

Factors influencing appearance appeals for decreasing unsafe tanning behaviors

by

Aaron Entringer

B.A., Augustana University, 2014

A THESIS

submitted in partial fulfillment of the requirements for the degree

MASTER OF SCIENCE

Department of Psychological Sciences  
College of Arts and Sciences

KANSAS STATE UNIVERSITY  
Manhattan, Kansas

2017

Approved by:

Major Professor  
Laura Brannon, Ph.D.

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## **Abstract**

In a two-study thesis, the current project compares the effectiveness of various messages aimed at reducing unsafe high-end tanning behaviors. Study 1 used messages focused on either the appearance or health consequences of tanning in an effort to reduce the intention of unsafe high-end tanning behaviors. The results indicated that participants did not differ in their high-end sun tanning frequencies as a result of the message condition, but that there was an interaction effect between message type and gender, such that appearance messages were most effective at reducing unsafe tanning behaviors for females. However, upon further examination of the appearance messages, it was noted that there were two primary aspects of appearance content that were present: aging and blemishes. Therefore, Study 2 examined whether the gender effect that was present in Study 1 was being driven by either the aging or blemish content of the messages. Surprisingly, it was found in Study 2 that aging messages were more effective on male participants than female participants at reducing intention of unsafe high-end tanning behaviors. Additionally, it was found in Study 2 that graphic images effectively decreased intention to perform unsafe high-end tanning behaviors. These findings along with their implications are discussed.

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## **Chapter 1 - Overview**

The primary purpose of this project was to examine the current appeals that are being used to reduce unsafe tanning behaviors. Ultimately, it was the project's goal to determine which appeals were most effective for certain individuals in an effort to provide more personalized and effective communication strategies in regards to the promotion of safe tanning behaviors. What follows is a discussion of the dangers of unsafe tanning, as well as the current state of research on tanning motivations and interventions that have been utilized to date. This will culminate in Study 1, which compared the effectiveness of appearance messages and health messages on reducing unsafe tanning behaviors among participants. Given this first study's findings, it was apparent that a follow-up study was necessary in order to further explore the nature of appearance messages. This led to Study 2, which sought to determine the effectiveness of messages containing content that focused on the aging effects of tanning and messages containing content that focused on the blemish effects of tanning. Study 2 also analyzed the results across genders to determine which message types are most effective for both males and females. In addition to these variables, Study 2 also included the use of graphic images to determine what effect, if any, they may have when combined with both aging and blemish messages.

### **Dangers of Tanning**

Skin cancer is one of the most prevalent health concerns facing the U.S. The American Academy of Dermatology (AAD) reports that the incidence rate of skin cancer exceeds the rates of all other cancers combined in the U.S. (AAD, 2016). In addition, the AAD reports that each year in the United States, nearly 5 million people will be treated for skin cancer (AAD, 2016). Many of these cases are non-melanoma forms of skin cancer. Although non-melanoma skin

cancer is not something to be taken lightly, it is not the most serious form of skin cancer. In most cases, it is highly treatable and usually non-life threatening. The most serious cases are those that are classified as melanomas. The aforementioned AAD report finds that melanoma is responsible for 75% of skin cancer deaths in the U.S. (American Academy of Dermatology, 2016). The report also estimated that 144,860 new cases of invasive melanoma would be diagnosed in 2016, and that there would be 10,130 deaths in 2016 as a result of the disease (AAD, 2016). To reframe those numbers, that means that a new case of melanoma is diagnosed about once every 4 minutes in the U.S. and that there would be roughly one death from the disease every hour. Moreover, treatments for such cases of melanoma are estimated to cost over 3.3 billion dollars in the U.S. per year (AAD, 2016). These numbers highlight the fact that there is a very serious and expensive health problem that is plaguing the U.S.

Melanoma is primarily caused by ultraviolet (UV) radiation. A report by the Skin Cancer Foundation found that 86% of melanoma cases were attributable to UV radiation (Skin Cancer Foundation, 2016). UV radiation is obtained through either direct exposure to the sun's rays or through other artificial sources of UV light. Whenever an individual goes outside without proper skin protection, they are susceptible to UV radiation. Oftentimes, this can be the result of an individual wishing to tan outdoors. In addition, the use of indoor tanning beds also provide direct exposure to UV radiation. It is these acts of tanning that this project focuses on.

In reviewing prior research, we can see just how prevalent tanning has become in the U.S. Abar et al. (2010) report that every day, close to 2 million Americans will visit a tanning salon. Of that number, around 70% are females between the ages of 16 and 49. Basch, Hillyer, Basch, and Neugut (2012) conducted a survey of 153 college undergraduates and found that nearly 88% of respondents reported spending more than 3 hours per day outdoors during the

summer. Of that number, Basch et al. (2012) found that only 17% of them indicated that they always used sunscreen when going outdoors. Perhaps an even more surprising finding from Basch et al. (2012) is that 60% of their respondents reported recent indoor tanning. The AAD (2016) came up with similar findings in their report, with 59% of college students, 35% of adults, and 17% of teens self-reporting using a tanning bed at some point in their lifetime. Such a large number of indoor tanners indicates that the desire for bronzed skin is widespread in our society, especially among young adults. As a result, it is not surprising to find that the most common form of cancer among women between the ages of 20 and 29 is melanoma (Abar et al., 2010). This information suggests that the desire for tanned skin has been creating a serious health problem for young adults in the U.S.

### **Tanning Motivations**

Several research studies have looked at motivations for tanning among individuals. Two of the most prominent motivations studied have been appearance and health motivations. For instance, Heckman, Wilson, and Ingersoll (2009) surveyed participants to find whether they had an appearance orientation (i.e. a great concern about one's appearance) or a health orientation (i.e. a great concern about one's health) and then related those orientations to tanning. They found that appearance orientation was associated with sunburns and incidental summer sun exposure. Appearance orientation was also associated with participants being more worried about skin cancer, and more worried about photoaging (Heckman, Wilson, & Ingersoll, 2009). Furthermore, Hillhouse, Turrisi, and Kastner (2000) compared tanning salon attitudes between those who tanned for appearance reasons and those who tanned for health reasons. The researchers found that those who were motivated to tan for appearance reasons reported significantly more favorable attitudes towards tanning salons. These findings were further

corroborated in a more recent study from Darlow, Heckman, and Munshi (2016), which looked at tanning motivations among high school girls. Here, researchers found that appearance was a significant motivation for sunbathing.

Another study from Beasley and Kittel (1997) identified key motivations for visiting tanning salons. They identified factors such as the perceived attractiveness of tans, socialization, and even perceived health as motivating factors. While it may seem odd that one might choose to tan for health reasons, there is a way to make sense of it. Researchers Yoo and Kim (2014) looked at health motivations to tan and reasoned that those who saw tanning as a healthy behavior were associating it with other healthy activities. For instance, if an individual is playing a sport outdoors while attempting to get a tan, they may look at it as a healthy behavior, simply because they were exercising at the time.

Research on tanning motivation has also looked at possible gender differences. A study from Cafri et al. (2008) developed a scale to assess appearance reasons to tan. This scale included dimensions such as appearance reasons to tan, appearance reasons not to tan, and sociocultural reasons for tanning. The researchers found that females scored higher than males on all three of the aforementioned dimensions. These findings would seem to indicate that women are more influenced by the appearance aspects of tanning in their decision of whether or not to tan. However, there is also research that indicates a gender difference in the opposite direction. A study by Banerjee, Campo, and Greene (2008) presented both male and female participants with photographs that showed the same woman with three varying levels of tanned skin (light, medium, and dark) and asked them about the attractiveness and perceived health, height, and weight of each of the photographed models. The results from this study indicated that only the male respondents perceived the dark-tanned woman as more physically attractive

and thinner than the medium-tanned and light-tanned woman. In addition, males also found the dark-tanned woman to be more interpersonally attractive and healthier than the medium-tanned woman. Female participants did not show different perceptions of the physical attractiveness, interpersonal attractiveness, or perceived health of any of the three images. Day, Wilson, Hutchinson, and Roberts (2016) were also able to find support for the idea that men are motivated to tan for appearance reasons. In this study, the researchers found that not only did males also have a desire for a tanned appearance, but they were also influenced to tan by peer sociocultural perceptions, indicating that males believe a tanned appearance is desirable among their peers. Based on the complex findings of these studies, it appears that there still is not a complete answer as to how tanning motivations differ by gender.

## **Chapter 2 - Study 1**

The purpose of Study 1 was to explore the effectiveness of appearance versus health messages regarding tanning as it pertains to lowering high-end tanning intentions. A decision was made to focus on high-end tanning intentions rather than an average of intentions due to the increased risk associated with tanning heavily (Dennis et al., 2008; Wu, Han, Laden, & Qureshi, 2014). Essentially, infrequent tanning is much less likely to lead to negative health outcomes. Instead, consistent tanning and frequent sunburns are likely to result in increased risks for things like skin cancer and melanoma. As such, it is these more dangerous behaviors that will be focused on, as opposed to the more often-used “average” of behavior. Additionally, the results were analyzed to look for possible gender differences in regards to future tanning intentions. A summary of the relevant literature pertaining to tanning the effectiveness of appearance and health messages follows.

