have attempted to identify ways to diminish this tendency (Rose, 2012; Weinstein, 1984; Weinstein & Klein, 1995). By reducing unrealistic optimism, individuals may have more realistic perceptions of health risks and consequently, may be more likely to engage in protective health behaviors that lower, or at least do not elevate, their actual risk. Unfortunately, however, reducing unrealistically optimistic health risk

perceptions is difficult because individuals do not readily accept threatening health information (Weinstein, 1983).

One influential study (Weinstein, 1983) investigated the inflexibility of individuals' unrealistic optimism in relation to health issues. An intervention was employed to counteract various contributors to unrealistic optimism: selective attention to one's own protective factors, lack of awareness of others' risk decreasing behaviors, and neglecting to rationally consider the risk status of others because of an intense focus on the self. The intervention involved three different conditions. Students in the first condition made comparative risk judgments for each specific event. Students in the second condition described their own perceived risk for each specific event before making the comparative risk judgments, which was designed to counteract selective attention to one's own protective factors. Students in the third condition were given peer information regarding the "typical response" of students at their university for each event. Overall, results indicated that students showed unrealistically optimistic tendencies regarding health issues such as having a heart attack, a drinking problem, diabetes, lung cancer, or committing suicide (Weinstein, 1983). More specifically, a main effect was found such that students who were provided with information regarding a typical student's risk estimate showed the least amount of unrealistic optimism of the three conditions. Therefore, giving students risk information that was supposedly provided by their peers seems to lower unrealistic optimism.

The influence of peer risk information is an example of descriptive norms at work. Descriptive norms provide individuals with information regarding the actions,

perceptions, and tendencies of others (Smith-McLallen & Fishbein, 2008). This type of information has been shown to influence not only individuals' current perceptions, but also their future behavioral intentions in a way that conforms to the descriptive norms. For example, Elek, Miller-Day, and Hecht (2006) found that when adolescents believed substance use among others their age was common, they generally had more frequent use themselves and were also more likely to try substances when offered. Similarly, providing peer risk information regarding health risks may influence individuals to rate their own risk comparably.

Weinstein (1984) conducted another study aimed at altering unrealistic optimism by manipulating participants' awareness of factors that other people consider when they estimate their chances of experiencing various events. Participants created lists of factors that either increased or decreased the likelihood of certain events happening to them. Some participants were then given lists of risk factors created by others and asked to make comparative risk judgments. The results indicated that people tend to use inaccurate perceptions of others when making comparative judgments about the likelihood of events. In general, individuals tend to focus on their own positive qualities and behaviors, while not giving the same credit to others.

Other research has shown that unrealistic optimism may be enhanced or diminished depending upon the types of risk estimates being made (i.e., absolute estimates with no comparison target vs. comparative estimates). Rose (2012) tested whether both unrealistic absolute optimism and unrealistic comparative optimism could be influenced using a unique debiasing strategy. The method was distinctive in that it

attempted to diminish absolute and comparative optimism at the same time. Participants made absolute and comparative risk judgments regarding various health-related issues including heart attack, cancer, injury from a car accident, high blood pressure, and arthritis. The absolute and comparative estimates were either elicited at the same time or separately. The results showed that participants who provided their absolute and comparative risk estimates together were less unrealistically optimistic overall. Thus, the debiasing technique was successful in diminishing direct (one question in which a person compares their own risk to another's) and indirect (one question asking about own risk and one question asking about another's risk) comparative optimism. Researchers speculate this trend occurred because participants who made both types of risk estimates together gave equal weight to absolute self and peer information.

Unexpectedly, additional efforts to diminish unrealistic optimism in health risk perceptions have been found to instead enhance the bias. Weinstein and Klein (1995) conducted a study in which participants were provided with a list of risk factors for someone either at high or low risk of having a weight problem. Participants were then asked to use those risk factors to create a vivid image in their minds of the person being described. After completing the visual imagery task, participants rated their own risk, as well as the average college student's risk of becoming overweight. The participants also completed a comparative measure of risk for becoming overweight. The results indicated that forming an image of someone at a high risk for obesity contributed to more (instead of less) unrealistic optimism about one's own health risks. These findings may be explained in terms of contrast effects. Contrast effects occur when individuals'

perceptions are biased to focus on differences as a result of preceding information or stimuli (Bhargava & Fisman, 2014). Past research has shown that when the self is the focus of comparison and the situation is of high self-relevance, contrast effects are likely to occur (Chia-Ching, 2010). Therefore, individuals comparing themselves to the image of a high risk target likely experienced some degree of contrast effects, in which they focused on the differences between themselves and the target. Thus, they subsequently rated their own health risks as lower than others' health risks.

