

**THE INDOOR TANNING BEHAVIORS OF UNDERGRADUATE WOMEN:  
A THEORY OF PLANNED BEHAVIOR APPROACH**

by

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the requirements for the degree of Master of Arts in Communication

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## **ABSTRACT**

Although intention to use tanning beds is reportedly (1) predicted by attitude towards tanning, perceived behavioral control over tanning, and actual tanning behavior, and (2) correlated with behavioral beliefs and control beliefs, it is unknown if intention to use tanning beds is correlated with normative beliefs. Furthermore, it is unknown which specific behavioral and control beliefs are correlated with intention to use tanning beds. This study utilized the Theory of Planned Behavior to evaluate the findings of previous studies, as well as the relationship between normative, behavioral, and control beliefs and undergraduate women's tanning intentions, using a multiple regression analysis and Pearson product-moment correlations. Respondents were 93 female and 28 male University of Delaware undergraduate students. All respondents participated in an online survey conducted in March 2013. Attitude toward indoor-tanning, perceived behavioral control over indoor-tanning, and past tanning behavior were found to be significant predictors of intention to use tanning beds. In addition, this study found that multiple behavioral, normative, and control beliefs were significantly correlated with intention to use tanning beds. The results could potentially provide anti-tanning intervention designers with a clearer understanding of why undergraduate women use tanning beds and how to most effectively persuade them to discontinue that use.

## Chapter 1

### INTRODUCTION

Melanoma, the most dangerous form of skin cancer, kills nearly 9,000 people in the United States every year (Skin Cancer Foundation, 2012). Although exposure to both the sun's natural rays and artificial ultraviolet rays have been found to increase men's and women's risk of developing melanoma, research has shown that exposure to artificial rays is more harmful, as it not only damages the skin but also decreases the skin's ability to heal (National Cancer Institute, 2004).

According to the National Cancer Institute (2004), using an artificial tanning bed more than once a month can increase one's chances of developing malignant melanoma, the deadliest form of skin cancer, by 55%. One study observed that indoor tanning was associated with a 69% increased risk of developing early-onset basal cell carcinoma (Ferrucci et al., 2012). "Approximately one quarter (27%) of early-onset [basal cell carcinomas], (or 43% among women) could be prevented if individuals never tanned indoors" (p. 552). Furthermore, multiple studies have linked artificial tanning bed use with increased risk of squamous cell carcinoma, cancers of the eye, wrinkles, and change in skin texture (Centers for Disease Control and Prevention, 2011).

Moreover, "there is convincing evidence to support a causal relationship [between the use of indoor tanning equipment and melanoma risk], particularly with exposure before the age of 35 years" (The International Agency for Research on Cancer Working

Group on Artificial Ultraviolet Light and Skin Cancer, 2007, p. 1121). More specifically, one study found that people who begin using artificial tanning beds under the age of 35 have an 87% higher risk of developing melanoma than non-users (Boniol et al., 2012). Furthermore, women under the age of 39 are more likely to develop melanoma than any other type of cancer, excluding breast cancer (Skin Cancer Foundation, 2012).

### **College Females: A High Risk Group**

According to the Skin Cancer Foundation (2012), of the nearly 30 million people who use artificial tanning beds every year in the United States, 71% are females between the ages of 16 and 29. Unfortunately, this means that the very age group that has a higher risk of developing melanoma via indoor tanning is using artificial tanning booths the most frequently.

One high-risk group that falls into this age range is college females. Knowing that college females are both (a) among the most frequent users of artificial tanning booths and (b) at a higher risk to develop melanoma via artificial tanning booths, persuading them to change their behavior and discontinue their use is essential. If an intervention can successfully reduce the use of tanning beds by college females, the incidence of melanoma and thus death among this group could be drastically reduced.

### **Theory-Based Behavior Change Interventions**

Behavior change has become an increasingly important area of study in today's society, particularly in the world of health. Mass media health campaigns such as public service announcements (PSAs) have frequently been used in an attempt to produce behavior change in a target population (Bryant & Oliver, 2009). These campaigns have

typically focused upon behaviors that could negatively affect the health of the population, such as artificial tanning bed use.

Public health campaigns rest upon the assumption that the mass media can affect the audience (Bryant & Oliver, 2009). According to Allen and Casey (2007), “at the core of . . . theories that explain media effects is the argument that exposure to media content will generate some demonstrable impact on an audience” (p. 31). More specifically, researchers have shown that televised PSAs have the ability to affect people’s attitudes and behaviors (Warren et al., 2006). Furthermore, studies have demonstrated that PSAs “targeting outcome expectancies (i.e., beliefs about the consequences of performing the behavior), normative beliefs (i.e., beliefs about the behaviors and normative proscriptions of relevant others), and self-efficacy beliefs (i.e., beliefs that one can perform the behavior, even under a number of different conditions) have produced behavior change” among target audiences (Fishbein, Hall-Jamieson, Zimmer, von Haeften, & Nabi, 2002, p. 238).

Many researchers attempt to utilize the effects of the mass media to change the behavior of a target population. However, “although there is some evidence that mass media campaigns can be successful, most studies evaluating mass media campaigns have found little or no effect” (Fishbein et al., 2002, p. 238). The failure of mass media campaigns has been attributed to (a) underfunding, (b) limited reach and frequency of messages, (c) a reliance on broadcasters to air PSAs when the target audience is actually watching, and (d) the content of the message (Fishbein et al.).



Mass communication researchers today have become particularly interested in the fourth factor mentioned above: the content of the message. Behavioral science researchers have documented the importance of the content of behavioral change campaigns as well as the importance of basing that content on theoretical and empirical research (Fishbein et al., 2002).

However, some researchers claim that many health-behavior change campaigns fail to use sound theories to develop both objectives and messages (Stead, Tagg, MacKintosh, & Eadie, 2005). “Theories of behavioral prediction and behavior change are useful because they provide a framework to help identify the determinants of any given behavior, an essential first step in the development of successful intervention to change that behavior” (Cappella et al., 2002, p. 51).

### **Popular Health Behavior Models**

Health behaviors have been studied using various theoretical backgrounds. Three of the most popular models (i.e., the Health Belief Model, the Trans-Theoretical Model, and the Theory of Planned Behavior) used to study health behaviors will be discussed below.

#### **The Health Belief Model**

Some researchers have chosen to study health behaviors such as tanning using the Health Belief Model (HBM; Rosenstock, 1974). The HBM, “a cognitive model of health behavior, specifies that individuals adopt a health protective behavior (e.g., sun protection) to the extent that they perceive themselves to be susceptible to a health threat (photo aging, skin cancer), perceive the threat to be severe, perceive the benefits of the

proposed health action (sun protection) for mitigating the threat, and can overcome perceived barriers to the health behavior” (Jackson & Aiken, 2000).

One study by Lamanna (2004) illustrates how the HBM has been applied to tanning. Lamanna surveyed Caucasian college students to examine the relationships among college students’ attitudes about cancer and their knowledge, perceptions, beliefs, and behaviors about sun tanning and skin cancer. A little more than half (53.1%) of the students reported that they perceive themselves as susceptible to skin cancer, and almost three-quarters (72.8%) of the students reported that they perceive skin cancer to be serious. However, most students (82.1%) reported that they highly value suntans, a perceived benefit of tanning not of sun-protection. Furthermore, 60% reported that they practice high-risk behaviors (i.e., tanning). As noted earlier, the HBM assumes that people place a high value on health and therefore are motivated to protect themselves. As Lamanna noted, “The Health Belief Model does not account for the desire for personal attractiveness and relaxation, which in this research study were two important values” (p. 175). Thus, the HBM is arguably not the model of choice for studying tanning behaviors.

As further evidence to bolster this argument, the HBM has not been found to have strong predictive power when applied to health behaviors in general (Armitage and Conner, 2000). In part, this is “a result of poor construct definition, a lack of combinatorial rules and weaknesses in the predictive validity of the HBM’s core psychological components” (Taylor et al., 2006, p. 36). Furthermore, a comparative meta-analysis of models used to study health behaviors discovered that the HBM was able to explain a significantly lower percent of health behavior variance than other

models (Zimmerman & Vernberg, 1994). In fact, of all of the models included in the meta-analysis, the HBM was the least powerful predictor of outcome variables. As Zimmerman & Vernberg argue, “the health belief model is a list of variables largely conceptualized in an attempt to understand discrete preventive behavior of the 1950s and 1960s. As such, it is not a theory as it does not specify the nature of relationships, and it is an anachronism, no longer applying well to an understanding of prevention” (p. 62).

### **The Trans-Theoretical Model of Health Behavior Change**

Developed by Prochaska and DiClemente in the 1980s, the Trans-Theoretical Model (TTM) is popular among health promotion practitioners (Whitelaw et al., 2000; Jones & Donovan, 2004). However, “several elements of the TTM that have been supported in the research literature, including the roles of intentions, current behavior, decisional balance, and self-efficacy in promotion behavior change, are not unique to the TTM . . . The TTM's most original contribution is the premise that different strategies facilitate progress at various points in the process of lifestyle change” (Rosen, 2000, p. 599). According to the TTM, an individual must go through five stages of change in order to adopt a new behavior: pre-contemplation (in which the individual has no intention of behavior change), contemplation (in which the individual has begun considering behavior change), preparation (in which the individual is planning his or her behavior change in the near future), action (in which the individual has made the behavior change) and maintenance (in which the individual is sustaining the change for a period of time) (Taylor et al., 2006).

A TTM-based study by Kristjansson, Branstrom, Ullen & Helgason (2003) illustrates how the model has been applied to tanning research. The questionnaire, used to investigate skin cancer prevention among adolescents, asked participants about the TTM's stages of change construct. Kristjansson et al. uncovered that a majority of young people are in the pre-contemplation stage for giving up intentional tanning. In other words, a majority of young adults who tan have not even begun to consider giving up the behavior. From a TTM standpoint, the implication of this finding is important for anti-tanning campaign designers; the first step of a successful campaign is getting adolescents to start thinking about changing their behavior (e.g., contemplating discontinuing their tanning bed use).

Despite the TTM's popularity, many researchers have criticized its use to study health behaviors. In addition to concerns about "its ability to integrate social and economic factors, a central focus of such concern has been on the validity of the stages of change construct in relation to smoking cessation and changing other (addictive and nonaddictive) behaviours, such as dietary habits and exercise patterns" (Taylor et al., 2006, p. 53). In a meta-analysis on the sequencing of change processes by stage, Rosen (2000) found that the use of discrete stages may not be appropriate for behaviors under volitional control such as exercise adoption or tanning. In exercise, unlike addictive behaviors such as smoking, "people use cognitive-affective process most frequently during action and maintenance. This may reflect differences between ceasing an addictive behavior and initiating a health-enhancing behavior" (Rosen, 2000, p. 602). Rosen's findings raise questions about the need for the stages of change of the TTM. "The TTM

may be no more parsimonious than several alternative continuum models for understanding [behaviors such as] exercise adoption or diet change” (Rosen, 2000, p. 602).