### **Appearance vs. Health**

Studies that have looked at interventions to promote safe tanning behaviors have typically focused on appearance (Abar, Turrisi, Hillhouse, Loken, & Stapleton, 2010; Jackson & Aiken, 2006; Loosemore & Grogan, 2015; Stapleton, Turrisi, Hillhouse, Robinson, & Abar, 2010). In each of these cited instances, the interventions were found to be at least somewhat successful, meaning that appealing to one’s appearance can be an effective way to promote safe tanning behaviors. Interventions that have looked at both appearance and health appeals in an effort to promote safe tanning behaviors have occurred much less frequently, though there are a few that stand out. Jones and Leary (1994) conducted a study in which participants read an essay that focused on the consequences that tanning can have on either one’s health or one’s appearance. Here, health messages were comprised of content that described the health risks of tanning, listed

incidence statistics for skin cancer, and described types of cancer. The appearance messages described the negative effects that tanning can have on appearance, such as scarring, wrinkling, and aging. Jones and Leary (1994) found that appearance essays were more effective than health essays at raising participants' concerns about the harmful effects of the sun and at increasing intention to use sunscreen.

A study from Thomas et al. (2011) also compared the effects of appearance appeals vs. health appeals. The researchers presented participants with messages on the topic of skin cancer that included information on either appearance issues associated with tanning (e.g. premature aging) or health issues associated with tanning (e.g. premature death). In this manipulation, the researchers' messages contained four lines of factual data concerning skin cancer that was followed by six lines of either appearance-framed or health-framed information. The authors then measured the perceived threat of skin cancer, intentions to perform different skin cancer prevention behaviors, and body consciousness among the participants. They found that participants who viewed the appearance message reported higher perceived threat of skin cancer than participants who read the health message. However, there was no difference between the two message conditions in terms of their intentions to perform different skin cancer prevention behaviors (Thomas et al., 2011). In addition, Thomas et al. (2011) found that loss-framed messages (i.e. messages centered on the costs of tanning) were more effective than gain-framed messages (i.e. messages centered on the benefits of not tanning) at decreasing future intention to tan. This finding, coupled with findings from Mays and Zhao (2015), where it was also found that loss-framed messages were more effective than gain-framed messages at reducing future tanning intentions, led to the decision to use loss-framed messages in Study 1.

A recent study from Morris, Cooper, Goldenberg, Arndt, & Gibbons (2014) also looked at both appearance and health appeals. The main interest of this study was looking at the effect of priming mortality when used with both appearance and health appeals on the dangers of tanning. When given reminders of their own mortality, participants who were provided with appearance appeals reported greater intention to use sun protection than participants who were provided with health appeals. The authors posited that the Goldenberg & Arndt's (2008) Terror Management Health Model (TMHM), which suggests that when thoughts of death are accessible, health decisions are likely to be aimed at maintaining self-esteem, could primarily explain this effect. When participants were given a reminder of their own mortality, it may have elicited a desire to maintain their self-esteem by improving (or conversely, not damaging) their appearance. In an earlier study, Mahler, Fitzpatrick, Parker, & Lapin (1997) showed participants slideshows consisting of either health content or content related to photoaging (i.e. aging of the skin due to UV radiation). Participants from the photoaging group were found to be more likely to intend to share the information that they had learned from the slideshow with their peers (Mahler et al., 1997). More importantly, using a spectrophotometer (a device used to measure melanin content), they found that participants from both intervention groups had lower melanin contents at a six-week follow-up than did participants from a control condition (Mahler et al., 1997). Melanin is the pigment that gives skin its color. The darker someone's skin is, the more melanin that they have. Having evidence of higher melanin content is an indication that someone has spent more time exposed to the sun. This evidence indicates that the control condition spent noticeably more time exposed the sun in between the study and its six-week follow-up than did the participants from either the health or photoaging groups.

As for gender differences, none of the aforementioned studies demonstrated a significant difference between males and females on either appearance or health appeals. Interestingly, while most of the previous research indicates that appearance appeals are more effective than health appeals, one study that used a population of only male construction workers found the opposite. In Stock et al.'s (2010) study on the matter, they provided their exclusively male participants with an educational video on either photoaging (one of the primary appearance defects caused by UV exposure) or skin cancer. The researchers found that participants who viewed the educational video on skin cancer reported higher levels of sun protection cognition, which was found to mediate for increased sun protection behaviors, as well as decreases in skin color. This finding suggests a context where health appeals may be more effective than appearance appeals. Given this information, and the contradictory findings on gender differences in tanning motivation, Study 1 sought to clarify the issue by providing more concrete results.

## **Hypotheses**

As mentioned, the purpose of Study 1 was to compare the effectiveness of appearance vs. health appeals on the promotion of safe tanning behaviors. Likewise, Study 1 sought to determine whether the effectiveness of these message types varied by gender. Study 1 used message type (i.e., message content focused on appearance-related consequences of tanning vs. message content focused on health-related consequences of tanning) and gender as independent variables, while assessing dependent variables of the 1) length of time that an individual intended to tan in the future and 2) frequency with which an individual intended to tan in the future. Both of these dependent variables were asked in the form of a high-end estimate (e.g. "When you are tanning most heavily, how many days per month would you be willing to sun-tan outdoors?").

This was done in an effort to account for the most maximal tanning behaviors of individuals, as opposed to just their “average” behaviors. As these maximal behaviors are likely to be more damaging and increase risk for negative health outcomes, we want to focus on this more damaging behavior. In addition, the following hypotheses were tested using reported past high-end length of time and frequency of tanning, respectively, as covariates. This was done to ensure equality between groups. Based on the review of the literature mentioned above, the following hypotheses were tested.

*Hypothesis 1:* There will be a main effect of message type for both of the dependent variables, such that participants receiving an appearance message would report lower intended high-end frequency of outdoor tanning and lower intended high-end lengths of time for outdoor tanning than those receiving a health message.

*Hypothesis 2:* There will be an interaction effect between message type and gender for each of the dependent variables. This interaction effect would be such that the main effect in hypothesis one would be stronger for women than for men, with a greater difference between the effectiveness of appearance and health messages for women.

## Chapter 3 - Study 1 Method

### Participants

The study included 494 undergraduate students (age:  $M = 19.87$ ) participating in exchange for course credit (62% female, 38% male). Roughly 79% of all participants indicated that they previously sunbathed, while 36% of all participants indicated that they had previously used a tanning bed. It was found that 69.2% of prior sunbathers were female, compared to 90.3% of prior tanning bed users being female. For the purposes of analyses, only participants that had reported prior sunbathing or tanning bed use were included ( $n = 390$ ).

### Measures

Two primary questions were used as the pretest in Study 1 (see Appendix A). To assess past tanning behavior, participants indicated the frequency (number of days 0-30 in a month) with which they have tanned outdoors and the length of time spent tanning during each session (measured in minutes). Participants were asked to provide a high-end estimate of both of these behaviors. This high-end estimate asked participants to think about periods of time in their life where they were tanning the most. A high-end estimate was used in an effort to focus on periods of time where skin damage is most likely to occur. Findings from Dennis et al. (2008) indicate that an increased risk for melanoma is associated with an increasing number of sunburns. Additionally, Wu, Han, Laden, & Qureshi (2014) found that Caucasian women who had received five or more blistering sunburns between the age of 15 and 20, had an 80% increased risk for contracting melanoma. Wu et al. (2014) also note that these women had a 68% percent higher risk for basal cell carcinoma and squamous cell carcinoma, two other forms of skin cancer. Together, these findings indicate the dangers of heavily tanning and the need to focus on this more risky behavior.

In the posttest, once participants had viewed their respective messages, they were asked to indicate their future intention for their high-end tanning behaviors (see Appendix B). These questions were in regards to the frequency and length of time they would spend sunbathing (e.g. “When you are tanning most heavily, how many days per month would you be willing to tan outside?”). As Hillhouse et al. (1997) concluded that measuring tanning intention is an adequate replacement for measuring actual tanning behavior, Study 1 opted for assessing tanning intentions rather than actual tanning behavior.

### **Procedure**

After participants were successfully recruited, they began an online survey. First, participants were asked about their current high-end tanning habits (length of time and frequency). Following that, each participant was randomly assigned to view one of two message types (see Appendix C). One message type focused on the appearance-related consequences of tanning (e.g. “Freckles, age spots, spider veins on the face, and rough and leathery skin can all be traced to UV light exposure”). The other message focused on the health-related consequences of tanning (e.g. “Exposure to the UV rays damages DNA in the skin. When a person’s body cannot repair the damaged DNA, cancer develops”). Both the appearance message and the health messages were approximately the same length, as they consisted of three paragraphs. Aside from emphasizing appearance in one message and health in the other, efforts were made to use similar wording between the two messages. Participants were allowed to view their message as long as they wished, and after they were finished reading one of the messages, participants were asked to indicate their future intentions regarding high-end outdoor tanning (length of time and frequency). After providing their future intentions towards tanning behaviors, participants were

asked to provide demographic information. Finally, after completing these questions, participants were debriefed and the study concluded.

To ensure that both the appearance and health messages were focusing on the consequences that they were intended to (i.e. the appearance message focused on appearance and the health message focused on health), a study was conducted asking participants to view both the appearance and health messages and respond to questions regarding their content. It was found that 31 out of 33 (93.9%) participants found the appearance message to be more focused on the appearance-related consequences of tanning than on the health-related consequences. Similarly, 31 out of 33 (93.9%) participants found the health message to be more focused on the health-related consequences of tanning than on the appearance-related consequences. Additionally, items were included for both messages that asked participants to rate their agreement on a 7-point Likert scale with the statements, “The message I just read focused on appearance-related consequences of tanning” and “The message I just read focused on health-related consequences of tanning”. Through a paired samples t-test, it was found that participants’ responses on the items for the appearance message were significantly different  $t(32) = 7.45, p < .01$ , with participants finding that the appearance message focused more on appearance-related consequences ( $M = 6.24, SD = 0.94$ ) than health-related consequences ( $M = 3.58, SD = 1.66$ ). Likewise participants’ responses on the items for the health message were significantly different  $t(32) = 7.91, p < .01$ , with participants finding that the health message focused more on health-related consequences ( $M = 6.36, SD = 1.22$ ) than appearance-related consequences ( $M = 2.64, SD = 1.77$ ).