In a supplemental study, Weinstein and Klein (1995) again attempted to reduce unrealistic optimism, this time by asking participants to generate a list of either personal risk factors or personal protective factors for developing a drinking problem or becoming overweight. After creating their lists, participants completed both absolute and comparative measures assessing their levels of unrealistic optimism. The results showed that unrealistic optimism did not decrease by having participants generate risk factors. However, participants who listed personal protective factors had more unrealistically optimistic risk estimates. This task may have elicited a priming bias among the participants. Research has shown that when primed with illness specific stimuli, participants' illness schemas, which are personal cognitive scripts about a particular illness, are activated (Henderson, Hagger, & Orbell, 2007). In a similar fashion, the task of listing personal protective factors for cancer may activate individuals' schemas with information relating to that particular illness, along with the reasons they are not likely to develop cancer. This would lead to lower subsequent risk estimates and higher unrealistic optimism among individuals.

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The Current Study

This study focused on influencing unrealistically optimistic health risk perceptions and built upon prior research in several ways. First, past studies have focused on diminishing unrealistic optimism (Rose, 2012; Weinstein, 1984; Weinstein & Klein, 1995), but never on enhancing and diminishing the tendency toward unrealistic optimism in the same investigation. An aim of the current study was to directly manipulate mechanisms that diminish the tendency towards unrealistic optimism, as well as mechanisms that enhance the tendency towards unrealistic optimism. Past research has demonstrated that exposure to a low risk image, receiving information about peers' risk estimates, and generating a list of one's own risk factors tend to diminish unrealistic optimism (Weinstein, 1980; 1983; Weinstein & Klein, 1995). Conversely, exposure to a high risk image, in the absence of receiving peer risk information, and generating one's own list of protective factors has been found to enhance unrealistic optimism (Weinstein, 1980; Weinstein & Klein, 1995). The current study experimentally manipulated these factors in an attempt to either enhance or diminish the tendency towards unrealistic optimism within the context of perceived risk of skin cancer.

Extensive past research has shown that people tend to be unrealistically optimistic about their chances of developing skin cancer (e.g., Buster, You, Fouad, & Elmets, 2012; Fontaine & Smith, 1995). In particular, young adults tend to view themselves as less at risk than older adults for experiencing skin cancer (Carmel, Shani, & Rosenberg, 1994). Unfortunately, people who hold these unrealistically optimistic beliefs are more likely to engage in risky sun behaviors (Branstrom, Kristjansson, & Ullen, 2005), such as

spending ample time in the sun without wearing sunscreen or other protective gear. This risk behavior elevates the likelihood of developing skin cancer (American Cancer Society, 2014). Because perceived risk has a major impact on health behaviors, it is important to determine the factors that enhance or diminish the tendency towards unrealistically optimistic risk perceptions.

Past research has shown that although both men and women are unrealistically optimistic about their chances of developing skin cancer, women view themselves as more likely to develop skin cancer than men do (Branstrom et al., 2005). There are also gender differences in protective and risky behaviors that impact the likelihood of developing skin cancer. Specifically, women tend to apply sunscreen more regularly and in a wider variety of situations in comparison to men (Abroms, Jorgensen, Southwell, Geller, & Emmons, 2003). On the other hand, women use tanning beds and intentionally sunbathe more frequently than men do (Branstrom et al., 2005), behaviors that put them at higher risk for skin cancer (Rigel & Carucci, 2000; Ting, Schultz, Cac, Peterson, & Walling, 2007). Given these gender differences in risk perception and behaviors associated with risk of developing skin cancer, the current study focused exclusively on women.

In addition, because older women tend to have more realistic views of skin cancer and may have even had personal experience with it, given that the risk of skin cancer increases with age (Simard, Ward, Siegel, & Jemal, 2012), the current study focused exclusively on young women between the ages of 18-24 years old. Finally, risk of skin cancer varies as a function of race, with Caucasian women being at greatest risk,

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followed by Latin Americans, American Indians/Alaska Natives, Asian Americans/Pacific Islanders, and African American women (Centers for Disease Control and Prevention, 2013). As such, the current study focused exclusively on Caucasian women in order to control for variations in actual risk due to race and because this racial group is at greatest risk to develop skin cancer.

The study's experimental design was an Image (high risk image, low risk image, no image) x Peers' Risk Estimate Information (given, not given) x Personal Factors List (risk factors, protective factors, none) 3 x 2 x 3 factorial design. Depending upon the randomly assigned Image condition, participants viewed an image depicting high risk sun exposure, an image depicting low risk sun exposure, or no image. Based on random assignment of the Peers' Risk Estimate Information condition, participants were either provided with information about their peers' risk estimate of developing skin cancer or they were not provided with any peer information. Lastly, participants were randomly assigned to one of three Personal Factors List conditions in which they generated a list of their own protective factors against skin cancer, their own personal risk factors for skin cancer, or they were not asked to list factors. The effects of these manipulations on unrealistic optimism about one's perceived risk of skin cancer were assessed in terms of one's comparative risk (i.e., compared to another women of the same age and with the same skin tone). As a secondary objective, the effects of these manipulations on one's absolute risk estimate were also assessed (i.e., perceived likelihood of developing skin cancer independent of a comparison target). Though past research has shown that these manipulated conditions can individually alter unrealistic optimism, they have not been

examined together nor directly compared within the context of one study with the aim of intentionally influencing unrealistically optimistic risk estimates of developing skin cancer.