### **The Theory of Planned Behavior: A Solid Theoretical Approach**

Several researchers claim that one theory in particular, the Theory of Planned Behavior (TPB), has the remarkable ability to enlighten the development of mass media behavior change campaigns (Armitage and Conner, 2002; Hardeman et al., 2002; Stead et al., 2005). A large volume of research indicates that “both the Theory of Reasoned Action and the Theory of Planned Behaviour have utility in predicting health behaviours, and that observed statistical relationships between their internal constructs based on behavioural, normative and control beliefs have significance across a wide range of contexts” (Taylor et al., 2007, p. 42). Furthermore, there is evidence that TPB has greater predictive power than the HBM (Taylor et al., 2006), and is both structurally and mathematically better specified than the HBM (Ajzen, 1998).

TPB is a thorough, longstanding, and cognitively-based theory of persuasion designed to predict and causally explain individuals’ reasoned, volitional behaviors (as opposed to addictive behaviors) in given contexts. Originally developed by Fishbein and Ajzen (1975) and entitled the theory of reasoned action (TRA), the theory was later extended by Ajzen (1991) to its current form as TPB.

### **TPB’s Major Concepts**

**Behavior.** As discussed, the primary goal of TPB is to predict and explain behavior, specifically overt behavior. Fishbein and Ajzen (1975) defined overt behavior

as “observable acts that are studied in their own right” (p. 335). The behavior of interest in a TPB study is measured at a chosen level of specificity. In other words, that behavior is defined in terms of its target, action, context, and time (TACT; Ajzen, 2002). For example, consider the case of a person running on a treadmill in a gym for at least 30 minutes a week in the upcoming month. In this example, the target is the person, the action is running for at least 30 minutes a week on a treadmill, the context is a gym, and the time is in the upcoming month. Notably, Ajzen states that “in many cases we may not be particularly interested in a specific context. We can generalize the context element by recording how often the behavior is performed in all relevant contexts” (p. 2).

**Intention.** As research has shown, intentions can be used to predict behavior with considerable accuracy (Ajzen, 1988). Thus, a central concept in TPB is intention to behave. According to Ajzen (1991), “intentions are assumed to capture the motivational factors that influence a behavior; they are indications of how hard people are willing to try, of how much of an effort they are planning to exert, in order to perform the behavior” (p. 181). Important to note, “an appropriate measure of intention corresponds in its level of specificity to the behavior that is to be predicted” (Fishbein & Ajzen, 1975, p. 381). In other words, a measure of intention to behave should include the exact same TACT elements as a measure of the behavior itself.

However, Ajzen (1991) argues that in order to understand fully a person’s behavior, one must discover the factors that determine intention. After all, “it is not very illuminating to discover that people usually do what they intend to do” (Fishbein & Ajzen, 1975, p. 282). The theory of planned behavior model specifies three major

determinants of intentions: attitudes toward the behavior, subjective norms, and perceived behavioral control (Fishbein & Ajzen, 2010). Important to note, Fishbein and Ajzen (1975) argue that each of these determinants must be measured at the same level of specificity as the behavior in question.

**Beliefs.** Because one of the major goals of TPB is to explain human behavior, it places importance on the antecedents (i.e., beliefs) of the determinants of intention (i.e., attitudes, subjective norms and perceived behavioral control). A person's belief about an object is "the perceived probabilistic relation between that object and some attribute" (Fishbein & Ajzen, 1975, p. 388).

According to the theory, human behavior is a function of salient beliefs (i.e., beliefs that are readily accessible in one's memory), relevant to the behavior (Ajzen, 1991). Ajzen (1991) states that "three kinds of salient beliefs are distinguished: *behavioral beliefs* which are assumed to influence attitudes toward the behavior, *normative beliefs* which constitute the underlying determinants of subjective norms, and *control beliefs* which provide the basis for perceptions of behavioral control" (p. 189).

Together, these salient beliefs represent the available information an individual has about a specific behavior (Fishbein & Ajzen, 2010). As Fishbein and Ajzen state, "to the extent that the beliefs are readily accessible, they lead to the spontaneous formation of an attitude toward the behavior, to perceived social pressure to perform or not to perform the behavior, and to a sense of self-efficacy or perceived behavioral control in relation to forming the behavior" (p. 321).

**Attitude toward the behavior.** The first major determinant of intention to perform a behavior is one's attitude towards the outcomes of performing that behavior; i.e., the degree to which one has a favorable or unfavorable evaluation of the outcomes of that specific behavior. According to Fishbein and Ajzen's (1975) expectancy-value model of attitudes, attitudes develop from salient behavioral beliefs. Each salient belief that a person holds about a behavior links the behavior to a specific outcome. TPB assumes that people form favorable attitudes toward behaviors that are believed to bring about positive consequences. As Ajzen (1991) states, "the outcome's subjective value contributes to the attitude in direct proportion to the strength of the belief, i.e., the subjective probability that the behavior will produce the outcome in question" (p. 191).

**Subjective norm.** The second major determinant of intention to perform a behavior is called the subjective norm; i.e., the perceived social pressure to perform or not perform the behavior. A person's subjective norm about a specific behavior develops from salient normative beliefs he or she holds about the likelihood that important others approve or disapprove of performing that behavior. According to Ajzen (1991), "the strength of each normative belief is multiplied by the person's motivation to comply with the referent in question, and the subjective norm is directly proportional to the sum of the resulting products across the salient referents" (p. 195).

**Perceived behavioral control.** The third major determinant of intention is perceived behavioral control; i.e., the perceived ease or difficulty of performing the behavior. According to Ajzen (1991), in addition to having the motivation to perform a behavior, one must also have the ability (i.e., the behavioral control) to perform that



behavior. A person's behavioral control depends upon the availability of non-motivational factors, such as time, money, and skills. As Ajzen states, "to the extent that a person has the required opportunities and resources, and intends to perform the behavior, he or she should succeed in doing so" (p. 322).

However, one's *perception* of behavioral control plays an important role in TPB (Ajzen, 2010). Research shows that behavior is influenced by a person's confidence in his or her ability to perform it (Bandura, Adams, & Beyer, 1997). According to TPB, perceived behavioral control about a specific behavior is formed by salient control beliefs that an individual holds about that behavior. As Ajzen (1991) states, "these control beliefs may be based in part on past experience with the behavior, but they will usually also be influenced by second-hand information about the behavior, by the experiences of acquaintances and friends, and by other factors that increase or reduce the perceived difficulty of performing the behavior in question" (p. 196). The theory predicts that the more an individual believes he or she possess the resources and opportunities to perform the behavior, and the less he or she believes there are obstacles to performing it, the greater his or her perceived behavioral control will be.

In addition to acting as a predictor of intention, Ajzen (1991) argues that perceived behavioral control can also be used directly as a measure of actual control, assuming that people's perceptions are accurate. Thus, as Ajzen states, "to the extent that perceived control is realistic, it can be used to predict the probability of a successful behavioral attempt" (p. 185).

## **The TPB Process: A Causal Sequence of Events**

Fishbein and Ajzen's (2010) model "stipulates a causal sequence of events describing the processes that determine human social behavior" (p. 321). This process begins when individuals form behavioral beliefs (beliefs strength and outcome evaluations), normative beliefs (strength and motivation to comply), and control beliefs (strength and perceived power) about a specific behavior. Though beliefs may be formed by past experience with the behavior, they may also be influenced by second-hand information about the behavior and by acquaintances and friends (Ajzen, 1991). Thus, both the mass media and salient others have the ability to indirectly affect one's behavior.

The beliefs an individual forms then lead to the formation of attitudes, perceived social norms, and perceived behavioral control related to that behavior. Together, these three factors may then lead to a spontaneous formation of an intention to perform or not perform that behavior. According to Ajzen (1991), "the more favorable the attitude and subjective norm with respect to a behavior, and the greater the perceived behavioral control, the stronger should be an individual's intention to perform the behavior under consideration" (p. 188). This relationship is represented in the equation:

$$BI = A_B + SN + PBC,$$

where BI = behavioral intention,  $A_B$  = attitude towards the behavior, SN = subjective norm, and PBC = perceived behavioral control (Ajzen, 1992b).

Important to note, Ajzen (1991) adds that the importance of each of the three major determinants of intention vary across behaviors and situations. "In some applications it may be found that only attitudes have a significant impact on intentions, in

others that attitudes and perceived behavioral control are sufficient to account for intentions, and in still others that all three predictors make independent contributions” (p 189). The more of an impact a determinant has on a given intention, the greater the relative weight of that determinant in the TPB model with respect to a given behavior. According to Ajzen (1992b), within a study, “estimates of the relative weights of attitudes, subjective norms, and perceptions of behavioral control are provided by standardized regression coefficients” (p. 3). Thus, the equation from above can more accurately be represented as:

$$BI = A_B(w_1) + SN(w_2) + PBC(w_3),$$

where  $w$  = weight. The process ends with the performance or non-performance of the behavior. The probability that the specific behavior will be performed by that individual is high if (a) he or she has a strong intention to perform it, (b) he or she has the skills and abilities necessary to perform it, and (c) there are no environmental constraints that could prevent him or her from performing it (Fishbein & Ajzen, 2010).

### **General TPB Research Findings**

Research pertaining to health communication has been successful in utilizing TRA and TPB models to promote and influence healthy behaviors, such as eating well, exercising, using sunscreen, and getting regular mammograms (Stead et al., 2005). As noted earlier, many researchers utilize TPB to discover possible focal points for future health campaigns. For example, in a TPB study of the marijuana usage of adolescents, Cappella et al. (2003) produced results that have significant implications for a mass media campaign. Cappella et al. observed that high-risk adolescents do not believe that

regular marijuana use is a gateway to the use of more serious drugs. Furthermore, Cappella et al. noted that high-risk adolescents already strongly believe that smoking marijuana regularly damages one's lungs. Thus, an anti-drug PSA designer aiming to change the behavior of high-risk adolescents could either attempt to (a) change the belief that marijuana use is not a gateway drug, or (b) prime the belief that smoking is damaging. If high-risk adolescents see the PSA, it could potentially change or prime their beliefs and intentions to do drugs, and thus potentially change their drug-use behavior.

Some researchers take TPB research a step further and actually utilize the findings to create mass media behavior change campaigns. One notable example is the Scottish Road Safety Campaign (Stead et al., 2005). Overall, empirical support was found for the decision to use TPB as the theoretical basis of anti-speeding advertising; TPB was observed to be a valuable tool for understanding and changing driving behavior. First, TPB was able to predict between 47 and 53% of the variance in intentions to speed. Second, Stead et al. "found desired changes over the campaign period in Attitude toward the behavior and its associated constructs, positive and negative affective Beliefs, and nearly all of these changes were significantly associated with awareness of the Attitude ad" (p. 47; capitalization in original). In other words, the ads designed to change drivers' attitudes toward speeding were successful in changing their beliefs about the consequences of speeding and its emotional benefits and drawbacks. Finally, "reported frequency in the last 12 months of speeding . . . appeared to decrease significantly between the baseline and fourth survey" (p. 46). The results of this advertising campaign

provide support for TPB-based mass media campaigns designed to change targeted behaviors.