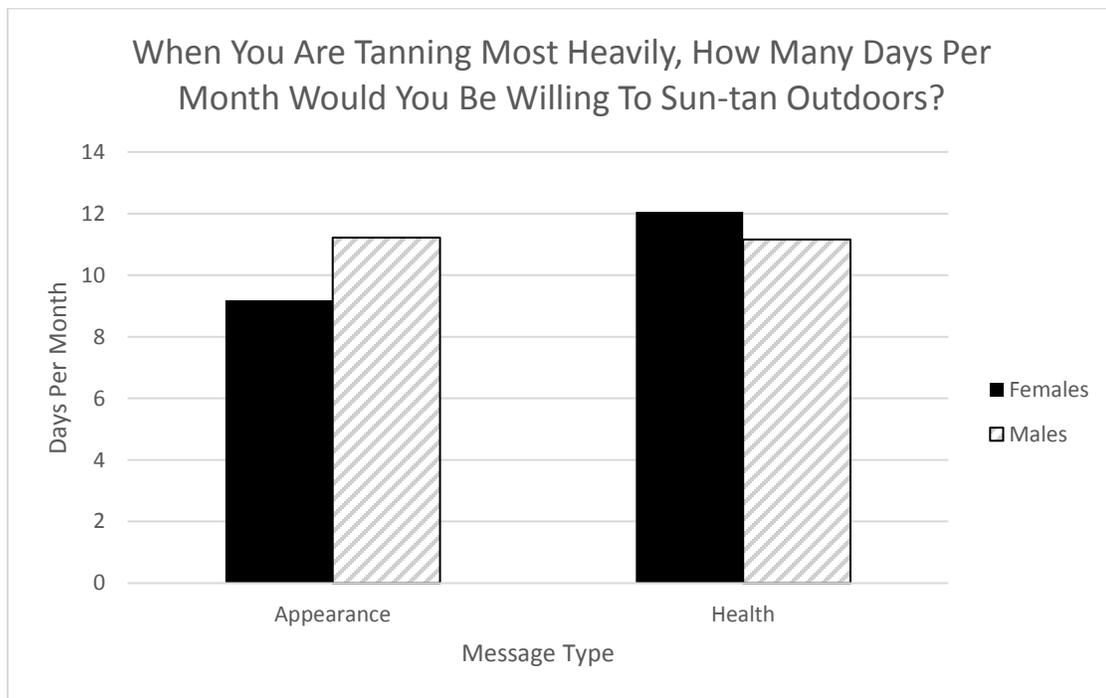
## Chapter 4 - Study 1 Results

At the conclusion of the study, the data were analyzed using two separate 2 (message: appearance/health) X 2 (gender: male/female) ANCOVAs. One analysis was performed on the posttest high-end frequency measure and another was performed for the posttest high-end length of time measure. An ANCOVA was used here to covary the pretest measures of high-end frequency and length of time. Before analyzing the high-end length of time measure, it was noted that there was an exceedingly large range between scores. As such, there were a number of outliers noted on the measure. Unsurprisingly, the analysis for this high-end length of time measure, revealed that there was no main effect of message type,  $F(1, 361) = 0.31, p = .89$ , or gender,  $F(1, 361) = 1.28, p = .46$ . There was also no interaction effect found for the high-end length of time measure,  $F(1, 361) = 0.63, p = .43$ . As such, it appeared that the high-end frequency measure was much more appropriate for analysis, and indeed, there was a significant finding for the high-end intention of frequency of sunbathing (for estimated marginal means, see Table 1). In this analysis, the covariate was the number of days that participants would tan outdoors in typical high-end month, and the dependent variable was the number of days that participants intended to tan outdoors in a future high-end month. The results show that there was no significant main effect for message type,  $F(1, 349) = 0.92, p = .51$ , nor for gender,  $F(1, 349) = 0.15, p = .76$ . However, the analysis did reveal a significant interaction effect between message type and gender,  $F(1, 349) = 4.06, p = .045$ . This was a crossover interaction, such that females who read the appearance message reported fewer days per month that they would be willing to suntan outdoors when they are tanning most heavily ( $M = 9.18$ ) as compared to females that read the health message ( $M = 12.06$ ) (See Figure 1). For males, those that read the appearance

message ( $M = 11.22$ ) did not differ from those that read the health message ( $M = 11.16$ ) in regards to frequency of high-end sunbathing intentions.

**Table 1. Number of Days Intended to Sunbathe in Future High-End Months - Estimated Marginal Means**

Condition		<i>M</i>	<i>SE</i>
Appearance	Female	9.18	0.58
	Male	11.22	0.87
	Total	10.20	0.52
Health	Female	12.06	0.57
	Male	11.16	0.85
	Total	11.61	0.51
Total	Female	10.62	0.41
	Male	11.19	0.611



**Figure 1. Number of high-end days per month that participants were willing to sunbathe after having read the message.**

## Chapter 5 - Study 1 Discussion

The results showed that there was partial support for hypothesis 2 and no support for hypothesis 1. Hypothesis 2, which stated that there would be an interaction effect such that women receiving appearance messages would report safer future high-end tanning intentions than women receiving health messages appeared to be only partially supported. While the proposed effect was found for high-end intentions of frequency of sunbathing, it was not found for the high-end measure of length of time. Meanwhile, there was no evidence from the results to indicate that there was a main effect of message type on either of the dependent variables (hypothesis 1).

An interesting point should be made regarding the significant difference of high-end frequency found between females who received appearance messages and females that received health messages. While some might believe that the difference between the appearance group ( $M = 9.18$ ) and the health message group ( $M = 12.06$ ) does not appear large, it must be understood with proper context. The Skin Cancer Foundation reports that a single tanning session results in a roughly 20% increased risk of skin cancer, with each additional session increasing the risk of skin cancer by about 2% (Skin Cancer Foundation, 2012). Coupled with the aforementioned studies from Dennis et al. (2008) and Wu et al. (2014), this information underscores the significantly increased risk of skin cancer that is associated with increased tanning. Even if the female participants who read appearance messages only reported roughly three fewer days of tanning than those that received health messages, that still represents a lowered risk for developing skin cancer. Any intervention that can decrease an individual's risk of skin cancer is something that should be encouraged.

The other primary takeaway messages concern the implications of the interaction effect that was found. First, it was thought that by utilizing a dependent variable focusing on high-end behaviors, as opposed to the usual measure of “typical” behavior in tanning studies, that we might be able to find a gender difference which had not yet appeared in studies comparing appearance vs. health interventions. In part, that was the purpose of Study 1, to investigate if a dependent variable that was more focused on the most dangerous tanning behaviors may identify any previously unfounded gender differences. As it appears from the results, using such a high-end measure does indeed reveal significant gender differences between how males and females react to these types of appeals. From this information, we might gather that a high-end measure might be more attuned to potential gender differences than previously utilized measures of “typical” behavior. Second, given the results that were found in Study 1, it appears that messages with content focusing on the appearance consequences of tanning are more effective than messages with content focusing on the health consequences of tanning at reducing unsafe high-end tanning behaviors for women. Men, however, do not appear to differ much in regards to their future high-end tanning intentions depending on message type. These results seem to fit with previous research that shows that women are more concerned with appearance than men are (Halliwell & Dittmar, 2003). Based on these findings, it appears that future interventions to promote safe tanning behaviors for women should focus on appearance appeals. For men, it seems clear that more research is needed to determine the most effective intervention strategies for promoting safe tanning behaviors. The information gathered here should make a positive contribution to the knowledge base on tanning research that informs and influences campaigns to promote safe tanning behaviors more effectively. These efforts could lead to decreasing the rapidly growing incidence rate of melanoma and skin cancer in the U.S.

At the conclusion of Study 1, it became apparent that future research is needed to further explore appearance and health messages to determine which aspects of their content are most effective and for whom. For instance, the appearance messages that were included in Study 1 contained content that referred to both blemishes and aging. It seems possible that appearance messages were found to be more effective for women because they are more concerned with aging than men are (Halliwell & Dittmar, 2003). Specifically, women tend to view aging as something that is harmful to their appearance, whereas men may view aging as something that enhances their appearance by making them look more distinguished. As such, the appearance messages may have been doubly negative for women (as they don't want blemishes or to appear older), whereas these messages may have contained both a negative (blemishes) and a positive (looking older) for men. Given these apparent issues with the content of the appearance messages used in Study 1 and in other similar studies, it appeared that follow-up research was needed to tease these aspects apart. This would help determine which types of content in an appearance appeal (aging or blemish) are effective for both males and females.

## **Chapter 6 - Study 2**

Even though Study 1 found that appearance-focused messages were more successful than health-focused messages at reducing the intended frequency to sunbathe for women but not for men, it did not reveal which aspect of appearance appeals are causing the reduced intention. Furthermore, it did not reveal if some aspect of appearance appeals were non-concerning for men. Study 2 sought to rectify that in an effort to reduce unsafe tanning behaviors. This follow-up study looked at the effectiveness of appearance messages that contained content focused on aging vs. appearance messages that contained content focused on blemishes, as well as how the use of graphic images may impact the persuasiveness of each message. Additionally, Study 2 assessed any potential differences between males and females in regards to message type in order to see which message types were most effective and for whom. The purpose of Study 2 was to discover this information in an effort to provide a more informed basis for campaigns focused on promoting safer tanning intentions among both men and women.