There were three main hypotheses of the current study.

Hypothesis 1a: Participants who received the "unrealistic optimism diminishing" conditions previously demonstrated to reduce unrealistic optimism (Weinstein, 1980; Weinstein, 1983; Weinstein, 1995), namely those who viewed the low risk image, were given peer risk estimate information, and generated a list of their own risk factors were expected to have significantly higher comparative risk estimates compared to participants who received the control conditions (no image, no peer information, and no factors list). Hypothesis 1b: Likewise, those who received the unrealistic optimism diminishing conditions were expected to have significantly higher absolute risk estimates than those who received the control conditions.

Hypothesis 2a: Participants who received "unrealistic optimism enhancing" conditions previously demonstrated to increase unrealistic optimism (Weinstein, 1980; Weinstein, 1995), namely those who viewed the high risk image, received no peer information, and generated a list of personal protective factors were expected to have significantly lower comparative risk estimates compared to participants who receive the control conditions. Hypothesis 2b: Likewise, those in the unrealistic optimism enhancing condition were expected to have significantly lower absolute risk estimates than those who received the control conditions.

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Hypothesis 3a: Participants who received the "unrealistic optimism diminishing" conditions were expected to have significantly higher comparative risk estimates than participants who received the "unrealistic optimism enhancing" conditions. Hypothesis 3b: participants who received the "unrealistic optimism diminishing" conditions were expected to have significantly higher absolute risk estimates than participants who received the "unrealistic optimism enhancing" conditions.

CHAPTER II

METHOD

Participants

The current sample consisted of 365 young women residing within the United States. To be eligible to partake in the study, participants had to be female, between 18-24 years old, and self-identify as Caucasian. Participants were recruited through Amazon's Mechanical Turk (MTurk) and received $0.25 as compensation for completing the study. Past research has shown MTurk to be a reliable tool that allows for the collection of high quality data (Bates & Lanza, 2013; Buhrmester, Kwang, & Gosling, 2011; Casler, Bickel, & Hackett, 2013).

Independent Variables

Independent variables in the current study include the Image, Factors List, and Peer Information as subsequently described.

Images

Two different images were used to represent low risk vs. high risk for skin cancer (see Appendix A). The two particular images were selected based on a pilot study of 50 women's responses solicited through MTurk. Participants in the pilot study rated the risk of a woman in each of 10 images for developing skin cancer on a scale from 1 (*low risk*) to 9 (*high risk*). The image with the lowest risk rating ($M = 3.32$; $SD = 2.02$) was subsequently used in the current study as the low risk image, while the image with the

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highest risk rating ($M = 8.08$; $SD = 1.28$) was used as the high risk image. A paired

samples t-test indicated the average ratings of the high and low risk images were

significantly different, $t(49) = -14.99$, $p < .001$. The low risk image shows a young

Caucasian woman sitting in the shade under a tree wearing a hat, and protective clothing.

This image is considered low risk because it reflects the woman practicing numerous

healthy behaviors while exposed to the sun (i.e., sitting in a shaded area, wearing a hat,

wearing protective clothing, etc.). The high risk image shows a similar looking woman

lying on the beach. This image was chosen because the woman is not wearing any

protective gear, she is directly exposed to the sun, and her skin is clearly burning in the

sun. This image represents a high risk of developing skin cancer because the woman is

not taking any preventive actions while engaging in a risky health behavior. Both images

were obtained from Google images. These images were used in order to investigate the

effect of viewing a high vs. low risk image on one's own risk estimate for skin cancer.

Participants were randomly assigned to conditions in which they view the low risk image,

the high risk image, or no image. Those in either of the image conditions were instructed

to "focus on the following image while it appears."

Peer Risk Estimate Information

Based on random assignment, participants did or did not receive the following

peer information regarding skin cancer risk perceptions: "Other young women your age

rated themselves as having a 34% chance of developing skin cancer in the future." This

peer risk information is based on past research showing that young individuals tend to

estimate their skin cancer risk as approximately 34% chance (Clarke, Williams, &
Arthey, 1997).

Personal Factors Lists

Depending on their randomly assigned condition, participants were asked to
generate a list of personal risk factors or personal protective factors for skin cancer.
Participants were instructed to: "List some of your own personal protective [risk] factors
against [for] developing skin cancer." There was no time limit on this portion of the
study. Thus, participants could list as many or as few factors as they saw appropriate.

<div align="center">

Dependent Measures

</div>

Dependent measures in the current study include comparative risk estimates and
absolute risk estimates as described below.