### **Predictive Validity of TPB**

The predictive validity of TPB has been demonstrated by numerous studies. More than a dozen studies have found that, across a wide range of health behaviors, TPB can explain over 20% of the variance in people's behavior (Armitage & Conner, 2001; Sheeran & Taylor, 1999; Albarracin et al., 2001; Blue, 1995; Hagger et al. 2002; Downs and Hausenblas, 2005).

For example, in one study, Ajzen (1991) ran multiple correlations to assess the predictive validity of TPB and uncovered that "the combination of intentions and perceived behavioral control permitted significant prediction of behavior in each case, and that many of the multiple correlations were of substantial magnitude." (p. 1986). The multiple correlations ranged from .20 to .78, with an average of .51.

Similarly, Godin and Kok (1996) completed a comprehensive review of 58 behavioral applications of TPB and noted that TPB explains about 41% of the variance in people's intention and 34% in people's health-related behavior. In communication research, these are extremely large percentages of explained variance.

Furthermore, in a third study, Hardeman et al. (2002) completed a comprehensive review of 30 distinct papers, each which used TPB as a theoretical foundation. They found that "half of the interventions were effective in changing intention, and two-thirds in changing behavior" (p. 123).

Notably, researchers who have applied TPB research to the creation and implementation of mass media campaigns have also uncovered support for TPB's predictive validity. For example, the Scottish Road Safety Campaign study discussed above reveals that "the predictive strength of the TPB remained consistent when measured cross-sectionally, at four separate survey stages; furthermore, the model was able to predict a moderate amount of variance in speeding intentions and behavior four years later" (Stead et al., 2005). This finding is particularly important, as it points to the validity of the application of TPB to mass media campaigns.

## Chapter 2

### REVIEW OF THE LITERATURE

In addition to its application to other health behaviors, TPB has been used as the theoretical basis for studying the tanning behaviors of young adults. The results of these studies will be discussed below. An analysis of their limitations will follow.

**Intention.** Intention to use tanning beds has been shown to predict actual tanning bed use in a large number of studies (Hillhouse, Adler, Drinnon, & Turrisi, 1997; Hillhouse, Turrisi, & Kastner, 2000; Dodd, Forshaw, & Williams, 2012; Myers & Horswill, 2006). For example, Hillhouse et al. utilized TPB to predict multiple tanning intentions and behaviors of college students, including sunbathing, tanning salon use, and sunscreen use. In addition to supporting the use of TPB to study tanning behaviors, Hillhouse et al. noted that indoor tanning behaviors were significantly correlated with intentions to use tanning salons, as predicted by the TPB model (Hillhouse et al.).

A second study by Hillhouse et al. (2000) that applied TPB to the prediction of tanning intentions and behaviors of college students found similar results. Once again, in support of the TPB model, intentions were observed to significantly predict the use of tanning salons.

**Attitude.** A large number of TPB tanning studies have shown that, in general, attitudes towards tanning in a tanning bed are significantly correlated with intention to use tanning beds, although specific behavioral beliefs about tanning in tanning beds were

not identified. (Branstrom, Ullen, & Brandberg, 2004; Hillhouse et al., 1997; Hillhouse et al., 2000; Dodd et al., 2012; Myers & Horswill, 2006). For example, Hillhouse et al. found that attitudes were highly and positively correlated with intentions to use indoor tanning salons. Unfortunately, Hillhouse et al.'s questionnaire did not include important behavioral belief and outcome evaluation questions, such as participants' beliefs about the appearance of tan skin or beliefs about the harmful nature of indoor tanning. Studies that do include these important behavioral belief constructs will be discussed below.

**Appearance-based behavioral beliefs.** Many studies indicate that appearance-based reasons for indoor tanning predict intention to use tanning beds (Branstrom et al., 2004; Hillhouse et al., 2000, Dennis, Lowe, & Snetselaar, 2009). For example, in a TPB study of a random sample of 18 to 37 year old residents of Sweden, Branstrom et al. reported that "people having a positive attitude towards sunbathing and having a tan were more likely to report using sun beds" (p. 992).

In a second study, Hillhouse et al. (2000) added the constructs of appearance motivation and self-monitoring to TPB to increase the predictive power of the study, although this addition was arguably unnecessary as will be discussed below. According to Hillhouse et al., "appearance motivation did not show any direct or interaction effects in the prediction of tanning salon behavioral intentions. It did, however, prove superior to health orientation in the prediction of tanning salon attitudes" (p. 405). As discussed above, however, Hillhouse et al. found that tanning salon attitudes predicted intention to use tanning beds. Thus, as behavioral beliefs in the TPB model lead to the formation of



attitudes toward the behavior, and as attitudes toward the behavior lead to the formation of intentions to behave, this finding is not surprising.

The correlation between appearance-based attitudinal beliefs and intention was supported in a study by Dodd et al., (2012). In this study, Dodd et al. applied TPB to the prediction of indoor tanning behaviors of young adults in the United Kingdom. Like Hillhouse et al. (2000), Dodd et al. added a new construct to measure appearance reasons to tan. This variable was measured using nine items whose endpoints ranged from strongly disagree to strongly agree. Participants were given statements such as “having a tan gives me more sex appeal,” “I tan because it makes me more attractive,” “I’m concerned about getting blemished skin as a result of [indoor tanning],” and “I’m concerned about freckling from [indoor tanning.]”

Using hierarchical multiple regression, the ability of appearance reasons to tan to predict intention to indoor tan was assessed. Although the original TPB variables entered in step one were observed to explain almost 8% of the variance in intention to tan indoors, after entry of the appearance reasons to tan variable in step two, the total variance explained increased to almost 17%. The findings suggest that the variable “appearance reason to tan” is the strongest predictor towards intention. According to Dodd et al. (2012), “the emphasis of appearance being the primary motivation to [indoor tan] is consistent with a number of authors who have been advocating the need for appearance-focused interventions to reduce UV exposure” (p. 6).

In a related study, Lazovich et al. (2004) looked at young women’s appearance reasons to use tanning salons. The results of the study indicate a significant correlation

between participants' beliefs that people with tans look more attractive and participants' intention to use tanning beds. A correlation between the belief that people with tans look healthier and intention to use tanning beds was not observed.

Finally, Dennis et al. (2009) studied the attitude construct of TPB as it relates to the tanning behaviors of undergraduate students and found that intention to tan was strongly influenced by the students' beliefs that tanning is important. To be specific, "the attitudes that corresponded best to the feeling that tanning is important included feeling better with a tan, that a tan is attractive, that lack of a tan is unattractive, that tanned skin looks healthier than untanned skin, and that their friends and the media support the idea that a tan is attractive" (p. 237). Furthermore, Dennis and his colleagues noted that there was a high overall perception held by undergraduate students that their peers feel a tan is attractive. Thus, Dennis et al. wrote that a behavioral intervention attempting to persuade young adults to stop using indoor tanning salons should focus on changing attitudes regarding the perceived attractiveness and healthiness of tanned skin.

**Risk-based behavioral beliefs.** Several studies have found that young adults' risk-based attitudes do not predict their intention to tan (Branstrom et al. 2004; Dennis et al., 2009). For example, Branstrom et al. uncovered that although young women are aware of the dangers of indoor tanning, they continue to expose themselves to UV radiation more than men or older women. This lack of association between knowledge of health effects and use of preventative behavior showed a weak correlation between unhealthy beliefs and the behavior of tanning.

In addition, Dennis et al. (2009) observed that beliefs about the risk associated with using tanning booths was not correlated with a low intention to use those booths. As they state, college aged “participants clearly had knowledge about the dangers of . . . [artificial] tanning, yet they still had a strong desire to tan and tanned frequently” (p. 239). Thus, Dennis et al. surmise that a behavior change intervention focused merely upon increasing college students’ knowledge of skin cancer as it relates to indoor tanning will not be sufficient to create behavior change.

**Control beliefs.** TPB indoor tanning studies have also found that perceived behavioral control (PBC) predicts intention, although typically to a lesser degree than attitude (Hillhouse et al., 1997; Hillhouse et al., 2000; Dodd et al., 2012). For example, Hillhouse et al. (1997) noted that the PBC of young adults is highly and positively correlated with intention to use tanning beds. Similarly, Dodd et al. discovered that the PBC of young adults is a statistically significant predictor of intention to use a tanning booth, ranking as the second highest predictor of intention to use tanning booths.

**Normative beliefs.** Studies done through the TPB lense have found mixed results about subjective norms as predictors of indoor tanning behaviors (Hillhouse et al., 1997; Hillhouse et al, 2000; Myers & Horswill, 2006). For example, Hillhouse et al. (1997) uncovered that the subjective norms of young adults are moderately and positively correlated with intention to use indoor tanning booths. In contrast, Myers and Horswill uncovered no significant correlation between the subjective norms of young adults and their intention to use tanning booths.

## **Limitations of Previous Studies**

Although it is important to review previous TPB literature about indoor tanning, the results of these studies should be viewed with a cautious eye. There are several limitations to some of the studies discussed above, which will be addressed below.

**Hillhouse et al. (1997).** The results of the Hillhouse et al. study should be evaluated with caution for several reasons. First, this study did not use a pilot survey to create the questionnaire, an essential step according to Fishbein & Ajzen (2010). In addition to eliciting responses to the direct measure items, a pilot questionnaire should be used to elicit salient behavioral, normative and control beliefs. Hillhouse et al. presumed the salient beliefs of their target population when creating the questionnaire, rather than performing a pilot study to uncover that population's actual salient beliefs.

Second, the questionnaire was given during the summer, and participants were asked about their intentions to use tanning salons "within the next week" (Hillhouse et al., 1997, p. 368). If a participant in this study went tanning less frequently than once a week, his or her intentions may not have been captured by this measurement. In addition, "tanning salons advertise a way to jump-start a tan in the winter and early spring, as consumers prepare for the summer's skin-baring clothing styles" (Delsigne, 2012, p. 7). Thus, the intentions and behaviors of participants who only use tanning salons in the winter and spring would also not be captured by this study.

Third, the questionnaire did not include important descriptive normative belief questions, such as participants' beliefs about what salient others think about the appearance of tan skin. Finally, the researchers did not administer a questionnaire to the

participants' salient others to discover whether the normative beliefs of the participants were accurate.