### **Aging vs. Blemishes**

While it has been shown that appearance appeals can be effective at reducing unsafe tanning behavior, little research has been done to look at what aspects of appearance appeals make them more effective. The two primary appearance consequences of tanning are related to aging and blemishes. With aging consequences, the content focuses on the imperfections that lead to a person appearing older (e.g. liver spots, wrinkles, leathery skin, etc.). With blemish consequences, the content is instead focused on the imperfections that are unrelated to age (e.g. freckles, blotchy complexion, actinic keratoses, etc.). The aim of Study 2 was to further examine appearance appeals in an effort to understand which aspect makes them more persuasive for tanners.

The majority of studies that have used appearance appeals have included information on both aging and blemishes (e.g., Jones & Leary, 1994; Morris, Cooper, Goldenberg, Arndt, & Gibbons 2014; Thomas et al., 2011). While these studies are useful in determining that appearance appeals can be effective, they don't reveal which aspect of the appeals makes them more effective. Mahler, Fitzpatrick, Parker, & Lapin (1997) conducted a study which showed participants slideshows consisting of either health content or content related to photoaging (i.e. aging of the skin due to UV radiation). They found that participants from both intervention groups had lower melanin contents at a six-week follow-up than did participants from a control condition (Mahler et al., 1997). Additionally, participants from the photoaging group were found to be more likely to share the information that they had learned from the slideshow with their peers (Mahler et al., 1997). Another study from Loosemore and Grogan (2015) used aging software to show male participants what their faces would look like both with and without UV exposure. This intervention was found to be effective at reducing intended UV exposure among the participants (Loosemore & Grogan, 2015). Although these studies provide some utility, they also fail to address the non-aging related aspects of sun damage, as well as potential gender differences that could be present.

In regards to gender differences, multiple studies have found differences in concerns about appearance and aging. Pliner, Chaiken, & Flett, (1990) studied men and women between the ages of 10 and 79 years old and found that women were more concerned about physical appearance and reported lower appearance self-esteem than men. Moreover, this difference was found across all age groups. Another study from Ando and Osada (2009) found that women across all age groups had lower body satisfaction than men and that women also had a higher degree of appearance consciousness than men. These researchers also found that concern with

appearance tended to decrease gradually across age groups, with older individuals being less concerned with appearance than younger individuals. Additionally, Muth and Cash (1997) examined differences in body image between males and females between the ages of 18-49 and found that women had more negative evaluations of their body and showed a greater investment in their appearance than men. Taken together, these findings appear to indicate that women are concerned to a greater extent about their appearance than men are.

Halliwell and Dittmar (2003) conducted interviews with both men and women between the ages of 22 and 62 and found that men most often thought about their body in terms of functionality, whereas women most often thought about their body in terms of appearance. In addition, they noted that men looked at aging as something that improved upon their appearance while women looked at aging as something that had negative effects on their appearance (Halliwell & Dittmar, 2003). Another study from Sargent-Cox, Rippon, and Burns (2014) surveyed participants from a variety of age groups and found that the effects of aging on appearance were significantly more pronounced for women than for men. A study from Homan and Boyatzis (2009) asked older men and women to fill out measures regarding body attitudes and their anxiety towards aging. They found that men reported higher body satisfaction and lower anxiety about aging than women did.

Panek, Hayslip, and Pruett, (2014) conducted another study in which they interviewed both men and women over the age of 50 and asked them to recall incidents in which they felt old. The researchers found that for women, the incidents most often focused on their physical features and appearance. In addition, women tended to view these situations as negative and hurtful. For men, however, the incidents most often revolved around them receiving some sort of benefit or discount as a result of their age. This finding would indicate that men appear to be

more focused on the positives that come with the age, while women tend to view aging and its effects on appearance negatively. In a study focusing on the appearance concerns associated with smoking, Grogan, Fry, Gough, and Conner (2009) asked male and female participants between the ages of 17 and 24 years old to discuss their thoughts on smoking as it impacted appearance. Researchers found that women were significantly more concerned than men were with skin aging as a result of smoking. As these studies seem to indicate, it appears that there is considerable evidence that women tend to be more concerned with effects of aging on appearance than men are.

Counter to the aforementioned studies, which found women to be more concerned with aging than men were, one study found there to be no difference between genders. Wilcox (1997) conducted a study looking at aging attitudes for both men and women between the ages of 20 and 80 years old. Here, it was found that there was no apparent difference between men and women in regards to their perception of aging. Furthermore, this finding held up across age groups, with both younger and older adults having similar attitudes towards aging. Returning to Panek, Hayslip, and Pruett's (2014) study, it should also be noted that both men and women reported that recent incidents in which they felt old made them feel self-conscious and/or elicited a negative self-assessment. As such, it appears that there is at least some evidence that neither men nor women view aging positively.

In regards to research on blemish-related effects to one's appearance, there seems to be mixed findings. Cafri et al. (2008) surveyed both men and women on their attitudes towards the immediate skin damage that results from tanning (e.g. freckles, sunburn, peeling skin). It was found that women reported greater concern with these blemishes than men did. Lawler, Sugiyama, and Owen (2007) surveyed men and women between the ages of 20 and 65 years old

and found that women were more concerned than men about sun exposure and potential skin damage that may result from such exposure. Additionally, Kellett and Gawkrödger (1999) sampled patients with chronic acne to assess how this skin disorder has impacted their lives. Notably, it was found that women reported greater embarrassment as a result of their acne than men did.

While these studies indicate that women care more about blemish-related issues than men do, there is evidence that men are concerned to some extent with such issues. Returning to the aforementioned study from Grogan et al. (2009) concerning both male and female attitudes towards smoking, it was found that both men and women noted concerns about the yellowing of teeth and skin as a result of smoking. Similarly, Kellett and Gawkrödger's (1999) findings indicate that men were embarrassed to some extent by their chronic acne, albeit less so than women. As such, there is evidence to make the case that while women tend to be more concerned than men with blemishes, men are still somewhat concerned by them.

### **Image Use**

In health persuasion, several studies have also looked the utility of including graphic images or photos along with messages. While no research has yet looked at the effects of graphic image use on safe sun behaviors when coupled with aging and blemish content, past research was able to inform Study 2. Study 2 sought to determine the utility of the use of graphic images in communicating the dangers of unsafe tanning behaviors. As such, one of the goals of Study 2 was to look at graphic image use and determine its potential utility as an effective method for encouraging safe sun behaviors.

Perhaps the best area of research to focus on in regards to the use of graphic images is that which has been done on the effectiveness of graphic warning labels on cigarette packaging.

These graphic warning labels tend to feature images showcasing the damaging effects of smoking (e.g. diseased lungs, discolored teeth, a stoma on a neck, etc.) Brought about by public policy shifts, the past decade or so has seen a substantial increase in research looking at the effects of image use on cigarette smoking. Hammond et al. (2004) surveyed Canadian citizens in 2001, shortly after the introduction of graphic warning labels to cigarette packages in Canada, to determine the effects of the policy change. Researchers found that 19% of those surveyed reported smoking less as a result of the graphic warning labels. Moreover, 44% of respondents reported experiencing at least some fear as a result of the graphics, and 58% reported feeling some sense of disgust. Additionally, it was also found that individuals who reported greater levels of fear and disgust were more likely to have read and thought about the warning messages on the cigarette packaging and were also more likely to have reduced their smoking, made an attempt to quit, or quit smoking entirely (Hammond et al., 2004).

Another study from O'Hegarty et al. (2006) looked at the effectiveness of graphic images on cigarette packaging using an American sample. In this study, both current and former smokers were asked to view both messages that were text-only and messages that involved both text and a graphic image. O'Hegarty et al. (2006) found that both current and former smokers found the text plus graphics packaging to be more of a deterrent for smoking than the text-only packaging. Likewise, it was found that both current and former smokers believed the text plus graphic packaging would be more effective in the areas of preventing individuals from starting to smoke, getting current smokers to stop, and maintaining abstinence from smoking for those who have quit.

Studies have also shown that the use of graphic images draws more visual attention from viewers. Peterson, Thomsen, Lindsay, and John (2010) used eye-tracking technology on middle

school students as they viewed anti-smoking magazine advertisements that consisted of either the traditional U.S. Surgeon General warning or the newer Canadian advertisements that featured graphic images. Following the eye-tracking, participants were asked to complete multiple recall exercises. Researchers found that while participants spent equal amounts of time viewing both types of advertisements, those that included the graphic images generated higher levels of visual attention directed specifically toward the message. It was also found that participants were more likely to accurately recall the advertisements featuring images than those consisting of basic text.

In a similar study, Strasser et al. (2012) utilized eye-tracking and recall exercises to determine the effectiveness of graphic cigarette warning labels for current smokers. Here, participants were randomly assigned to view either an advertisement that consisted of the traditional U.S. General Surgeon's warning text or included a graphic image. After viewing the message for 30 seconds, participants were asked to recall information about the advertisement. Strasser et al. (2012) found that those in the graphic image condition correctly recalled 83% of the information in their advertisement, compared to just 50% correct recall for those in the text-only advertisement. Researchers also found that the graphic image drew attention more quickly and resulted in greater dwell time (time spent looking).

While the overwhelming majority of the research on the use of graphic images in health persuasion is concentrated on the topic of smoking, there is evidence for its effectiveness elsewhere. A study from Bazzo et al. (2012) looked at the effect of graphic images on communicating the dangers of alcohol consumption for pregnant women. During a 30-day period in the city of Treviso, Italy, researchers put up numerous posters at hospitals, on buses, and at local bars and restaurants featuring a graphic image and message about the potential health problems that may result from the consumption of alcohol while pregnant. One year later, the

researchers followed up with residents of the city to determine the effectiveness of their graphic image posters. Bazzo et al. (2012) found that 93% of respondents indicated that they remembered the warning messages and 53% recalled the health behavior suggested by the campaign. The researchers concluded that this was a rather high level of visibility and declared the campaign as effective.