Comparative Risk Estimates

Participants' unrealistic optimism was assessed using two comparative risk items.
Specifically, participants were asked to estimate their risk of developing skin cancer in
relation to other similar women. The first item, adapted from Weinstein (1982) read:
"Compared to other women of the same age and skin tone, my chances of developing
skin cancer in the future are _____." The scale of response options ranged from -3
(*much below average*), to +3 (*much above average*), with a midpoint of 0 (*the same*). For
this item, negative scores below zero were indicative of unrealistic optimism. The second
item was identical to the first but differed in the response options and range. The second
item response options ranged from *100% less likely than others* to *100% more likely than*

others, with a midpoint of 0% (*equally likely as others*). For this item, scores below the midpoint reflected unrealistic optimism.

Absolute Risk Estimates

The participants were also asked to estimate their own absolute risk of developing skin cancer (without reference to any comparison target) by providing a percent from 0% - 100% chance.

<p align="center">**Possible Covariates**</p>

Due to their potential association with perceived risk of skin cancer, the following demographic information was also collected: education level, geographic region, personal history of skin cancer, family history of skin cancer, knowing someone with skin cancer, and personal skin tone (see Appendix B). Demographic factors found to relate to the dependent measures were included as covariates in the main analyses. Finally, in order to verify eligibility to participate, participants were also asked to specify their age, gender, and race.

<p align="center">**Procedure**</p>

Participants logged on to MTurk to complete a study about women's health beliefs and were informed in the study description that they must be Caucasian, female, residing with the United States, and between the ages of 18-24 to participate. Participants consented to participate in the study by clicking the link to the study. Once they began the study, they were asked their age, where they live in the US, their gender, and their race. Those individuals who indicated that they were not female, Caucasian, or between the ages of 18-24, were not permitted to continue the study.

Participants identified as Caucasian women within the required age range were randomly assigned to view the high risk image, the low risk image, or no image. The image remained on the screen for 10 seconds. Then, participants viewed peer information showing risk of skin cancer estimates provided by other individuals their age. This information remained on the computer screen for 10 seconds. Participants in the no peer information condition did not receive any information about their peers. Next, participants were asked to generate a list of personal protective factors against skin cancer, a list of personal risk factors for skin cancer, or were not asked to generate factors at all. They had as much time as they need to complete this task. The order of exposure to the three independent variables was counterbalanced to control for potential order effects on the dependent measures.

Following these manipulations, participants completed the comparative risk estimates and the absolute risk estimate. Lastly, they were asked about their own skin tone, personal history of skin cancer, family history, and whether they knew anyone who has had skin cancer. Upon completion of the study, participants were thanked and given a list of tips for protecting themselves against skin cancer from the American Cancer Society (see Appendix C). Finally, they were compensated for their participation.

CHAPTER III

RESULTS

Preliminary Analyses

Descriptive statistics were computed for all demographics and dependent variables. Two participants indicated having previously been diagnosed with skin cancer and their data were excluded. Thus, all subsequent analyses were based on the remaining 363 participants. As detailed in Table 1, 86% of participants reported having at least some college education. All four geographic regions of the United States were represented, with the largest portion of participants (32.5%) residing in the southern United States. Over half (54.5%) of participants indicated that they knew someone who had been diagnosed with skin cancer and many (32.5%) indicated having a family member who had been diagnosed with skin cancer. Finally, on average, participants rated their skin tone as light/fair on a scale from 1 to 7 ($M = 1.93$; $SD = 0.86$).

Regarding perceived risk of skin cancer, participants rated their absolute risk of skin cancer as below 50% chance ($M = 36.84\%$; $SD = 22.41$). In terms of their comparative risk of skin cancer, participants rated their risk as equally likely to developing skin cancer as other women of the same age and skin tone ($M = -0.01$; $SD = 1.43$) on the first measure. Conversely, on the second measure of comparative risk, they rated themselves as about 5% ($M = -4.94$; $SD = 42.09$) less likely to develop skin cancer

than other women of the same age and similar skin tone, reflecting slight comparative optimism.

Table 1

Descriptive Statistics of Demographics, Potential Covariates, and Risk Estimates

	Mean (n)	SD (%)	Range	Poss. Range
Region of the U.S.				
Midwest	(81)	(22.30%)		
Northeast	(90)	(24.80%)		
South	(118)	(32.50%)		
West	(74)	(20.40%)		
Highest Level of Education				
Less than high school	(3)	(0.80%)		
High school diploma	(45)	(12.40%)		
Some college	(142)	(39.10%)		
Associate's Degree	(40)	(11.00%)		
Bachelor's Degree	(115)	(31.70%)		
Master's degree or higher	(18)	(5.00%)		
Know Person With Skin Cancer				
Yes	(198)	(54.50%)		
No	(165)	(45.5%)		
Family Member With Skin Cancer				
Yes	(118)	(32.50%)		
No	(245)	(67.50%)		
Skin Tone	1.93	0.86	1.00-4.00	1.00-7.00
Risk Estimates				
Absolute Risk	36.84	22.41	99.00	0%-100%
Comparative Risk 1	-0.01	1.43	6.00	-3 - +3
Comparative Risk 2	-4.94	42.09	200.00	-100 - +100

Regarding assignment to experimental conditions, 119 participants viewed the low risk image, 120 viewed the high risk image, and 124 did not view any image. In terms of peer information, 180 participants were shown peer information, while 183 participants did not view any peer information. Finally, the 119 participants who were asked to list personal risk factors listed an average of 2.36 risk factors. The most common

risk factors listed were "tanning" and "not using sunscreen," which were listed by 63.87% of participants. The 121 participants who were asked to list protective factors listed an average of 2.52 protective factors, with "wearing sunscreen/SPF lotion" being the most common protective factor, as listed by 92.56% of participants. The remaining 123 participants were not asked to list any personal factors.