**Hillhouse et al. (2000).** The results of the Hillhouse et al. (2000) study should also be evaluated with caution. First, like Hillhouse et al. (1997), Hillhouse et al. (2000) did not use a pilot questionnaire to develop the final questionnaire. Second, the method used for measuring attitudinal and behavioral constructs was “derived from those suggested by Ajzen and Madden (Ajzen & Madden, 1986)” (Hillhouse et al., 2000, p. 408). This method is questionable because TPB was not updated from its original form as TRA until 1991. Third, this study's questionnaire also did not ask important descriptive normative belief questions, or administer a questionnaire to the participants' salient others to discover whether the normative beliefs of the participants were accurate. Finally, appearance motivation and self-monitoring were assessed with items drawn from literature outside of TPB (Hillhouse et al., 2000).

The authors of this study failed to recognize that appearance motivation is accounted for by TPB as behavioral beliefs, and self-monitoring is accounted for by TPB as motivation to comply. The addition of these “outside” constructs and measurement items was unnecessary and potentially detrimental to the results. Furthermore, as behavioral beliefs in the TPB model predict attitude toward the behavior, we should not be surprised that appearance motivation was found to predict tanning salon attitudes, not intention to tan.

**Dodd et al. (2012).** Finally, the results of the Dodd et al. (2012) study should be regarded cautiously. Dodd et al. did not complete a pilot study, and the researchers also

unnecessarily added an “appearance reasons to tan” construct to the TPB model when TPB’s behavioral belief construct already accounts for appearance reasons to tan. In addition, as Dodd et al.’s “appearance reasons to tan” construct was measured as a scale, discerning precisely which appearance item is the best predictor of intention to tan indoors is impossible. For example, are young adults more likely to tan because it makes them appear sexy? Are young adults more likely to tan because it makes them appear thin? Do young adults associate tanning with increased wrinkles, blemishes, and/or freckles? Do young adults think wrinkles, blemishes and/or freckles are positive or negative things? These are questions that the Dodd et al. study cannot answer. Dodd et al. “feel that an in-depth exploration of the factors associated with appearance enhancement within young adults is also warranted and such findings would help to shape appearance-focused interventions” (p. 6).

## Chapter 3

### **HYPOTHESES AND RESEARCH QUESTIONS**

After examining the relevant extant literature, there is clearly a need to study college women's appearance-based reasons to use indoor-tanning booths more thoroughly, as well as college women's beliefs about the appearance-based perceptions of their male peers. In combination with the research findings presented above, several hypotheses emerge. First, previous research suggests that there is a relationship between intention to use tanning beds and the actual use of tanning beds (Hillhouse et al., 1997; Hillhouse et al., 2000; Dodd et al., 2012; Myers & Horswill, 2006). Although this study cannot measure future behavior, it can measure past behavior. Thus, in line with previous literature, one can expect that past tanning behavior will predict intention. Thus:

H<sub>1</sub>: Past usage of tanning beds will be directly related to intention to use tanning beds.

Second, the previous research reviewed above suggests that control beliefs predict intention to use tanning beds (Hillhouse et al., 1997; Hillhouse et al., 2000; Dodd et al., 2012). In line with this literature, one can reasonably expect that there will be a relationship between college females' control beliefs and their intention to use tanning booths. Therefore:

H<sub>2</sub>: Control beliefs will be directly related to intention to use tanning beds.

Third, the existing literature reviewed above found a strong relationship between attitudes, particularly appearance-based behavioral beliefs, and intention to use tanning beds (Branstrom et al., 2004; Hillhouse et al., 2000; Dennis et al., 2009). In line with this literature, one can expect a strong relationship between some college females' appearance-based behavioral beliefs and their intentions, such that appearance-based behavioral beliefs about using tanning beds should predict intention to use tanning beds. However, because all appearance-based behavioral beliefs are not mutually exclusive and the existing literature did not specify which specific beliefs were related to intention, one can only safely expect that one or more of the appearance-based behavioral beliefs measured in the present study should predict intention to use tanning beds. Therefore:

H<sub>3</sub>: One or more appearance-based behavioral beliefs about using tanning beds will be directly related to intention to use tanning beds.

Although previous research suggests that appearance-based behavioral beliefs predict intention to use tanning beds, these behavioral beliefs need to be explored in more depth. As mentioned above, discerning which appearance-based behavioral beliefs are the best predictors of intention to use tanning beds is important. Thus, this investigation seeks to answer the following question:

RQ<sub>1</sub>: Which appearance-based behavioral beliefs are the most strongly correlated with intention to use tanning beds?

In addition, because the normative belief findings of prior studies are inconsistent (Hillhouse et al., 1997; Hillhouse et al., 2000; Myers & Horswill, 2006), discovering



whether normative beliefs predict college women's intention to use tanning beds is consequential. Thus, this investigation also seeks to answer the following question:

RQ<sub>2</sub>: Are the normative beliefs of college women related to their intention to use tanning beds?

Finally, this study will seek to determine (a) whether college women perceive that their male peers believe they should go tanning; (b) if this perception is a predictor of their indoor tanning behaviors; and (c) what their male peers' actual beliefs about tanned skin are. A thorough study of college males' actual beliefs will help determine whether the women's perceptions are accurate or not. Accordingly:

RQ<sub>3a</sub>: Do college females perceive that their male peers believe that women should go tanning in tanning beds?

RQ<sub>3b</sub>: Do these perceptions about the beliefs of the male peers correlate with the college females' intentions to use tanning beds?

RQ<sub>3c</sub>: Do the male peers perceive that college females are more attractive when tan than when not tan?

## Chapter 4

### **METHODS**

According to Fishbein and Ajzen's (2010) TPB, the first step in a behavior change intervention is the completion of formative research of the target audience. Serving as that first step, this thesis will be a quantitative examination of the tanning behavior of college females using a TPB-based questionnaire. This questionnaire will be constructed based on step-by-step instructions provided by Fishbein and Ajzen to test the thesis' hypotheses. These hypotheses will be based upon a thorough review of previous literature in the area.

According to Fishbein and Ajzen (2010), the first step in designing a questionnaire is to define the behavior in question in terms of its constituent elements: target, action, context, and time. The behavior in question in this particular study is defined as follows: tanning in a tanning booth at least once in the next three months.

The second step in designing a questionnaire is specifying the research population. As discussed above, the research population for this investigation is college females. For the sake of convenience, this thesis's sample is comprised of college females attending the University of Delaware. Fishbein and Ajzen argue that beliefs about salient others can affect one's behavior. As a result, college females were surveyed in a pilot study about who their salient others are. Because males were named among

these salient others, as will be discussed below, male college students will also be surveyed to validate the accuracy of the females' perceptions and answer RQ<sub>3c</sub>.

The third step in designing a questionnaire is formulating items for direct measure. Typically, several seven-point bipolar adjective scales are used to assess each of the theory's major constructs: attitude, perceived norm, perceived behavioral control, and intention. These items must be compatible with the specific behavior in question, and they must be self-directed (Fishbein & Ajzen, 2010). Participants will be asked to select the number on the scale that best represents their personal opinion.

The fourth step is administering a pilot questionnaire to a small sample of University of Delaware students, both male and female. In addition to eliciting responses to the direct measure items discussed in step three above, the female pilot questionnaire was used to elicit salient behavioral, normative and control beliefs. The male pilot questionnaire was only used to elicit salient behavioral beliefs about female's tanning in tanning beds. The pilot questionnaires were designed using the clear instructions outlined by Fishbein & Ajzen (2010; see appendix A and B).

After administration of the pilot questionnaire, tests for normality were run on the items for direct measure. Based upon the normality tests, the items were deemed as normally distributed and thus included in the final questionnaire. Next, a content analysis of the responses was completed to establish categories for the modal salient beliefs of the participants. The content analysis involved tallying the frequencies of listed salient beliefs by hand and then combining similar beliefs into single categories. Irrelevant, off-topic, or infrequent responses were discarded.

The content analysis of the female pilot study resulted in a list of modal salient outcomes, referents and control factors (see Appendix C). The eight female modal salient outcomes uncovered are: (1) having clearer skin, (2) having an improved mood, (3) being more attractive, (4) having a base tan before spring break, (5) having an increased risk for skin cancer, (6) spending a lot of money, (7) damaging your skin, and (8) getting a tan. The 13 female referents uncovered are: (1) tanning salons, (2) friends, (3) other University of Delaware females, (4) guys, (5) sorority girls, (6) doctors, (7) parents, (8) organizations or people who know the health risks involved, (9) celebrities, (10), girls going on spring break or to a formal, (11) family members, (12) older people, and (13) people who are concerned about their health. The six female control factors uncovered are: (1) having more money, (2) the existence of non-harmful tanning beds, (3) having more convenient tanning salons, (4) having spring break or formal plans, (5) having your friends going tanning, and (6) having less time.

The content analysis of the male pilot study resulted in a list of modal salient outcomes of females tanning in tanning beds (see Appendix D). The nine modal salient outcomes uncovered are: (1) having high self-esteem, (2) having a tan year-round, (3) looking attractive, (4) looking healthy, (5) having an increased risk for skin cancer, (6) wasting money, (7) having orange skin, (8) wasting time, and (9) caring too much about appearance.

The fifth step involves using the results of the pilot questionnaire reported above to construct the final standard questionnaire for both females and males (Fishbein & Ajzen, 2010). The pilot study sample consisted of 39 female and 41 male University of

Delaware students enrolled in an inter-major introductory public speaking course. The female questionnaire includes the following elements: behavioral beliefs and outcome evaluations, injunctive normative beliefs and motivation to comply, descriptive normative beliefs and identification with the referent, control beliefs and power of control factors, direct measures, gender, and behavior. The male questionnaire includes only behavioral beliefs and outcome evaluations about female tanning behavior. All questions were constructed by following the clear and specific instructions provided by Fishbein and Ajzen (See Appendix E & F).

The final questionnaire was distributed using an online survey system to a total of 121 respondents, all of whom were University of Delaware students enrolled in a communication research methods course. 93 or 77% of these respondents were female and 28 or 23% of the respondents were male. Because the current study is focused primarily on the study of undergraduate females, this gender discrepancy was desired.

The final step involved using multiple regression to analyze the female data to determine the relative contributions of attitudes, subjective norms, and perceptions of behavioral control to the prediction of intentions; and the relative contributions of intentions and perceptions of control to the prediction of behavior (Fishbein & Ajzen, 2010). Furthermore, behavioral, normative, and control beliefs can be assessed to explore the cognitive foundation of the tanning behaviors of college females. Regression will be used to analyze the male data to determine the overall attitudes that males hold in regards to females tanning in tanning beds.

## Chapter 5

### **RESULTS**

The statistical analyses applied to these data yielded interesting results. First, a correlation matrix of the main variables in the study are reported. Next, the results of the regression analysis used to examine the fit of TPB in studying tanning behaviors are reported. Finally, each of the three hypotheses and three research questions were examined in more detail through the results of Pearson product-moment correlations. These analyses will indicate whether the hypothesized variables are associated with intention to tan in a tanning bed.