Despite the overwhelming evidence for the effectiveness of image-use in warning labels, there has been at least one study to report conflicting findings. Sabbane, Lowrey, and Chebat (2009) compared the effects of anti-smoking messages that consisted of text-only or text plus a graphic image on both U.S. and Canadian high school students. Researchers found that while the graphic image was most effective at lowering intention to smoke among Canadian participants, the findings were reversed for U.S. participants, with text-only messages being the most effective at lowering intention to smoke. Sabbane, Lowrey, and Chebat (2009) hypothesized that this disparate finding may have been the result of U.S. participants being unfamiliar with the use of graphic images on warning labels, while Canadian participants had been accustomed to seeing graphic images on warning labels.

Despite the aforementioned piece of contrary evidence, it seemed increasingly likely that the use of graphic images could serve to make messages directed at promoting safe tanning behaviors more effective. Given the overwhelming success of graphic images in the context of smoking and alcohol consumption, it appears that health persuasion is most effectively accomplished when images are added to the message under study. As there had yet to be any research looking at the use of graphic images on safe sun behaviors when in combination with aging and blemish messages, Study 2 was able to provide an important first step in determining

the utility of such a technique. By coupling both images and text, we may hopefully have found a way to more effectively communicate the dangers of unsafe tanning behaviors.

## **Hypotheses**

Study 2 used message type (i.e., message content focused on aging-related consequences of tanning and message content focused on blemish-related consequences of tanning), image use, and gender as independent variables, while assessing dependent variables for the frequency with which an individual intends to tan in the future and the length of time with which an individual intends to tan in the future. These dependent variables were again asked in terms of a high-end estimate (e.g. “When you are tanning most heavily, how many days per month would you be willing to sun-tan outdoors?”). However, as Study 1 produced significant findings for only the high-end frequency of sunbathing measure, and the high-end length of time measure did not look promising, hypotheses were only made concerning the high-end frequency measure. In addition, the following hypotheses were tested using reported prior high-end frequency of tanning as a covariate. This was done to ensure equality between groups.

*Hypothesis 1:* There will be a main effect of message type, such that groups receiving messages with blemish-related content will report a lower high-end frequency of intended sunbathing than groups receiving messages with aging-related content.

*Hypothesis 2:* There will be a main effect of gender, such that women will be more influenced by both of the appearance messages than men. This effect will be such that women in either the aging or blemish conditions will report lower high-end frequencies of intended sunbathing than men in the corresponding conditions.

*Hypothesis 3:* There will be a main effect of image use, such that messages including a graphic image will be more effective at reducing the high-end frequency of sunbathing than messages that do not include a graphic image.

*Hypothesis 4:* There will be an interaction effect, such that for men, the group receiving messages with blemish-related content will report a lower high-end frequency of intended sunbathing than the male groups receiving the aging-related content message.

## Chapter 7 - Study 2 Method

### Participants

The study included 204 undergraduate students (age:  $M = 19.50$ ) participating in an online study in exchange for course credit (54% male, 46% female). Roughly 81% of all participants indicated that they had previously sunbathed. For the purpose of analyses, only participants that had reported prior sunbathing were included ( $n = 166$ ).

### Measures

To assess past high-end tanning behavior, participants answered four questions concerning the high-end frequency of sunbathing, length of time spent sunbathing, time spent outside, and sunscreen use (see appendix D). Here, participants specified their frequency of sunbathing in terms of number of days (0-30) in a month, their length of time spent sunbathing or outside in terms of minutes, and their sunscreen use in terms of a percentage (0%-100%). Again, these behaviors were both gathered as a high-end estimate as described in Study 1. Using these measures of an individual's high-end behavior allowed us to look specifically at the most dangerous tanning behaviors. It should also be noted that the items for frequency and length of time of sunbathing were specifically asking participants about their experiences "In the past 12 months". Additionally, the items on time spent outside and sunscreen use were specifically asking participants what their experiences were "During the most recent summer". The items were phrased this way in an effort to avoid any sort of timing effect, given that the study took place during the fall. In addition to these questions, there were also two items asking participants to rate their agreement with the following statements: "Exposure to the sun's rays causes skin to look older (e.g. wrinkles, loose skin, liver spots)" and "Exposure to the sun's rays causes skin blemishes (e.g. moles, freckles, warts)".

After receiving the message, participants were also asked to answer four questions concerning their high-end intentions toward frequency of sunbathing, length of time spent sunbathing, time spent outside, and sunscreen use (see appendix E). Again, participants specified their intended high-end frequency of sunbathing in terms of number of days (0-30) in a month, their intended high-end length of time spent sunbathing and high-end time spent outdoors in terms of minutes, and their high-end sunscreen use in terms of percentage (0%-100%). As Hillhouse et al. (1997) conclude that measuring tanning intention is an adequate replacement for measuring actual tanning behavior, Study 2 is assessing tanning intentions rather than actual tanning behavior. In addition to these measures, the two aforementioned agreement items concerning aging and blemish effects in the pretest were included in the posttest as well.

### **Procedure**

After participants were successfully recruited, they completed an online survey. First, participants were asked about their current high-end tanning habits (frequency, length of time tanning and outside, sunscreen use), as well as their belief in the negative aging and blemish effects of tanning. Following that, each participant was randomly assigned to read one of four message types differing in terms of message content (see appendix F) and image use (see appendix G). The first message type focused on the aging-related negative consequences of tanning (e.g. “Wrinkles, liver spots, leathery skin, loose skin, and spider veins can all be traced to UV light exposure”) and did not feature a graphic image. The second message type focused on those same aging-related consequences and included a graphic image of the aging effects of sun exposure. The third message type focused on the blemish-related negative consequences of tanning (e.g. “Freckles, moles, sunburns, peeling skin, a blotchy complexion, swollen eyelids and solar keratoses (thick wart-like, rough, reddish patches of skin), can all be traced to UV light

exposure”) and did not include a graphic image. Lastly, the fourth message type focused on those same blemish-related consequences and included a graphic image of the blemish effects of sun exposure. All graphic images in this study were presented in color. The length of each message type was similar, with each message consisting of three paragraphs of information and participants were allowed to view the message as long as they liked. After participants finished reading the message, there was a quick manipulation check question asking participants what the message was about, and then participants were again asked to indicate their high-end future intentions regarding the frequency and length of sunbathing, amount of time spent outside, and sunscreen use. Participants were also asked to indicate their belief in the negative effects of tanning (aging and blemishes) after having read the message. Finally, participants completed demographic questions, were debriefed and the study concluded.