Next, correlations between the dependent variables and the potential covariates of education level, geographic region, personal history of skin cancer, family history of skin cancer, knowing someone with skin cancer, and personal skin tone were computed (see Table 2). Knowing someone who had been diagnosed with skin cancer and having a family member who had been diagnosed with skin cancer were correlated with absolute risk estimates and both comparative risk measures. Specifically, knowing someone who had been diagnosed with skin cancer was associated with higher absolute risk estimates ($r = .24$, $p < .01$), higher comparative risk estimates on the first measure ($r = .21$, $p < .01$) and higher comparative risk estimates on the second measure ($r = .19$, $p < .01$). Furthermore, having a family member who had been diagnosed with skin cancer was associated with higher absolute risk estimates ($r = .28$, $p < .01$), higher comparative risk estimates on the first measure ($r = .33$, $p < .01$), and higher comparative risk estimates on the second measure ($r = .30$, $p < .01$). Accordingly, these two variables were included as covariates in the following main analyses.

Table 2

Bivariate Correlations among Risk Estimates and Potential Covariates

	Absolute Risk	Comparative Risk 1	Comparative Risk 2
Family Member With Skin Cancer	.28**	.33**	.30**
Know Person With Skin Cancer	.24**	.21**	.19**
Highest Education Level	.08	.03	.08
Region of the U.S.	.03	-.01	.01
Skin Tone	.08	.01	.09

**$p < .01$

Main Analyses

A 3 x 2 x 3 MANCOVA (with knowing someone who had been diagnosed with skin cancer and having a family member who had been diagnosed with skin cancer as covariates) on the two measures of comparative risk and one measure of absolute risk was computed. The overall MANCOVA indicated that there was a significant main effect for Peer Information, Wilks' Lambda = .959, $F(3, 341) = 4.92$, $p = .002$, $\eta_p^2 = .041$ and for the covariate "having a family member who had been diagnosed with skin cancer," Wilks' Lambda = .928, $F(3, 341) = 8.775$, $p < .001$, $\eta_p^2 = .072$. There were no other main effects or interaction effects in the overall MANCOVA.

Follow-up univariate analyses of covariance (ANCOVAs) were used to probe effects on each dependent measure and to contrast specific groups of interest in order to

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test Hypotheses 1a and 1b: That participants who received the "unrealistic optimism diminishing" conditions were expected to have significantly higher comparative risk estimates and higher absolute risk estimates compared to participants who received the control conditions. For all three dependent measures, there were no significant interaction effects. As shown in Table 3, those who received the "unrealistic optimism diminishing" conditions did not significantly differ from those who received the control conditions in terms of either their comparative or absolute risk estimates. Thus, Hypotheses 1a & 1b were not supported.

The same ANCOVAs were used to test Hypotheses 2a & 2b: That participants who received the "unrealistic optimism enhancing" conditions were expected to have significantly lower comparative risk estimates and lower absolute risk estimates compared to participants who received the control conditions, and Hypotheses 3a & 3b: That participants who received the "unrealistic optimism diminishing" conditions were expected to have significantly higher comparative risk estimates and higher absolute risk estimates than participants who received the "unrealistic optimism enhancing" conditions. Again, a lack of significant interaction effects indicated a lack of support for these hypotheses. That is, those in the "unrealistic optimism enhancing" condition did not differ in comparative or absolute risk estimates from either those in the "unrealistic optimism diminishing" condition or those in the control condition. See Table 3.

Table 3

Means and Standard Deviations for Optimism Diminishing, Enhancing, and Control Conditions

	Diminishing[d] M (SD)	Enhancing[e] M (SD)	Control[f] M (SD)
Absolute Risk[a]	32.24% (4.87)	37.78% (4.99)	41.92% (4.98)
Comparative Risk 1[b]	0.40 (0.31)	-0.12 (0.32)	0.37 (0.32)
Comparative Risk 2[c]	1.95% (9.27)	-10.39% (9.50)	5.49% (9.49)

[a]Absolute Risk: $F(4, 343) = 1.33$, $p = .26$. [b]Comparative Risk 1: $F(4, 343) = 0.24$, $p = .91$. [c]Comparative Risk 2: $F(4, 343) = 0.53$, $p = .72$. [d]$n = 19$. [e]$n = 18$. [f]$n = 18$.