#### **Correlation Matrix**

Correlations were computed for the main variables in this study: intention, attitude towards behavior, subjective norm, perceived behavioral control, behavioral beliefs, normative beliefs, control beliefs and past behavior. Table 1 presents the correlation matrix of these variables.

Table 1

*Correlation Matrix of Main Variables*

		<b>Correlation Matrix</b>							
		1	2	3	4	5	6	7	8
1	Intention	1.00	.76***	.57***	.62***	.17	.26*	.68***	.76***
2	Attitude towards Behavior		1.00	.63***	.60***	.17	.22*	.66***	.72***
3	Subjective Norm			1.00	.53***	-.02	.32**	.53***	.51***
4	Perceived Behavioral Control				1.00	.20	.54***	.55***	.59***
5	Behavioral Beliefs					1.00	.32**	.29**	.27*
6	Normative Beliefs						1.00	.48***	.25*
7	Control Beliefs							1.00	.63***
8	Past Behavior								1.00

Notes. \*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$ .

As Table 1 shows, all variables are significantly correlated with each other except for behavioral beliefs with intention, attitude towards behavior, subjective norm and perceived behavioral control.

**Overall Fit of TPB Model**

Multiple regression analysis was used to assess the application of the TPB model to studying tanning behaviors. The results of the multiple regression of intention indicated that the three main TPB predictor variables, attitude towards behavior,

subjective norm, and perceived behavioral control, explained 66% of the variance in intention to tan in a tanning bed,  $F(3, 83) = 55.74, p < .0001, R^2 = .66$ . These results support the application of the TPB model to studying tanning behaviors.

However, only two of the three main TPB predictor variables significantly predicted intention to tan in a tanning bed. Attitude towards tanning is the strongest significant predictor of intention to tan,  $\beta = .57, t(1) = 6.47, p < .0001$ . Perceived behavioral control also significantly predicted intention to tan but to a lesser degree than attitude towards tanning,  $\beta = .27, t(1) = 3.97, p < .001$ . Subjective norm did not significantly predict intention to tan,  $\beta = .15, t(1) = 1.8, p = .08$ .

Overall, these results indicate that when it comes to undergraduate women, the more favorable their evaluations of the outcomes of tanning are and the easier tanning is perceived to be, the more likely they are to intend to tan in a tanning bed; undergraduate women who perceive a high level of social pressure to use tanning beds are not more likely than those who don't perceive a high level of social pressure to use tanning beds to intend to tan. Table 2 lists the results of this multiple regression of intention to tan.

Table 2

*Multiple Regression of Intention to Tan*

Intention	<i>b</i>	<i>S.E</i>
Attitude toward Behavior	.57***	.087
Subjective Norm	.15	.083
Perceived Behavioral Control	.27***	.069
Model Fit: $R^2 = .660$		

Notes. \*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$ .



## **Hypothesis 1**

Hypothesis 1 predicted that past usage of tanning beds is directly related to intention to use tanning beds. The results of a Pearson product-moment correlation, shown above in Table 1, support Hypothesis 1. Past usage of tanning beds and intention to use tanning beds were significantly correlated,  $r = .76$ ,  $n = 93$ ,  $p < .001$ . Overall, there was a strong, positive correlation between past usage and intention such that increases in past usage of tanning beds were correlated with increases of intention to use tanning beds in the future.

## **Hypothesis 2**

Hypothesis 2 predicted that control beliefs would be directly related to intention to use tanning beds. The results of a Pearson product-moment correlation, shown in Table 1, support Hypothesis 2. Control beliefs and intention to use tanning beds were significantly correlated,  $r = .65$ ,  $n = 91$ ,  $p < .0001$ . Overall, there was a strong, positive correlation between control beliefs about tanning and intention such that increases in control belief levels were correlated with increases of intention to use tanning beds in the future. In other words, those undergraduate women who perceive (1) that they have more resources and opportunities to tan in a tanning bed and (2) that there are less obstacles to tan in a tanning bed report having a higher intention to tan in a tanning bed in the future.

When broken down by the individual control beliefs (i.e., beliefs about the specific resources, opportunities and/or obstacles) in a second Pearson product-moment correlation displayed in Table 3, all six are directly related to intention to use

tanning beds. The belief that “having spring break or formal plans would enable me to tan in a tanning bed at least once in the next three months” is the most strongly significantly correlated with intention to tan,  $r = .81, n = 93, p < .0001$ , followed by the beliefs that (1) “having my friends going tanning would enable me to tan in a tanning bed at least once in the next three months,”  $r = .74, n = 93, p < .0001$ , (2) “having more convenient tanning salons would enable me to tan in a tanning bed at least once in the next three months,”  $r = .72, n = 93, p < .0001$ , (3) “having more money would enable me to tan in a tanning bed at least once in the next three months,”  $r = .70, n = 93, p < .0001$ , (4) “the existence of non-harmful tanning beds would enable me to tan in a tanning bed at least once in the next three months,”  $r = .44, n = 93, p < .0001$  and (5) “having less time would make it difficult for me to tan in a tanning bed at least once in the next three months,”  $r = .24, n = 93, p < .05$ .

Table 3

*Correlations of Intention and Control Beliefs*

	Intention
More Money	.70***
Less Time	.24*
More Convenient Salons	.73***
Spring Break/ Formal Plans	.81***
Friends Going Tanning	.74***
Non-Harmful Tanning Beds	.44***

Notes. \*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$ .

### Hypothesis 3

Hypothesis 3 predicted that one or more appearance-based behavioral beliefs about using tanning beds will be directly related to intention to use tanning beds.

Respondents were asked five appearance-based behavioral belief questions, measured on a scale from 1 to 7 where 1 is good and 7 is bad. These questions were (1) “my having clearer skin is:,” (2) “my being more attractive is:,” (3) “my being tan is:,” (4) “my having a base tan before spring break is:” and (5) “my damaging my skin is:,” The results of a third Pearson product-moment correlation, shown in Table 4, support Hypothesis 3. Although some appearance-based behavioral beliefs were significantly correlated with intention to use tanning beds, others were not, as shown in Table 4. These results will be discussed in more detail below.

Table 4

*Correlations of Intention and Appearance-Based Behavioral Beliefs*

	Intention
Clearer Skin	.02 <i>n</i> = 93
Being More Attractive	.11 <i>n</i> = 93
Being Tan	.39*** <i>n</i> = 92
Having a Base Tan Before Spring Break	.66*** <i>n</i> = 93
Damaging My Skin	.30** <i>n</i> = 93

Notes. \*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$ .

### Research Question 1

RQ1 asked which appearance-based behavioral beliefs are the most strongly correlated with intention to use tanning beds. This question is also answered by the correlations in Table 4. The belief that having a base tan before spring break is good is the most strongly correlated with intention to tan in a tannin bed,  $r = .66$ ,  $n = 93$ ,  $p < .001$ . Overall, there was a strong, positive correlation between this belief and intention

such that increases in beliefs that having a tan before spring break is good were correlated with increases in intention to use tanning beds in the future.

The belief that being tan is good is the second most strongly correlated with intention to use tanning beds,  $r = .39$ ,  $n = 93$ ,  $p < .001$ . Overall, there was a moderate, positive correlation between this belief and intention such that increases in beliefs that being tan is good were correlated with increases in intention to use tanning beds in the future.

The last appearance-based behavioral belief correlated with intention to use tanning beds was the belief that damaging your skin is good,  $r = .30$ ,  $n = 93$ ,  $p < .01$ . Overall, there was a moderate, positive correlation between this belief and intention such that increases in the belief that damaging your skin is *bad* were correlated with increases in intention *not* to use tanning beds in the future.

The two appearance-based behavioral beliefs that were not significantly correlated with intention to use tanning beds were (1) the belief that having clearer skin is good,  $r = .02$ ,  $n = 93$ ,  $p = .85$  and (2) the belief that being more attractive is good,  $r = .11$ ,  $n = 93$ ,  $p = .28$ . In other words, those undergraduate women who perceive that having clearer skin and being more attractive are good do not report having a higher intention to tan in a tanning bed in the future.

## **Research Question 2**

Research Question 2 asked if the normative beliefs of college women correlate with their intention to use tanning beds. The results of the Pearson product-moment correlation, shown in Table 1, indicate that normative beliefs and intention to use

tanning beds were significantly correlated,  $r = .26, n = 89, p < .05$ . Overall, there was a moderate, positive correlation between normative beliefs about tanning and intention such that increases in normative belief levels were correlated with increases of intention to use tanning beds in the future. In other words, undergraduate women who (1) perceive that it's likely that important others approve of tanning in tanning beds and (2) are motivated to comply with those important others reported having a higher intention to tan in a tanning bed in the future.

When broken down by specific normative beliefs, three beliefs were found to be significant predictors of intention to tan. First, there was a significantly positive correlation between intention to tan and the belief that "when it comes to tanning, I want to do what tanning salons think I should do,"  $r = .24, n = 93, p < .05$ , such that increases in the belief that one should do what tanning salons want were correlated with increases in intention. Second, there was a significantly moderate and negative correlation between intention to tan and the belief that "when it comes to tanning, I want to do what doctors think I should do,"  $r = -.38, n = 93, p < .001$ , such that decreases in the desire to do what doctors think you should do was correlated with increases in intention. Finally, there was a significantly negative correlation between intention to tan and the belief that "when it comes to tanning, I want to do what organizations or people who know the health risks of tanning beds think I should do,"  $r = -.22, n = 93, p < .05$ , such that decreases in the desire to do what those organizations or people think you should do correlated with increases in intention.

### Research Question 3

Research Question 3, which has three parts, asked (1) do college females perceive that their male peers believe that women should tan (2) do these perceptions about the beliefs of the male peers correlate with the college females' intentions to use tanning beds and (3) do male peers perceive that college females are more attractive when tan than when not tan?

The mean of the question "guys think that I should tan in a tanning bed at least once in the next three months," on a scale of 1 to 7 where 1 is probable and 7 is improbable, was calculated to answer RQ<sub>3a</sub>. The results indicate that college females overall perceive that it is more improbable than probable that their male peers believe that they should tan in tanning beds ( $M = 5.0$ ,  $SD = 1.72$ ). A t-test provides support that this mean is significantly different from a mean of zero,  $t(92) = 27.83$ ,  $p < .0001$ .

A Pearson product-moment correlation of intention and the normative belief about guys provides the answer to RQ<sub>3b</sub>. The perception that male peers don't believe that undergraduate women should go tanning does not correlate significantly with intention to go tanning in tanning beds,  $r = .14$ ,  $n = 92$ ,  $p = .19$ . In other words, increases in normative belief levels were not significantly correlated with increases in intention to use tanning beds in the future. Thus, college females do not base their decision to tan on the opinions of their male peers.