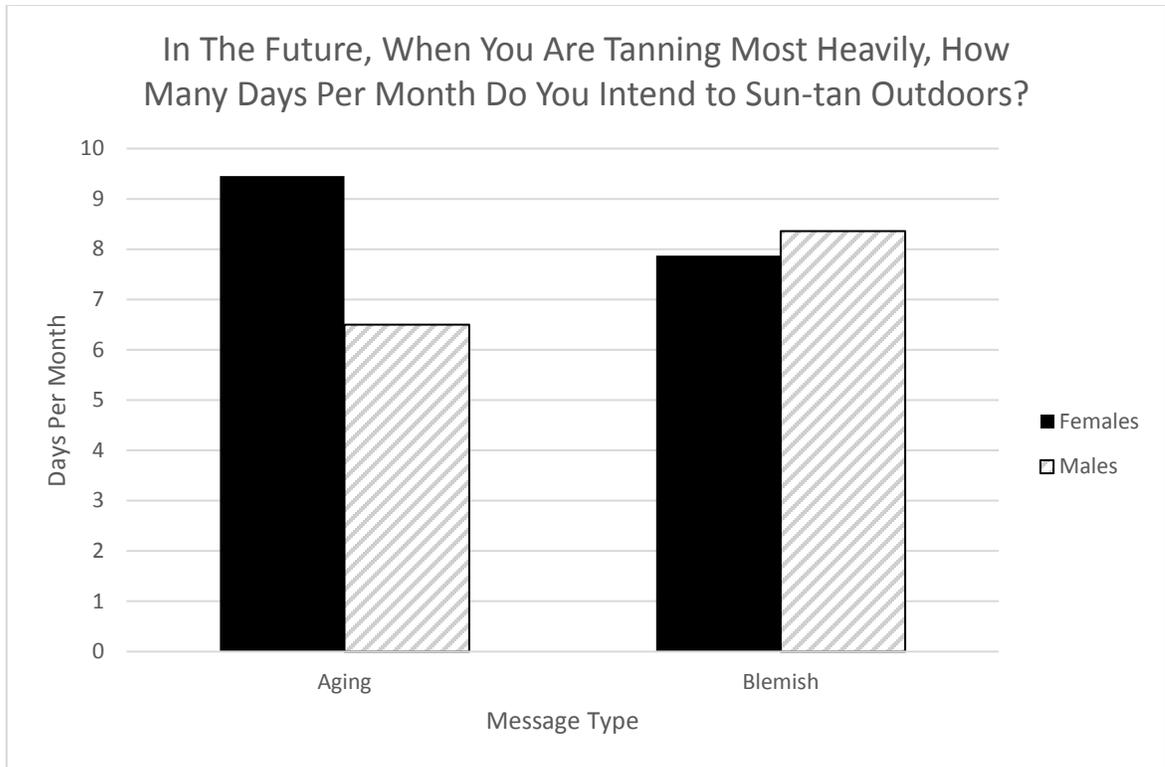
## Chapter 8 - Study 2 Results

At the conclusion of the study, the data was analyzed for possible differences using a 2 (message: aging/blemish) X 2 (gender: male/female) X 2 (photo: present or not present) ANCOVA on the dependent variable of high-end frequency of sunbathing (for the estimated marginal means, see Table 2). An ANCOVA was used here to covary the pretest measure of high-end frequency. In the analysis, it was found that there was no main effect of message type,  $F(1, 160) = 0.03, p = .87$ . Thus, hypothesis 1 which proposed that blemish messages would be more effective at reducing high-end frequency of sunbathing was not supported. Hypothesis 2, which proposed a main effect of gender, such that females would be more influenced by the messages than males, was also not supported,  $F(1, 160) = 1.93, p = .167$ . Hypothesis 3, however, which proposed a main effect of image, such that messages using a graphic image would be more effective than messages which did not use a graphic image, was supported,  $F(1, 160) = 6.27, p = .01$ . It was found that those receiving a graphic image in their message reported significantly fewer high-end days that they intended to sunbathe ( $M = 6.96$ ) than did those who did not receive a graphic image with their message ( $M = 9.13$ ). Hypothesis 4 predicted an interaction effect between gender and message type such that males would report fewer high-end sunbathing days per month when viewing blemish messages than they would when viewing aging messages. Despite a finding of significance with this interaction,  $F(1, 160) = 3.94, p = .05$ , the hypothesis was not supported (see figure 2). It was found that males receiving aging messages reported fewer high-end sunbathing days per month ( $M = 6.50$ ) than males who received blemish messages ( $M = 8.36$ ). Interestingly, it was also seen that females receiving blemish messages reported fewer high-end sunbathing days per month ( $M = 7.87$ ) than females receiving aging messages ( $M = 9.45$ ). However, using a pairwise comparison revealed that

neither the difference between aging and blemish conditions for males,  $F(1, 160) = 2.12, p = .15$ , nor the difference between the aging and blemish conditions for females,  $F(1, 160) = 1.776, p = .19$ , appeared to be driving the finding of significance. Instead, it was found through a pairwise comparison that the difference between males and females for aging messages was driving the effect,  $F(1, 160) = 5.29, p = .02$ . The pairwise comparison revealed no significant difference between males and females for blemish messages,  $F(1, 160) = .17, p = .68$ .

**Table 2. Number of Days Intended to Sunbathe in Future High-End Months - Estimated Marginal Means**

Condition			<i>M</i>	<i>SE</i>
Aging	Image	Female	8.80	1.15
		Male	6.00	1.40
		Total	7.40	0.91
	No Image	Female	10.09	1.16
		Male	7.01	1.33
		Total	8.55	0.88
	Total	Male	6.50	0.98
		Female	9.45	0.82
		Total	7.98	0.63
Blemish	Image	Female	6.45	1.28
		Male	6.61	1.16
		Total	6.53	0.86
	No Image	Female	9.30	1.14
		Male	10.12	1.18
		Total	9.71	0.82
	Total	Female	7.87	0.86
		Male	8.36	0.83
		Total	8.12	0.60
Total	Image	Female	7.62	0.86
		Male	6.30	0.91
		Total	6.96	0.62
	No Image	Female	9.69	0.82
		Male	8.56	0.90
		Total	9.13	0.60
	Total	Female	8.66	0.59
		Male	7.43	0.64



**Figure 2. Number of high-end days per month that participants were willing to sunbathe after having read the message.**

## Chapter 9 - Study 2 Discussion

Perhaps the most surprising finding from Study 2 comes from the interaction effect between gender and message type. As noted in the literature review, there is a substantial amount of evidence indicating that males tend to not care about looking older while women are greatly concerned with appearing older. However, judging from the results, this does not appear to be the case. It was found that males were significantly more impacted by messages focused on aging-related content than females were. While this notion comes as a surprise at first, there may be good rationale behind it. Importantly, before participants had read any messages, they were asked to respond to two items measured on a 7-point Likert scale that asked them to rate their level of agreement with the following statements, “Exposure to the sun’s rays causes skin to look severely older” and “Exposure to the sun’s rays causes severe skin blemishes”. In a one-way ANOVA looking at the role of gender on these two dependent variables, it was revealed that there was significant difference between males and females on the aging question  $F(1, 203) = 7.47, p = .01$ , but not on the blemish question,  $F(1, 203) = 1.00, p = .318$ . For the aging item, it appeared that females ( $M = 5.07, SD = 1.39$ ) had a significantly stronger initial belief in the aging effects of sun exposure than did males ( $M = 4.56, SD = 1.28$ ).

This finding of females having a stronger belief in the negative aging effects of sun exposure is not unique to Study 2. Cafri et al. (2008) also found that female participants reported stronger beliefs in the aging effects of sun exposure than did male participants. Similarly, Yan et al. (2015) conducted a study using Chinese residents and found that 73.3% of females reported knowledge about the aging effects of sun exposure, compared to just 59.7% of males. Additionally, as part of a study looking at gender differences in the perception of aging, famed fashion company Yves Saint Laurent (YSL) found that nearly two thirds of females said that

they were aging better than their partner, while 59% of men said the same (Jones, 2013). A spokesperson for YSL reasoned that, “Women have always been much more aware of the aging process and as a result this may mean they are making provisions that men aren’t”, and notes that, “Females have had it drummed in to them about the effects that things smoking, sun exposure and a bad diet can have on their skin and overall appearance” (Jones, 2013). This information may explain, at least in part, the surprising interaction effect from Study 2. If females are already aware of the aging effects of sun exposure, presenting a message focusing on such information may not have much of an impact. However, if males do not know about the aging effects of sun exposure, that allows the aging-related messages to present new information to them that can lead to lowering future high-end intentions to sunbathe.

The aforementioned interaction effect, as well as the finding that females had a stronger belief in the negative aging effects of sun exposure may also explain the other findings in the analyses. Hypothesis 1 proposed a main effect of message type, such that blemish messages would be found to be more effective than aging messages. However, as noted above, there was no finding of significance for message type. While it was believed prior to the study that aging messages would have little to no impact on males based on prior research (Halliwell & Dittmar, 2003; Homan & Boyatzis, 2009; Sargent-Cox, Rippon, & Burns, 2014), the results revealed this was clearly not the case. As such, it is unsurprising that hypothesis 1 was not supported. In addition, hypothesis 2 which proposed a main effect of gender, such that females would find either appearance message to be more effective than males would, was also unsupported. This hypothesis was based on prior research which has revealed that females tend to care about their appearance to a greater extent than males do. However, if females are already aware of and taking precautions to avoid the negative aging effects of sun exposure, the aging-related

messages presented in the study are unlikely to have as much of an effect on them. As such, this difference in knowledge of the negative aging effects of sun exposure makes the lack of support for hypothesis 2 understandable.

Hypothesis 3, which proposed a main effect of image use, such that messages including a graphic image would be more effective at reducing high-end sunbathing frequency than messages not including a graphic image, was supported in Study 2. Given the effectiveness of graphic image use in prior studies on smoking and alcohol, Study 2 provides support for the use of such images in a new domain. Future research may be necessary to determine what other domains the use of graphic images may be applied to. Additionally, as noted by Brown and Richardson (2012), overly graphic images may cause viewers to avert attention to the image, so as to reduce stress. Future research may need to address the point on the topic area of sun-safety as to what effect overly graphic images may have. As the findings here indicate though, graphic image use represents a promising persuasion method for enhancing the effectiveness of sun-safety messages.

While past research has examined the effectiveness of appearance messages in comparison with health messages in reducing unsafe tanning behaviors, there has been a lack of research on which aspects of appearance appeals are most effective. Study 2 provides insight into that issue by comparing the use of aging-related content and blemish-related content, as well as by identifying a major gender difference. This research will hopefully allow us to market campaigns to promote safe tanning behaviors more effectively. For instance, with the finding that males are more impacted by aging-related messages, perhaps future interventions aimed at reducing unsafe tanning behaviors should emphasize details such as wrinkles, liver spots, and loose skin, especially when targeting a male audience. Such an effort could lead to decreasing

the rapidly growing incidence rate of melanoma in the U.S, at least among males. For females, however, it appears that more research is necessary to determine the best way to prevent unsafe tanning behaviors. Perhaps future research could consider the use of alternative types of content, such as focusing on specific health issues associated with tanning and UV exposure.

As for potential limitations of Study 2, it should be noted that there may be possible issues with the use of graphic images. Both the aging message and blemish message in Study 2 contained a photo of a female that was undergoing skin problems. Given that Study 2 was looking at gender differences between participants, it may be possible that the gender of the subject in the graphic image had an effect on participants' perceptions and intentions. Future research might want to include the gender of the subject in graphic images as an independent variable to see if male and female participants are impacted differently by the gender of the image's subject. Additionally, perhaps altering the age of the subject in a graphic image may produce different results. It may be possible that participants in Study 2 believed the subjects of the graphic images to be of different ages, which may have led to differing effects. Again, this represents another idea for future research to consider. Another potential issue concerning the graphic images that were used is that they differed in terms of the permanence of each issue. For instance, the aging image showed wrinkles, something that isn't likely to go away for an individual. Alternatively, the blemish image showed a sunburn and blistered skin, things which are not permanent. It certainly may be possible that the permanence of aging effects might have been what was driving the effect for men, rather than the aging effects themselves. Future research may consider controlling for the permanence of skin issues in such images or consider teasing those aspects apart. Finally, there may have been an issue with participants thinking of certain aging effects as blemishes. For instance, it's possible that some participants may have

interpreted liver spots to be more associated with blemishes than with aging. Given the manipulation checks used in the study though, it does not appear that any such issues impacted participants from correctly identifying the message as either focused on “aging” or “blemishes”.