Despite the lack of support for the main hypotheses, the ANCOVA results did indicate significant main effects for Peer Information on two of the three dependent measures. Specifically, those who received peer information versus those who did not receive peer information significantly differed in both absolute risk estimates and comparative risk estimates. Unexpectedly, participants who viewed peer information estimated their own absolute risk of skin cancer as significantly lower ($M = 32.56\%$) than participants who did not view peer information ($M = 41.04\%$), $F(1, 343) = 14.04$, $p < .001$, $\eta_p^2 = .039$. Similarly, participants who viewed peer information estimated their comparative risk as significantly lower ($M = -9.33\%$) than those who did not view peer information ($M = -0.75\%$), $F(1, 343) = 3.97$, $p < .05$, $\eta_p^2 = .011$. Thus, contrary to the expectation that exposure to peer information would diminish optimism, it had the opposite effect in that it significantly enhanced optimism resulting in lower perceived absolute and comparative risk of skin cancer.

CHAPTER IV

DISCUSSION

According to Linos et al. (2011), only 30% of Caucasian adults use sunscreen regularly, while more than 50% experienced at least one sunburn in the past year. Furthermore, recent research has found that 25% of young Caucasian women utilize indoor tanning beds, with 15% reporting frequent use (Guy Jr, Berkowitz, Watson, Holman, & Richardson, 2013). Given that young women continue to intentionally expose themselves to the sun, tanning beds, and get sunburned despite knowing the risks of skin cancer, it is important to identify factors that contribute to these unhealthy behaviors. One such factor examined in the current study is unrealistic optimism, the tendency to believe that one is less likely than others to experience negative life events (Shepperd et al., 2013). Consistent with various health behavior theories including the Health Belief Model (Becker, 1974; Janz & Becker, 1984), the Theory of Reasoned Action (Fishbein & Ajzen, 1975), and the Precaution Adoption Process Model (Weinstein, 1988) less unrealistic optimism, as indicated by greater perceived risk, should be associated with more precautionary behaviors. Thus, the current study expanded upon the existing literature on unrealistic optimism in health contexts by manipulating the tendencies that contribute to unrealistic optimism. This study included an "unrealistic optimism enhancing" condition (i.e., high risk image, no peer information, and list of personal protective factors) and an "unrealistic optimism diminishing" condition (i.e., low risk

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image, peer information, and list of personal risk factors). These conditions were created based on past research indicating that these particular factors contribute to the enhancement or diminishment of unrealistic optimism for risk perceptions (Weinstein, 1980; 1983; Weinstein & Klein, 1995). Unrealistic optimism was assessed in terms of both comparative risk estimates and absolute risk estimates.

On average, 20 out of every 100,000 or 2.0% of Caucasian women are diagnosed with skin cancer each year (Howlader et al., 2015). In the current study, young women estimated their absolute risk of developing skin cancer in the future as 36.84% on average. Thus, it appears that the current group of women greatly overestimated their risk of developing skin cancer in the future. Despite this overestimation in their absolute risk, they were slightly optimistic when comparing their own risk to a similar other's risk.

The results of the current study did not support the main hypotheses. It was expected that individuals who viewed the low risk image, received peer risk estimate information, and generated a list of personal risk factors would perceive their risk of developing skin cancer in the future as higher compared to participants who received the control conditions (no image, no peer information, and no factors list) and compared to those who viewed the high risk image, received no peer information, and generated a list of personal protective factors. It was also expected that this latter group would perceive themselves as being at lower risk of developing skin cancer compared to participants who receive the control conditions.

There are several possible reasons why these hypotheses were not supported. The current study investigated the potential impact of three different factors (i.e., images, peer

information, and listing personal factors) on individuals' risk estimates. As indicated by the results, peer information had the largest impact of the three factors on subsequent risk estimates, whereas viewing images and listing personal factors had no significant influence on risk estimates. It is possible that the images used in the current investigation were not influential or extreme enough to result in a substantial change in risk estimates. The high risk image in this study showed a woman lying in the sun without protective gear and appearing to get sun burned. Spending time in the sun may be a common behavior for some participants and thus, viewing the image did not affect their subsequent risk estimates. However, had the image shown more extreme effects of sunburn, such as extremely red blistering skin, participants may have drastically lowered their personal risk estimates due to contrast effects.

Varying the method in which skin cancer messages are presented may influence the degree of impact they have on one's personal risk estimates. More specifically, there may be other factors not included in the current study that strongly impact personal risk perceptions, such as health related videos, images of individuals with skin cancer, or personal accounts from someone who has skin cancer. These alternate stimuli may serve to arouse feelings of fear among participants. A meta-analysis of fear appeals in health campaigns found that strong fear appeals are persuasive and can evoke feelings of susceptibility among individuals (Witte & Allen, 2000). The stimuli used in the current study may not have been extreme enough to result in significant differences in risk estimates. Therefore, using more fear-eliciting stimuli in future research may have a larger influence on individuals' risk estimates.