Although the opinions of males are no longer of interest in light of the answers to the previous two research questions, the perceptions of the male respondents were still analyzed to answer RQ<sub>3b</sub>. The mean of the question "if college females tan in a

tanning bed they will look more attractive,” on a scale of 1 to 7 where 1 is likely and 7 is unlikely, was calculated. The results indicate that male undergraduates overall perceive that it is more likely than unlikely that college females who tan in a tanning bed will look more attractive ( $M = 2.15$ ,  $SD = 1.41$ ).

In summary, the results of the study support H1, H2 and H3. Additionally the results indicated that three of the five appearance-based behavioral beliefs and control beliefs were significantly correlated with intention to tan in a tanning bed (RQ1, RQ2), though normative beliefs about male peers were not. The next chapter will discuss both the theoretical and practical implications of these findings.

## Chapter 6

### **DISCUSSION AND CONCLUSIONS**

The current study used the TPB to identify the determinants of undergraduate women's indoor tanning behavior, an essential first step in the development of a successful intervention or campaign to persuade undergraduate women to discontinue the use of tanning beds. The results of this study are important for several reasons. First, the results support the TPB model's application to studying indoor-tanning behaviors. Although applied to undergraduate women in the current study, the TPB could be applied to studying multiple other groups who use tanning beds.

Second, although the literature has already determined that both attitude towards tanning and perceived behavioral control are significant predictors of intention to tan and that appearance-based behavioral beliefs and control beliefs are significantly correlated with intention to tan (Branstrom et al., 2004; Hillhouse et al., 1997; Hillhouse et al., 2000; Dodd et al., 2012; Myers & Horswill, 2006; Dennis et al., 2009), it is important for researchers to identify the specific behavioral and control beliefs that are correlated with intention. After all, the more specific the research community's knowledge of indoor-tanning behavior is, the more specific, strategic, and effective the anti-tanning messages can be.

Third, because the findings of previous studies conflict with one another in regards to whether subjective norm is a significant predictor of intention to tan, the



current study brings important clarity to tanning literature; beyond finding that subjective norm is not a significant predictor of intention to tan, the current study dug deeper to discover that a few normative beliefs do correlate with intention to tan. The following discussion expands upon the results from the current study and their implications regarding an anti-tanning campaign to persuade undergraduate women to discontinue tanning bed useage. The limitations of the current study are also reviewed, and suggestions for future direction in tanning research are provided.

### **Results Summary and Impliations**

**TPB application to indoor-tanning research.** The TPB suggests that behaviors will be predicted from (1) attitude: one's beliefs about the consequences of performing a specific activity and one's positive or negative evaluations of those consequences, (2) subjective norm: one's perception that important other support the performance of the behavior and one's motivation to compy with those others and (3) perceived behavioral control: one's perception that he or she possess the resources and opportunities to perform the behavior and one's perception that there are no obstacles to performing it. The results of this study indicate that the TPB model is highly applicable to the study of indoor tanning behaviors. The TPB model explained 66% of the variance in intention to tan in a tanning bed, an impressive amount of variance in the social sciences. In other words, the TPB was able to explain two-thirds of the indoor-tanning behaviors of undergraudate women. The implications of this finding are important for future tanning research; with a high ability to explain indoor-tanning behavior comes a high potential to effectively persuade undergraduate women to discontinue their indoor-tanning

behaviors if the study's findings are used strategically in an anti-tanning campaign. These findings will be discussed below.

Even though the current study was unable to verify the TBP's suggested relationship between intention and future behavior due to time constraints, past behavior was measured in the questionnaire. Hypothesis 1 proposed that past usage of tanning beds would be directly related to intention to use tanning beds. The results indicated that past usage of tanning beds was strongly and positively correlated with intention to use tanning beds. In other words, undergraduate women who have tanned in the past are highly likely to intend to tan again in the future. The implication of this finding is that indoor tanning is not typically a one-time behavior. Because indoor tanning is a very dangerous behavior, the knowledge that undergraduate women are likely to repeat the behavior makes the creation of an effective anti-tanning campaign even more important.

**TPB determinants and intention to use tanning beds:** The results of the current study suggest that only two of the three determinants of intention are significant predictors of undergraduate women's intentions to use tanning beds. Recall that not all of the three major determinants of intention impact every behavior, and that the importance of each of the determinants varies across behaviors and situations (Ajzen, 2001). Recall also that identifying the determinants of any given behavior is an essential first step in the development of a successful intervention aimed at changing that behavior (Cappella, et al., 2002). Thus, there are important implications of this study's finding that, in line with previous research (e.g., Hillhouse et al., 1997; Dodd et al., 2012), only attitude towards tanning and perceived behavioral control significantly predicted tanning behaviors.

Important to note, however, the finding that subjective norm is not a significant predictor of intention to tan could potentially be a statistical artifact; it is possible that, as a predictor of intention, subjective norm's significance was overshadowed by the higher-weighted determinants, attitude towards tanning and perceived behavioral control. Thus, it is important not to completely rule out subjective norm's impact on intention to use tanning beds. After all, as shown in Table 1, subjective norm and intention to use tanning beds were significantly correlated,  $r = .57$ ,  $n = 93$ ,  $p < .001$ .

Statistical artifacts aside, the current study suggests that the strongest predictor of intention to use tanning beds is attitude towards tanning. In other words, attitude towards indoor-tanning has the greatest impact on undergraduate women's intention to use tanning beds. The more favorable undergraduate women's evaluations of the outcomes of tanning are, the more likely they are to intend to use tanning beds and, thus, actually use those tanning beds. This result has several implications for an anti-tanning campaign. An anti-tanning campaign designed to persuade undergraduate women to discontinue their use of tanning beds might be the most successful if it focuses upon changing the attitudes of indoor-tanners. This change could involve either persuading undergraduate women that the outcomes of tanning are not positive or persuading them that the outcomes of not tanning are positive.

Although it is important to know that attitude towards indoor tanning is the strongest predictor of intention to use tanning beds, it is also important to explore the behavioral beliefs that make up attitude towards indoor tanning to ensure that anti-tanning messages are as specific and strategic as possible. Previous research suggests that

appearance-based behavioral beliefs strongly correlate with intention to use tanning beds (i.e., Branstrom et al., 2004; Hillhouse et al., 2000, Dennis, Lowe, & Snetselaar, 2009), but these behavioral beliefs had not been explored in depth prior to the current study. Thus, H3 hypothesized that one or more appearance-based behavioral beliefs about using tanning beds would be directly related to intention to use tanning beds, and RQ1 asked which appearance-based behavioral beliefs are the most strongly correlated with intention to use tanning beds.

The results of this study support H3 and shed light on RQ1. Indeed, more than one appearance-based behavioral belief was correlated with intention to use tanning beds. The most strongly correlated of these beliefs is the belief that having a base-tan before spring break is good. In other words, undergraduate women going on spring break are likely to use tanning beds in order to get a tan before their vacation. The implication of this result for an anti-tanning campaign is that an effective message might either (1) focus upon persuading undergraduate women that getting a tan before spring break is not necessary or (2) focus upon informing undergraduate women of alternative methods to getting a tan before going on spring break, such as spray tans and lotions.

Two other appearance-based behavioral beliefs were correlated with intention to indoor tan, although to a lesser degree than the belief about base-tans. Undergraduate women who believe that being tan is good are *more* likely to intend to use tanning beds, and undergraduate women who believe that damaging your skin is bad are *less* likely to intend to use tanning beds. In other words, undergraduate women who prefer the appearance of tanned skin over-untanned skin are more likely to use tanning beds to get

that tan they desire. Furthermore, undergraduates who are not very concerned about damaging their skin are more likely to use tanning beds. These results have two implications for an anti-tanning campaign. First, anti-tanning messages could attempt to persuade undergraduate women that pale skin, rather than tanned skin, is good and desirable. Second, anti-tanning messages could attempt to persuade undergraduate women that damaging your skin is bad, and that tanning beds will result in damaged skin. For example, an anti-tanning message of this type could compare a tanner and a non-tanner's skin at various ages, demonstrating how tanners will have an increased amount of wrinkles and age spots at a younger age than non-tanners.

In addition to attitude towards indoor tanning, the current study suggests that perceived behavioral control is also a predictor of intention to use tanning beds, though a less impactful one. In other words, perceived behavioral control does impact undergraduate women's intention to use tanning beds, although to a lesser degree than attitude toward indoor-tanning. The easier undergraduate women perceive indoor-tanning to be, the more likely they are to intend to tan and thus actually use tanning beds. These women who tan perceive that they have the resources to use tanning beds and that there are no obstacles standing in their way.

This result has several implications for an anti-tanning campaign, even though perceived behavioral control is slightly less of a determinant of intention to tan than attitude towards tanning. Although it might prove difficult to persuade undergraduate women that tanning is not easy if they indeed think that it is, a campaign could attempt to

change public policy and create obstacles to indoor tanning by appealing to the government.

Once again, uncovering the components that make up perceived behavioral control is important to truly understand the behavior. Hypothesis 2 predicted that control beliefs would be directly related to intention to use tanning beds. In line with the findings of previous literature (Hillhouse et al., 1997; Hillhouse et al., 2000; Dodd et al., 2012), H2 was supported and then explored further by correlating control beliefs with intention to tan in a tanning bed. The belief that “having spring break or formal plans would enable me to tan in a tanning bed at least once in the next three months” had a very strong relationship with intention to use tanning beds. Once again, undergraduate women are citing spring break and formals, two events that typically occur on or near the beach, as reasons they go tanning. The fact that these women are saying that these plans “enable” them to go tanning suggests that they would not be using tanning beds without those plans. The implication of this finding is similar to the implication stated above; an anti-tanning campaign could attempt to (1) convince undergraduate women that getting a tan before leaving for spring break or a formal isn’t necessary, or (2) convince undergraduate women to use an alternative method of getting a tanned appearance.

In addition to spring break plans, three other control beliefs are very strongly correlated with intention to tan: (1) the belief that “having my friends going tanning would enable me to tan in a tanning bed,” (2) the belief that “having more money would enable me to tan in a tanning bed” and (3) the belief that “having more convenient tanning salons would enable me to tan in a tanning bed at least once in the next three

months.” These findings suggest that undergraduate women who have friends who go tanning, who have enough money to go tanning, and who have convenient access to tanning salons are more likely to use tanning beds.

Once again, there are implications for these findings for anti-tanning campaigns. First, a campaign could focus its attention on persuading groups of friends, rather than individuals, to discontinue their use of tanning beds in its messages. Second, a campaign could attempt to get the government to implement policies that make indoor tanning more expensive (e.g., via a tanning tax) and less convenient (e.g. via a limit on the number of tanning salons allowed in a college town). If these money and convenience barriers were put in place, fewer undergraduate women would likely use tanning beds despite their desire to do so.