Study 2 provides insight into the best methods for communicating the consequences of unsafe tanning behavior. While research may indicate that aging-related messages would be more effective for females than they would for males, Study 2 offers alternative evidence. In that same vein, this alternative evidence contributes to the current literature on gender differences in tanning, which, at the moment, appears to be lacking. As aging-related messages were found to be effective for males, it indicates that, for males, appearance appeals for decreasing unsafe tanning behaviors may need to focus on aging-related content for future research and implementation. Similarly, the finding that aging-related messages are relatively ineffective for females appears to indicate that research and implementation of sun-safety messaging may need to pursue alternative message content. Taken together, Study 2 appears to illustrate that sun-safety messaging may not have a “one-size fits all” solution. In other words, while producing appeals that can effectively reach both a male and female audience is much easier and more preferable, it may simply not be an effective way to promote safe-sun behaviors. Given apparent gender differences in the knowledge and perception of the effects of sun exposure, perhaps more individualized and targeted messaging would be a more effective option. Additionally, based on the current findings, research may also need to focus on gender differences in knowledge and beliefs about negative aging effects in other topic areas, such as smoking or dieting. Such research would also provide insight into the need for individualized messaging in other domains.

## Chapter 10 - General Discussion

When thinking about the findings from both Study 1 and Study 2, it may appear that they do not fit well together at first, but in reality, the findings do seem to make sense. In Study 1, it was found that females who received appearance messages ( $M = 9.18$ ) reported fewer high-end sunbathing days than females who received health messages ( $M = 12.06$ ). In Study 2, it was found that females receiving blemish messages ( $M = 7.87$ ) reported fewer high-end sunbathing days than females who received aging messages ( $M = 9.45$ ). As we can see, the mean for frequency of high-end sunbathing for females receiving appearance messages in Study 1 is right in-between the means for aging and blemish messages in Study 2. While the means may hint at blemish messages being more effective, and perhaps driving the effectiveness of the appearance messages in Study 1, there is no concrete evidence for this at the time.

Additionally, what Study 2 found was that the difference between males and females who received aging messages was primarily what was driving the interaction effect. This was such that males ( $M = 6.50$ ) reported significantly lower high-end sunbathing days than women ( $M = 9.45$ ). As mentioned above, the difference between female intentions for appearance messages in Study 1 and aging messages in Study 2 is not very large, however, the difference between male intentions for appearance messages in Study 1 ( $M = 11.22$ ) and aging messages in Study 2 ( $M = 6.50$ ) does appear to be quite large. One possible explanation for this apparently large difference would be that the blemish content in Study 1 was hurting the effectiveness of the appearance message. However, given the effect of the blemish message by itself in Study 2 ( $M = 8.36$ ), that seems unlikely. Another possibility would be that the use of graphic images in Study 2 improved the overall effectiveness of both aging and blemish messages for male participants. While the main effect of graphic image use supports this idea, there isn't quite enough

information to confirm that this is the cause. A third possibility is simply that when combining both aging and blemish content together for male viewers, the effectiveness of each type of content is lessened. It is certainly possible that combining both types of content may lead to males thinking less about either of them than they would if the content were the sole focus of a message, however, future research would need to further investigate this idea to determine if this were the case.

The primary purpose of this thesis was to further examine the current types of appeals that are being used to reduce unsafe tanning behaviors. Ultimately, the goal of the research project was to determine which appeals were most effective for each gender in an effort to provide more effective communication strategies for promoting safe tanning behaviors. Such research may be able to reduce the number of deaths occurring each year in the U.S. due to skin cancer, a number that the AAD (2016) estimates to be over 10,000. In Study 1, both appearance and health messages were researched as possible interventions to reduce the intention to sunbathe. Contrary to the initial hypothesis, it was found that there was no significant difference between appearance and health messages in terms of their effectiveness in reducing future intentions for either the high-end length of time spent sunbathing, or the high-end frequency of sunbathing. What Study 1 did find, however, was an interaction effect between gender and message type. This interaction effect was such that females receiving appearance messages reported fewer high-end days per month that they would be willing to sunbathe. Initially, what this finding appeared to indicate was that safe sun messages for females should focus on appearance, rather than health, and that safe sun messages for males could focus on either type of content without a noticeable difference in effectiveness. However, it was noticed afterwards that the appearance messages used in Study 1 contained content for both aging and blemishes. As

such, a decision was made to conduct a follow-up study that separated these types of content to determine which aspect of appearance may have been driving the interaction effect in Study 1.

As mentioned, Study 2's primary goal was to tease apart the aging and blemish aspects of the appearance message in Study 1. In addition, Study 2 also included the use of graphic images in an initial effort to determine the effectiveness of such an intervention on the topic of safe sun behaviors. While the success of graphic image use has been widely studied with large amounts of success on the topic area of smoking, there has yet to be research linking graphic image use to safe sun behaviors. Using a similar procedure to Study 1, Study 2 looked at the effects of these two variables (message content & graphic image use) across genders. After gathering data from participants, it was found that there was no main effect of message type or gender; however, there was evidence for a main effect of graphic image use and an interaction effect between gender and message type. This interaction was such that males receiving aging messages reported significantly fewer high-end sunbathing days than females receiving those same messages. The main effect of graphic image use points towards the potential utility of applying such images to safe sun materials in the future. More research is certainly necessary on the use of graphic images for safe sun behaviors, but Study 2 represents a critical first step in the process. The interaction effect between gender and message type appears to primarily be explained by the finding that females had a much higher knowledge on how tanning causes skin to look aged than males did. With females already being informed about such information, the aging message in the study does not provide much new information to them. Males, however, reported much lower knowledge about the aging effects of tanning than women did. As such, the aging messages presented in this study were able to supply males with much more new

information that may have impacted their future intentions. This represents a promising area for future research and theory to consider.

Future research should be done to further examine the aspects of appearance messages that make them more effective, as well as health messages to see if certain aspects such as skin cancer, immune suppression, or eye damage are more effective at reducing unsafe tanning behaviors than others. Future research might also consider applying such methods to other behaviors, such as smoking or substance abuse. Of course, as was the case with both Study 1 and Study 2 in this project, it would be advisable to analyze any results by gender to determine what interventions strategies are most effective for both males and females. This could hopefully lead to effectively reducing the number of people that are negatively impacted by issues such as tanning, smoking, and substance abuse in the U.S. In regards to studies one and two in this project, it should be mentioned that the participant pool used in both studies offers a chance to generalize findings to populations both in the U.S. and globally. As the AAD (2016) reports that tanning is most popular among young adults, using undergraduate participants is particularly appropriate. However, it should also be noted that there are potential limitations to the current project. As is often the case when using measures of intention in place of measures of behavior, there is the question of whether or not an intervention can actually cause behavioral change. Despite Hillhouse et al. (1997) reporting tanning intentions to be a suitable replacement for behavioral measures, it is possible that the interventions used in studies one and two may not lead to actual behavioral change. To know for certain that intentions would lead to behavioral change, it may be necessary to include an alternative measure of behavior, such as a follow-up self-report from participants.

In regards to the importance of this project, the results found here have multiple implications for future safe sun interventions. First, as was noted in Study 2, it appears that interventions for a male audience need to focus on aging effects when it comes to safe sun materials, as it is likely that they don't have much prior knowledge of such dangers. For females, however, it appears that using messages focusing on aging effects may not be the best intervention. Instead, based on the findings from Study 1, it appears that a message including both aging and blemish content may be the more effective option. As was noted in Study 2, females already have a fairly good idea of the kind of damage that UV exposure can do to their skin, so researchers might wish to focus on alternative methods for effectively reducing unsafe tanning behaviors in females. Such efforts may provide some insight into the most effective intervention methods for promoting safe sun behaviors for females, and possibly even indicate some additional intervention methods for males. Additionally, it also was shown in Study 2 that graphic image use represents a promising new tool in safe sun research. Future research may wish to see exactly under what conditions graphic image use is and is not appropriate. By further investigating and applying the findings from this project, it may be possible to lower the incidence rate of skin cancer and produce a healthier culture in the U.S. when it comes to sun safety behaviors.

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## **Appendix A - Study 1 Pretest**

For the following questions, please reflect back on the times in your life that you were tanning the most.

When you were tanning the most, how many days per month did you sun-tan outdoors (0-30)?

\_\_\_\_\_

When you were tanning the most, how long did you sun-tan for each time (in hours and minutes; ex. 45 minutes, 1 hour and 30 minutes, 4 hours)?

\_\_\_\_\_

## Appendix B - Study 1 Posttest

For the following questions, please think about the MOST amount of time that you are willing to spend tanning in the future.

When you are tanning most heavily, how many days per month would you be willing to sun-tan outdoors (0-30)?

\_\_\_\_\_

When you are tanning most heavily, how long would you be willing to sun-tan for each time (in hours and minutes; ex. 45 minutes, 1 hour and 30 minutes, 4 hours)?

\_\_\_\_\_

### Demographic information

Age: \_\_\_\_\_ years

Weight: \_\_\_\_\_ lbs.

Height: \_\_\_\_\_ ft. \_\_\_\_\_ in.