Listing personal risk or protective factors also did not have a substantial impact on risk estimates. Although participants were able to list personal factors putting them at greater risk for skin cancer, such as not wearing sunscreen and using tanning beds, they may not be aware of the degree to which these actions increase their risk for skin cancer. For instance, participants may have believed that indoor tanning only slightly increases their risk of skin cancer, when in reality, individuals who use tanning beds before the age of 35 experience a 59% to 75% increase in their risk for developing skin cancer (Guy Jr et al., 2013). Furthermore, participants who listed personal protective factors may not realize the strong positive impact of such actions. For example, Green, Williams, Logan, and Strutton (2011) conducted a longitudinal study, which showed that wearing sunscreen on a daily basis cut skin cancer risk in half. If participants were informed of the true impact of these types of risk and protective factors, perhaps the task of listing them would prove more effective.

Despite the lack of support for the hypotheses, the current findings did yield a significant main effect for Peer Information, but in the opposite direction of what was expected. Specifically, women who viewed peer information estimated their own absolute risk and their comparative risk of developing skin cancer as significantly lower than those who did not view peer information. Past research suggests that those who receive peer information regarding a typical person's risk of experiencing a negative event would rate their own risk as higher, thus showing lower levels of unrealistic optimism (Rothman, Klein, & Weinstein, 1996; Weinstein, 1983). However, in the current study, participants who received peer information actually displayed higher levels

of unrealistic optimism, as they rated themselves at lower risk than others for developing skin cancer in the future. The provided peer information stated that other individuals rated themselves as having a 34% chance of developing skin cancer in the future. This percentage was adopted from prior research showing that young individuals rated their own risk of developing skin cancer in the future as about 34% (Clarke et al., 1997). Past research has shown that when provided with peer information, individuals' current perceptions tend to conform to the descriptive norms (Smith-McLallen & Fishbein, 2008). In this case, the provided peer information may have led participants to make risk estimates similar to the given statistic. This may explain why participants displayed higher levels of unrealistic optimism, which is the opposite effect of what was expected. Presumably, participants would rate their risk of developing skin cancer as much higher if they were told the average person rated their risk as 75% for example. Future research should manipulate the peer information component by providing different risk percentages in order to assess its degree of influence on absolute and comparative risk estimates.

Consistent with prior research (Manne et al., 2004; Manne et al., 2011), family history of skin cancer predicted greater perceived risk of skin cancer in the current study. Participants who reported having a family member who had been diagnosed with skin cancer had higher absolute risk estimates and higher comparative risk estimates on both measures as compared to other women in the study. Thus, as expected, individuals who had experiences with skin cancer through a family member were less optimistic in their personal risk estimates. These findings are consistent with a prior study by Manne et al.

(2004) who found that 65% of individuals who had a family member diagnosed with skin cancer rated their risk as higher than the risk of others. Likewise, another past study showed that individuals who were related to a skin cancer patient rated themselves at a higher risk compared to others for developing skin cancer (Manne et al., 2011). This trend highlights the influence that family histories can have in the forming of one's health perceptions.

<div align="center">**Implications**</div>

The current findings imply that young women may be greatly influenced by information about similar others when determining their own risk for developing skin cancer in the future. In that case, it may be advantageous to share statistics highlighting the dangers of skin cancer and its prevalence in today's society in hopes of diminishing levels of unrealistic optimism among individuals who are underestimating their risk of skin cancer. Ideally, lower levels of unrealistic optimism, reflected by higher personal risk estimates, would contribute to more preventative health behaviors regarding skin cancer, as suggested by the Health Belief Model (Becker, 1974; Janz & Becker, 1984), the Theory of Reasoned Action (Fishbein & Ajzen, 1975), and the Precaution Adoption Process Model (Weinstein, 1988). In particular, the Health Belief Model (Becker, 1974; Janz & Becker, 1984) asserts that perceived susceptibility and perceived benefits influence health related behaviors. Accordingly, individuals who do not feel susceptible to skin cancer or who believe appearing tan outweighs the benefits of sunscreen are not likely to engage in protective sun behaviors. In the case of women with a family history of skin cancer, their perceived susceptibility is likely higher than women without a family

history of skin cancer. Therefore, health campaigns targeting these individuals do not need to focus on increasing perceptions of susceptibility. Instead, those campaigns should focus on increasing personal self-efficacy and the perceived benefits of sun protective behaviors. Overall, future research in this area should aim to discover specifically which factors have the strongest influence on individuals' health perceptions regarding skin cancer.

Furthermore, the fact that viewing images and listing personal factors did not significantly impact risk perceptions indicates that individuals may not be strongly influenced by such stimuli. As previously mentioned, the specific stimuli used in the current study may not have been impactful enough to elicit changes in risk estimates. Perhaps individuals are already aware of their personal risk or protective factors on a regular basis, and thus, the task of listing them was not especially effective. In future research, distinguishing between influential and non-influential factors is vital for determining how to create effective health campaigns.