**Normative beliefs and intention to use tanning beds.** The results of this study also answer RQ2, which asked if the normative beliefs of college women related to their intention to use tanning beds. Recall that the normative belief findings of prior studies conflict, such that some studies found that subjective norms correlate with indoor tanning behaviors (e.g., Hillhouse et al., 1997), whereas others found that they do not (e.g., Myers & Horswill, 2006). As discussed above, the current study did not find that the overall subjective norms of undergraduate women are significant *predictors* of intention to use tanning beds. However, a positive correlation between normative beliefs about tanning and intention was found. In other words, undergraduate women who (1) perceive that it is likely that important others approve of tanning in tanning beds and (2) are motivated to

comply with those important others are slightly more likely to intent to tan in a tanning bed in the future.

This study also went a step further and discovered which normative beliefs are the most strongly correlated with intention to tan in a tanning bed. As noted above, these beliefs involved three salient others: tanning salons, doctors and organizations or people who know the health risks of tanning beds. Undergraduate women who intend to tan are more likely to care about what tanning salons think they should do, and less likely to care what doctors and organizations or people who know the health risks of tanning beds think they should do.

There are definite implications of these results for an anti-tanning campaign. A campaign could attempt to persuade undergraduate women that they should not care about what tanning salons think they should do, perhaps by showing tanning salons in a poor light. Furthermore, a campaign could attempt to persuade undergraduate women that they should start caring what doctors and other knowledgeable organizations and people think they should do.

RQ3a-c, which asked (1) if college females perceive that guys believe that they should go tanning, (2) if these perceptions correlate with their intentions to use tanning beds and (3) if guys think college females are more attractive when tan than when not tan, is answered indirectly by RQ2. This three-part research question was included in the current study in an attempt to add to the existing literature, as no previous studies answered these questions. In other words, the current study wanted to uncover whether



females perceive that guys think they should go tanning, and if they do indeed perceive this, whether males actually think tanning makes females more attractive.

The results suggest that though males do indeed think females are more attractive if they go tanning, female undergraduates do not perceive that guys want them to go tanning and, furthermore, they are not motivated to comply with what their male peers want anyway. Thus, an anti-tanning campaign focused on convincing female undergraduates to stop caring what men think would not be effective, nor would a campaign focused upon convincing males that females are attractive when they are untanned.

### **Methodological Limitations**

Despite the interesting findings uncovered, there are limitations to the current study. First, this study assumes that tanning is a reasoned behavior under volitional control. Although not an addiction for most, it is possible that some people are actually addicted to tanning in tanning beds (Mosher & Danoff-Burg, 2010). Because the TPB is not built to explain or predict addictive behaviors (Fishbein & Ajzen, 1975), it may not be the model of choice to study *all* tanning behavior.

Second, this study focused only on the indoor tanning behaviors of undergraduate women from the University of Delaware. Though undergraduate women are an important group to study in regards to tanning, they are not the only group. Furthermore, University of Delaware students might not be representative of undergraduates across the United States or in other countries. Thus, this study's findings cannot be applied with confidence to anti-tanning campaigns for other demographic. Furthermore, although indoor tanning

is a known cause of skin cancer, it is not the only cause. Thus, this study's findings cannot be applied with confidence to anti-tanning campaigns aimed at convincing a population to wear sunscreen or stay out of the sun altogether.

Third, the respondents took the current study's survey approximately two weeks before University of Delaware's spring break began. Although the timing of the survey captured the tanning behaviors of undergraduate women heading to the tanning salon to get a tan before spring break, it may not have caught the tanning behaviors of undergraduate women who use tanning beds only in the summer, fall or winter months.

Finally, when a regression was used to analyze the female data to determine the relative contributions of the behavioral, normative and control components to the prediction of their corresponding intention determinants (attitude towards behavior, subjective norm and perceived behavioral control, respectively), the components explained surprisingly low amounts of variance in the intention determinants. The control components significantly predicted its associated determinant but explained only 18.6% of the variance in perceived behavioral control,  $\beta = .43$ ,  $t(1) = 4.48$ ,  $p < .0001$ . The normative components also significantly predicted its associated determinant but explained only 10.3% of the variance in subjective norm,  $\beta = .32$ ,  $t(1) = 3.09$ ,  $p < .01$ . The behavioral components did not significantly predict its associated determinant, explaining just 3.9% of the variance in attitude towards the behavior,  $\beta = .17$ ,  $t(1) = 1.60$ ,  $p = .11$ . As the component questions included in the survey were created using the salient beliefs supplied by the pilot study participants as suggested in Fishbein and Ajzen's instructions, the low predictive ability of the components remains a mystery.

## **Directions for Future Research**

Based upon the results of the current study, along with the limitations discussed above, there are several directions that could be taken for future research on tanning behaviors. First, as this TPB study only explains and predicts non-addictive tanning behavior, researchers should attempt to use an alternative model to study addictive tanning behaviors. The results of such a study could be used in an anti-tanning campaign aimed at people who have an addiction to using tanning beds.

Second, researchers should replicate this study with a variety of groups, in a variety of places, with a variety of behaviors and at a variety of times. For example, this study should be replicated with undergraduate women across the country and possibly the world in case University of Delaware students represent a unique set of undergraduates. The study should also be replicated with a variety of demographic groups such as high school students and adults. Additionally, the study should be replicated with other harmful sun-behaviors such as outdoor-tanning without sunscreen. Finally, it should be replicated at various points of the year such as fall and winter. The results of these studies should be used to persuade all people to practice sun-safe behaviors throughout the year.

Third, researchers should attempt to explain why despite closely following Fishbein and Ajzen's clear directions, the current study's components did not strongly predict their relative intention determinants. Although the lack of predictive power in the current study may have been a fluke, if future researchers run into the same problem there may be a need to revise Fishbein and Ajzen's instructions for creating the TPB questionnaire.

Finally, and most importantly, an anti-tanning campaign aimed at undergraduate women should be created using the results discussed above. The messages of this campaign should be thoroughly pre-tested among a sample of undergraduate students and then experimentally evaluated to assess the effectiveness of the campaign in convincing undergraduate women to discontinue their indoor-tanning behaviors. If the campaign's messages are closely based upon this study's findings, there is reason to expect a significant change in the amount of undergraduate women who tan in tanning beds.

### **Conclusion**

The current study sought to explain and predict the indoor-tanning behaviors of undergraduate women using a TPB framework by measuring their intention to use tanning beds and the three major predictors (i.e., determinants) of intention (i.e., attitude towards the behavior, subjective norm and perceived behavioral control). Although some previous research has been done in this area, the current study sought to provide a clearer and more detailed explanation of undergraduate women's indoor tanning behaviors beyond what extant literature has already uncovered by examining the components or beliefs that make up those predictors of intention. The proposed hypotheses which predicted that (1) past usage of tanning beds, (2) control beliefs and (2) appearance-based behavioral beliefs would be directly related to intention to use tanning beds derived from a comprehensive review of TPB tanning studies.

The results supported all three hypotheses and the use of TPB to study indoor tanning behaviors and provided interesting answers to the three research questions. The finding that attitude towards indoor-tanning is the strongest predictor of intention to use

tanning beds, followed by perceived behavioral control, remained consistent with previous research. These results suggest that one's attitude toward indoor-tanning has the strongest significant impact on one's future indoor-tanning behavior, and that one's perceived behavioral control over indoor-tanning has a less but still significant impact on one's future indoor-tanning behavior as well. Specifically, those who (1) perceive that using a tanning bed will result in positive outcomes and (2) perceive that indoor-tanning is easy and within their control are more likely use a tanning bed in the future. This finding has an important implication for an anti-tanning intervention or campaign. Campaign designers should focus upon changing undergraduate women's perceptions that indoor-tanning results in positive outcomes and making indoor-tanning harder for them to do.

The current study expands upon tanning literature by going beyond the measurement of attitude and perceived behavioral control to uncover the specific belief components that make up attitude toward indoor-tanning and perceived behavioral control of indoor-tanning. In support of H2 and H3 and the findings of extant literature, the results suggest that one's appearance-based behavioral beliefs and one's control beliefs are related to one's intention to use tanning beds.

Because attitude toward indoor-tanning has the strongest impact upon intention to use tanning beds, the current study suggests that it is important for anti-tanning campaigns to address the significantly correlated appearance-based behavioral beliefs in persuasive messaging. Undergraduate women who value having a base tan before spring break and having a tan in general are more likely to use tanning beds, while those who

fear damaging their skin are less likely to use tanning beds. These findings have important implications for anti-tanning campaigns. In order to persuade undergraduate women to discontinue use of tanning beds, messages should either change the belief that having a base tan before spring break is good, persuade women to use alternative methods to gain a tan appearance before spring break such as spray tans, change the belief that being tan in general is good, and/or persuade women tanners to fear the damage tanning beds will cause their skin.

In addition to appearance-based behavioral beliefs, the current study suggests that anti-tanning campaigns should address control beliefs since they are significantly correlated with intention to use tanning beds and perceived behavioral control of indoor tanning has a significant impact upon intention to use tanning beds. Undergraduate women who have (1) spring break or formal plans, (2) friends who go tanning (3) access to convenient tanning salons and (4) money are more likely to use tanning beds than those who do not.

These findings have important implications for anti-tanning campaigns. In order to prevent undergraduate women from using tanning beds, these resources must be made harder to get and barriers to using tanning beds must be increased. For example, government policy change could increase the price of tanning or limit the number of tanning locations, thus decreasing convenience. Although undergraduate women may still *want* to tan, they may have less control over being able to physically do so.

Finally, the current study's findings suggest that undergraduate women's decisions to use tanning beds are not significantly impacted by perceived social norms,

and that these women don't believe that men want them to tan, nor do they report making their tanning decisions based off of what men want them to do. However, the study also suggests that undergraduate women who want to do what tanning companies think they should do are more likely to go tanning, while undergraduate women who want to do what doctors and other organizations/people who know the risks associated with tanning want them to do are less likely to go tanning. These findings have an implication for anti-tanning campaigns. Anti-tanning messages could convince undergraduate women to stop caring what tanning companies think and/or start caring what doctors and other knowledgeable organizations/people think.

The current study expands upon indoor-tanning literature by providing anti-tanning campaign designers with (1) a more detailed understanding of the indoor-tanning behaviors of undergraduate women and (2) specific topics to address in messages in order to most effectively persuade them to suspend these behaviors. Considering that undergraduate women are a high-risk group for skin cancer because they are both (a) among the most frequent users of artificial tanning booths and (b) at a higher risk to develop melanoma via artificial tanning booths, persuading them to change their behavior and discontinue their use is essential. Furthermore, knowing that the objectives and messages of behavior-change interventions should be based on the findings of sound theoretical research (Stead et al., 2005), the findings of the current study are exceedingly important for that persuasion process. Hopefully, the results of this study will someday be used to create an effective anti-tanning campaign aimed at undergraduate women. The lives of many young women may depend on it.

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## APPENDIX A

### FEMALE PILOT QUESTIONNAIRE

We are conducting a study about the indoor tanning behaviors of undergraduate students at the University of Delaware. We would appreciate your responses to some questions about this. There are no right or wrong answers; we are just interested in your personal opinions.