Ethnicity:

\_\_\_\_\_ White/Caucasian                      \_\_\_\_\_ African-American

\_\_\_\_\_ Hispanic/Latino(a)                      \_\_\_\_\_ Asian-American

\_\_\_\_\_ Other (please specify): \_\_\_\_\_

Gender: \_\_\_\_\_ Male    \_\_\_\_\_ Female    \_\_\_\_\_ Other

## **Appendix C - Study 1 Appearance and Health Messages**

### **Appearance Message:**

Use of indoor tanning beds, or failure to take proper precautions when exposed to the sun's rays, such as failure to apply sunscreen, can result in significant harm to your skin. Without protection from the ultraviolet (UV) rays produced by the sun, as well as tanning beds, just a few minutes of exposure each day over the years can cause noticeable changes to your skin. Freckles, age spots, spider veins on the face, rough and leathery skin, fine wrinkles that disappear when stretched, loose skin, a blotchy complexion, and actinic keratoses (thick wart-like, rough, reddish patches of skin), can all be traced to UV light exposure. Maintaining improper protection from UV rays can make you more susceptible to all of these issues, and leave your skin with some serious damage.

“Photoaging” is the term dermatologists use to describe this type of aging caused by exposure to UV rays. Photoaging occurs over a period of years. With repeated exposure to the sun, the skin loses the ability to repair itself, and the damage accumulates. Scientific studies have shown that repeated UV exposure breaks down collagen and impairs the synthesis of new collagen. The sun also attacks our elastin. Sun-weakened skin ceases to spring back much earlier than skin protected from UV rays. Skin also becomes loose, wrinkled, and leathery much earlier with unprotected exposure to UV rays.

By not reducing the amount of indoor tanning that you do, or failing to properly apply sunscreen and not limiting the amount of time that you spend exposed to sun's rays, you're leaving yourself open to the negative effects that tanning can have on your appearance. Your skin may begin looking rougher, more leathery, and you may develop one or many of the known blemishes that tanning can cause. So next time that you're thinking about tanning, just remember all of the harm that you may be doing to your skin.

### **Health Message:**

Use of indoor tanning beds, or failure to take proper precautions when exposed to the sun's rays, such as failure to apply sunscreen, can result in significant harm to your health. Ultraviolet (UV) light exposure is the leading cause of skin cancer. According to the American Cancer Society, “Many of the more than 1 million skin cancers diagnosed each year could be prevented with protection from the sun's rays.” Scientists now know that exposure to the UV rays damages DNA in the skin. When a person's body cannot repair the damaged DNA, which can occur with cumulative sun exposure, cancer develops. Maintaining improper protection from UV rays can make you more susceptible to skin cancer, which can result in death.

The two main types of skin cancer are melanoma and non-melanoma cancer. Melanoma is the more dangerous of the two, and accounts for most of the deaths due to skin cancer each year. Non-melanomas occur in the basal or squamous cells located at the base of the epidermis, and often develop in sun-exposed areas of the body, including the face, ears, neck, lips, and the backs of hands. Exposure to UV light can also weaken the immune system and compromise the

body's natural defenses against aggressive cancer cells. Maintaining improper protection from UV rays can make you more susceptible to both melanoma and non-melanoma cancer.

By not reducing the amount of indoor tanning that you do, or failing to properly apply sunscreen and not limiting the amount of time that you spend exposed to sun's rays, you're leaving yourself open to the negative effects that tanning can have on your health. You're putting yourself at risk for developing skin cancer, which has been shown to result in serious health complications, or even death. So next time that you're thinking about tanning, just remember all of the harm that you may be doing to your health.

## Appendix D - Study 2 Pretest

For the following questions, please reflect back on the times in your life that you were tanning the most.

In the past 12 months, when you were tanning the most, how many days per month did you sun-tan outdoors (0-30)?

\_\_\_\_\_

In the past 12 months, when you were tanning the most, how long did you sun-tan for each time (in hours and minutes; ex. 45 minutes, 1 hour and 30 minutes, 4 hours)?

\_\_\_\_\_

During the most recent summer, when you were outside the most, how many hours per day did you spend outside doing activities other than tanning (in hours and minutes; ex. 45 minutes, 1 hour and 30 minutes, 4 hours)?

\_\_\_\_\_

During the most recent summer, when you were outside the most, what percentage of the time did you wear sunscreen (0%-100%)?

\_\_\_\_\_

Please rate your level of agreement with each of the following statements.

Exposure to the sun's rays causes skin blemishes (e.g. moles, freckles, warts)?

Strongly disagree   Disagree   Neither agree nor disagree   Agree   Strongly Agree

Exposure to the sun's rays causes skin to look older (e.g. wrinkles, loose skin, liver spots)?

Strongly disagree   Disagree   Neither agree nor disagree   Agree   Strongly Agree

## Appendix E - Study 2 Posttest

In a sentence or two, please try to summarize the main point of the message that you just read.

\_\_\_\_\_

For the following questions, please think about the MOST amount of time that you intend to spend tanning in the future.

In the future, when you are tanning most heavily, how many days per month do you intend to sun-tan outdoors (0-30)?

\_\_\_\_\_

In the future, when you are tanning most heavily, how long do you intend to sun-tan for each time (in hours and minutes; ex. 45 minutes, 1 hour and 30 minutes, 4 hours)?

\_\_\_\_\_

During future summers, when you are outdoors the most, how many hours per day do you intend to spend outside doing activities other than tanning (in hours and minutes; ex. 45 minutes, 1 hour and 30 minutes, 4 hours)?

\_\_\_\_\_

During future summers, when you are outside the most, what percentage of the time do you intend to wear sunscreen when you are outdoors (0%-100%)?

\_\_\_\_\_

Please rate your level of agreement with each of the following statements.

Exposure to the sun's rays causes skin blemishes (e.g. moles, freckles, warts)?

Strongly disagree   Disagree   Neither agree nor disagree   Agree   Strongly Agree

Exposure to the sun's rays causes skin to look older (e.g. wrinkles, loose skin, liver spots)?

Strongly disagree   Disagree   Neither agree nor disagree   Agree   Strongly Agree

### Demographic information

Age: \_\_\_\_\_ years

Weight: \_\_\_\_\_ lbs.

Height: \_\_\_\_\_ ft. \_\_\_\_\_ in.

Ethnicity:

\_\_\_\_\_ White/Caucasian                      \_\_\_\_\_ African-American

\_\_\_\_\_ Hispanic/Latino(a)                      \_\_\_\_\_ Asian-American

\_\_\_\_\_ Other (please specify): \_\_\_\_\_

Gender: \_\_\_\_\_ Male    \_\_\_\_\_ Female    \_\_\_\_\_ Other

## **Appendix F - Study 2 Aging and Blemish Messages**

### **Aging Message:**

Failure to take proper precautions when exposed to the sun's rays, such as failure to apply sunscreen, can result in significant aging to your skin. Without protection from the ultraviolet (UV) rays produced by the sun, just a few minutes of exposure each day over the years can cause noticeable changes to your skin. Wrinkles, liver spots, leathery skin, loose skin, and spider veins can all be traced to UV light exposure. Maintaining improper protection from UV rays can make you more susceptible to all of these issues, and leave your skin looking much older.

“Photoaging” is the term dermatologists use to describe this type of aging caused by exposure to UV rays. Photoaging occurs over a period of years. With repeated exposure to the sun, the skin loses the ability to repair itself, and the damage accumulates. Scientific studies have shown that repeated UV exposure breaks down collagen and impairs the synthesis of new collagen. The sun also attacks our elastin. Sun-weakened skin ceases to spring back much earlier than skin that is protected from UV rays. Skin also becomes loose, wrinkled, and leathery much earlier with unprotected exposure to UV rays.

In order to protect yourself from these potentially harmful effects of UV rays, dermatologists recommend using sunscreen every time that you go outside. It is also recommended to use a sunscreen with an SPF of at least 30. By failing to properly apply sunscreen and not limiting the amount of time that you spend exposed to sun's rays, you're leaving yourself open to the negative aging effects that tanning can have on your appearance. Your skin may begin looking more wrinkled and leathery than it should at your age. So next time that you're thinking about tanning, just remember all of the harm that you may be doing to your skin.

### **Blemish Message:**

Failure to take proper precautions when exposed to the sun's rays, such as failure to apply sunscreen, can result in significant blemishes and marks on your skin. Without protection from the ultraviolet (UV) rays produced by the sun, just a few minutes of exposure each day over the years can cause noticeable changes to your skin. Freckles, moles, sunburns, peeling skin, a blotchy complexion, swollen eyelids and solar keratoses (thick wart-like, rough, reddish patches of skin), can all be traced to UV light exposure. Maintaining improper protection from UV rays can make you more susceptible to all of these issues, and leave your skin with some serious blemishes.

For example, sunburns happen when UV rays reach your skin and damage cells in the epidermis. In response, your immune system increases blood flow to the affected areas. The increased blood flow is what gives a sunburn its characteristic redness and makes the skin feel warm to the touch. At the same time, the damaged skin cells release chemicals that send messages through the body until they are translated as a painful burning sensation by the brain. White blood cells, which help protect you from infection and disease, attack and remove the

damaged skin cells. It is this process of removing damaged cells that can cause sunburned skin to itch and peel.

In order to protect yourself from these potentially harmful effects of UV rays, dermatologists recommend using sunscreen every time that you go outside. It is also recommended to use a sunscreen with an SPF of at least 30. By failing to properly apply sunscreen and not limiting the amount of time that you spend exposed to sun's rays, you're leaving yourself open to the negative blemishes and marks that tanning can cause on your appearance. You may begin developing sunburns, peeling skin, or a blotchy complexion. So next time that you're thinking about tanning, just remember all of the harm that you may be doing to your skin.

## Appendix G - Graphic Images

**Aging Image**



**Blemish Image**