Study Limitations and Future Directions

One limitation of the current study is that it focused exclusively on young Caucasian women, which reduces the generalizability of the current findings. Therefore, future research should expand beyond this specific group of individuals to assess skin cancer risk estimates among, for example, men, older individuals, and racial minorities. Past research has uncovered gender differences in perceptions of skin cancer risk, as women tend to rate their risk of developing skin cancer as higher than men do (Branstrom et al., 2005). Therefore, studies assessing risk perceptions of men may show lower

absolute and comparative risk estimates among those individuals. In that case, skin cancer prevention campaigns directed towards men should focus on increasing perceived susceptibility among this group of individuals.

Also, older adults tend to view themselves as more at risk for developing skin cancer than younger adults (Carmel et al., 1994). Therefore, examining risk perceptions of older individuals would likely result in higher absolute and comparative risk estimates. Furthermore, research has found that older individuals are less motivated than younger individuals to conform to perceived norms among their peers (Parker, Manstead, Stradling, Reason, & Baxter, 1992). In this case, studies focusing exclusively on older adult populations may not find a significant influence of peer information on skin cancer risk estimates.

Moreover, it is likely that differences in risk estimates would emerge among different races, due to the fact that research has shown the risk of skin cancer varies as a function of race. Compared to other racial groups, Caucasians are at the greatest risk for developing skin cancer (Centers for Disease Control and Prevention, 2013). Research has also shown that attitudes regarding skin cancer differ for African Americans and Hispanics as compared to Caucasians. African American and Hispanic individuals tend to believe their risk of skin cancer is lower than others, and therefore are less likely to seek medical attention for potentially dangerous skin spots (Friedman et al., 1994). Because these groups perceive their risk of developing skin cancer as comparatively low, their risk estimates may not be impacted by viewing an image or listing personal factors. This would likely contribute to higher personal risk estimates among Caucasian participants

and lower personal risk estimates among African American and Hispanic participants. Expanding this area of research to these other various participant pools would enhance the understanding of various factors that influence personal perceptions of skin cancer.

Although the current study investigated the potential influences of various factors on individuals' risk perceptions of skin cancer, it did not examine behavioral outcomes of exposure to the different stimuli. An important aspect of research on risk perceptions involves the relationship between one's personal health beliefs and subsequent health behaviors. Future research should measure behavioral outcomes of exposure to a high/low risk image, peer information, or generating a list of personal protective/risk factors. Some of the important behaviors to examine regarding skin cancer include amount of time spent intentionally tanning, sunscreen use, and frequency of skin exams. Behavioral outcomes warrant further study since they can have a substantial effect on one's health and well-being.

As previously mentioned, future research should also strive to determine what other factors may play a significant role in the formation of health perceptions. By pinpointing the most influential factors, health campaigns can utilize them in such a way as to diminish levels of unrealistic optimism and foster more realistic health perceptions. Ideally, this would contribute to more precautionary health behaviors among individuals as well.

In conclusion, the current study provides valuable information regarding the influence of various factors on health risk perceptions. Individuals' unrealistic optimism was not affected by viewing images or listing personal factors, while viewing peer

information enhanced unrealistic optimism instead of diminishing it as predicted. The current findings have significant implications for understanding how individuals form their personal health perceptions. Furthermore, as individuals continue to intentionally sunbathe, the current study highlights the need for further research regarding unrealistic optimism and health risk perceptions of skin cancer.

APPENDICES

Skin Cancer Risk Images

Low Risk Image:

High Risk Image:

Appendix B
Demographics Questionnaire

Demographics:

1. What is your highest level of education completed?
        Less than a high school diploma
        High school diploma/GED
        Some college
        Associate's Degree
        Bachelor's Degree
        Master's Degree
        PhD/MD/JD

2. In what region of the United States do you reside?
        Midwest
        Northeast
        South
        West

3. Personal history of skin cancer
        Have you ever been diagnosed with skin cancer? Yes/No

4. Family history of skin cancer
        Has anyone in your family been diagnosed with skin cancer? Yes/No

5. Knowing someone with skin cancer
        Do you know anyone who has been diagnosed with skin cancer? Yes/No

6. Select a number below that best describes your skin tone:
        Fair/Light   Medium   Dark
          1   2   3   4   5   6   7

7. How old are you? _____ years

8. What is your gender? Female/Male

9. Please indicate which of the following racial categories best describes you:
        Caucasian
        African American
        Asian
        Latina
        Native American
        Hawaiian/Pacific Islander

Appendix C
Skin Protection Information Sheet

Thank you for participating in this study. The purpose of this study is to gain a better understanding of how young women view their risk of developing skin cancer. According to the American Cancer Society (2014), there are a number of things that you can do to protect yourself from skin cancer:

- Wear sunglasses
- Wear a hat
- Wear sunscreen and reapply every few hours
- Sit in the shade and avoid exposure to direct sunlight
- Avoid using tanning beds

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