First, please take a few minutes to tell us what you think about the possibility of tanning in a tanning bed at least once in the next three months. In response to the questions that follow, please list the thoughts that come immediately to mind. Write each thought on a separate line. (Five or six lines are provided for each question).

- What do you see as the advantages of you tanning in a tanning bed at least once in the next 3 months?
- What do you see as the disadvantages of you tanning in a tanning bed at least once in the next 3 months?
- What else comes to mind when you think about tanning in a tanning bed at least once in the next 3 months?
- Please list the individuals or groups who would approve or think you should tan in a tanning bed at least once in the next 3 months.
- Please list the individuals or groups who would disapprove or think you should not tan in a tanning bed at least once in the next 3 months.
- Please list the individuals or groups who are most likely to tan in a tanning bed at least once in the next 3 months.
- Please list the individuals or groups who are least likely to tan in a tanning bed at least once in the next 3 months.
- Please list any factors or circumstances that would make it easy or enable you to tan in a tanning bed at least once in the next 3 months.

- Please list any factors or circumstances that would make it difficult or prevent you from tanning in a tanning bed at least once in the next 3 months.

Finally, please answer each of the following questions by circling the number that best describes your opinion. Some of the questions may appear to be similar, but they do address somewhat different issues. Please read each question carefully.

For me to tan in a tanning bed at least once in the next three months would be  
*Harmful* : 1 : 2 : 3 : 4 : 5 : 6 : 7 : *Beneficial*

Tanning in a tanning bed at least once in the next three months would be  
*Pleasant* : 1 : 2 : 3 : 4 : 5 : 6 : 7 : *Unpleasant*

Most people who are important to me approve of my tanning in a tanning bed at least once in the next three months  
*Strongly disagree* : 1 : 2 : 3 : 4 : 5 : 6 : 7 : *Strongly agree*

Most other University of Delaware students will tan in a tanning bed at least once in the next three months.  
*Extremely unlikely* : 1 : 2 : 3 : 4 : 5 : 6 : 7 : *Extremely likely*

It is expected of me that I tan in a tanning bed at least once in the next three months.  
*Definitely false* : 1 : 2 : 3 : 4 : 5 : 6 : 7 : *Definitely true*

I am confident that I can tan in a tanning bed at least once in the next three months  
*Definitely false* : 1 : 2 : 3 : 4 : 5 : 6 : 7 : *Definitely true*

My tanning in a tanning bed at least once in the next three months is entirely up to me.  
*Strongly disagree* : 1 : 2 : 3 : 4 : 5 : 6 : 7 : *Strongly agree*

I intend to tan in a tanning bed at least once in the next three months.  
*Extremely unlikely* : 1 : 2 : 3 : 4 : 5 : 6 : 7 : *Extremely likely*

In the past three months, I have tanned in a tanning bed at least once.  
*Definitely false* : 1 : 2 : 3 : 4 : 5 : 6 : 7 : *Definitely true*

## **APPENDIX B**

### **MALE PILOT QUESTIONNAIRE**

We are conducting a study about the indoor tanning behaviors of undergraduate students at the University of Delaware. We would appreciate your responses to some questions about this. There are no right or wrong answers; we are just interested in your personal opinions.

First, please take a few minutes to tell us what you think about college females tanning in a tanning bed at least once in the next three months. In response to the questions that follow, please list the thoughts that come immediately to mind. Write each thought on a separate line. (Five or six lines are provided for each question).

- What do you see as the advantages of college females tanning in a tanning bed at least once in the next 3 months?
- What do you see as the disadvantages of college females tanning in a tanning bed at least once in the next 3 months?
- What else comes to mind when you think about college females tanning in a tanning bed at least once in the next 3 months?

## APPENDIX C

### CONTENT ANALYSIS TABLES: FEMALE PILOT QUESTIONNAIRE

Q1: What do you see as the advantages of you tanning in a tanning bed at least once in the next 3 months

Clearer Skin	Clearer Skin Clears skin of acne Clears up pimples Better skin Clears skin (acne) More healthy looking Make skin look healthy Healthy looking skin		Sexy Glow Nice glow Glow Better self-image Increased confidence
Improved Mood	Improved Mood Helps with seasonal depression UV rays make you happier Happier Feel good Good feelings boost from vitamin D Vitamin D	Getting a tan	Getting a tan Look tan Being tan Less pale Getting tanner Nice skin tone body color nice tan tanner Being tan Color during winter Darker skin in winter Get a tan in winter
More Attractive	Attractive Look better More attractive Feel more attractive Better appearance Look better Attractive Beautiful Attractive Approve appearance	Base Tan Before Spring Break	Won't burn during spring break Base tan before summer Avoid burning (spring break/summer) Base tan Avoid burning on spring break



Q2: What do you see as the disadvantages of you tanning in a tanning bed at least once in the next 3 months?

Increased risk for Skin Cancer	Bad for you Skin Cancer Increased skin cancer risk Skin cancer Skin cancer Skin cancer Skin diseases Unhealthy Melanoma risk Melanoma risk Dangerous Cancer possibility Higher skin cancer risk Melanoma Cancer Cancer Skin cancer Skin cancer Bad for health Unhealthy Cancer Skin cancer Cancer Cancer Skin cancer
Expensive	Expensive High cost Expensive Costs money Expensive Cost Waste money Expensive Costly Expensive

Damages Your Skin	Damage skin Harmful to skin Harmful to skin Bad for skin Bad for skin Skin damage Damage skin Skin problems Wrinkles Bad for skin Dries skin out Harming skin Bad for eyes
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Q3: Please list the individuals or groups who would approve or think you should tan in a tanning bed at least once in the next 3 months.

Tanning Salons	Tanning salon owners People who work at a tanning salon Tanning companies Tanning salon owners Tanning bed companies Tanning salons Tanning salon owners Tanning salons Workers in tanning salon Tanning salon employees
Friends	My friends Friends My friends My female friends Peers Roommates Friends

	Friends Friends Friends Friends Friends Friends Friends
College females	UD girls UD females College age girls Teenage girls Women Girls UD girls who tan Girls
Guys	Guys Guys
Sororities	Sororities Sorority girls Sorority girls

Q4: Please list the individuals or groups who would disapprove or think you should not tan in a tanning bed at least once in the next 3 months.

Doctors	Doctors Health centers Health professionals Doctors Health professionals Doctors doctors Doctors Doctors Dermatologists		Grandparents My father Parents Parents My parents Parents mom
Parents	Family Parents Family members Parents Family members Family Family Parents Parents Parents My mom Parents Parents parents My mom Dad	People or organizations who know the associated risk	Skin cancer society Cancer associations Skin cancer advocate groups FDA Smart people People who don't care to increase risk of cancer People who know the effects People who think you can get skin cancer Educated individuals aware of risk Friends who have had a family death caused by cancer People with skin cancer People with Skin cancer

Q5: Please list the individuals or groups who are most likely to tan in a tanning bed at least once in the next 3 months

College Girls	College girls College girls College students College girls College age women UD girls College females Women Females Women Girls Girls Girls Girls who want to be tan
Your friends	My friends Friends Friends My friends Some friends
People going on spring break or to a spring formal	College girls before spring break My friends before spring break People going on spring break People going on spring break People going on vacation People going on spring break Females going to formal Girls going to prom

	Girls getting it for prom
Celebrities	Celebrities Models Fashion People Models Snooki People from Jersey Jersey shore cast
Sorority Girls	Sorority girls Sororities Sorority girls Sororities Sorority girls

Q6: Please list the individuals or groups who are least likely to tan in a tanning bed at least once in the next 3 months.

Men	Men Men Men Men Boys Boys Men Males Boys
People concerned about health	People concerned about health People who know it's bad People who know the health effects People who don't want to risk their health Health Professionals Doctors Doctors Medical workers

Family members	My family Parents Parents Brother Parents Dad Siblings My family Family
Older People	Old people Old people Elderly Older people Elderly Older adults Older adults

Q7: Please list any factors or circumstances that would make it easy or enable you to tan in a tanning bed at least once in the next 3 months

If you had more money	If it was free/discounted Good deals If I had more money Cost less money If I have extra money IF it was less expensive IF it was free If I had more money If I had more money Free sessions Free tanning More money More money Lower cost Less money cheaper IF I had more money Less expensive More money
If it was safer	If it wasn't harmful Safer Less chemicals Not as bad for you Less bad for you If wouldn't get cancer

If it was more convenient	Higher availability of beds in Newark Higher availability More tanning beds on campus Tanning beds at gym If I lived closer to tanning salon Lived closer If it was closer If it was closer Convenient location Convenient locations If I had a ride there
If I was going on spring break or to a special event (e.g., a wedding or formal)	If I was going to a special event Prom Wedding Special event Wedding Spring break coming up Important event Spring break Spring formal
If my friends were going	Encouragement from friends If friends all go Friends going with me

Q8: please list any factors or circumstances that would make it difficult or prevent you from tanning in a tanning bed at least once in the next 3 months

If it was more difficult to get to the salon	Salon far away Inconvenient Less tanning salons NO transportation NO places near campus
If it was more expensive.	More expensive Cost Expensive Not enough money Money Money Price rising Money More expensive Money No money No money Less money More money More expensive Expensive No money High cost Cost Money Too expensive Expensive
If there was increased health risks involved	Health effects Bad for you Higher danger Cancer statistics Increased health risk Study showing how bad it is Health risk More harmful Health concerns

	Knowledge of effects Knowledge that it's harmful
If I had no time	Busy schedule Time/availability NO time No time Time

## APPENDIX D

### CONTENT ANALYSIS TABLES: MALE PILOT QUESTIONNAIRE

Q1: What do you see as the advantages of college females tanning in a tanning bed at least once in the next 3 months?

Improves Self-Esteem	Improved self esteem Boost self esteem Self-esteem boost Feel more confident More self confidence Feel prettier Feel better about themselves
Seasonal Tan	Getting tan during winter Get tan during winter Tan during winter Get tan during winter Look tan More tan Look tanner
More Attractive	More physically attractive More attractive Look attractive Look good Attractive Look better Enhance appearance More attractive Improved appearance Look better More attractive Attractive

	More appealing Fine as hell More sex appeal Look hotter Pale bodies are nasty Pale is ugly Look more athletic Help skin issues
Look Healthier	Look healthier Look healthier Help Good for their skin



Q2: What do you see as the disadvantages of college females tanning in a tanning bed at least once in the next 3 months?

Increased Risk for Skin Cancer	Skin Cancer Skin cancer Skin cancer Health risks Skin cancer Fatal damage to skin Cancer Skin cancer Skin Cancer Skin cancer Skin cancer Cancer Skin cancer Skin cancer Skin cancer Cancer Skin cancer Skin cancer Harms skin Bad for skin Harmful Damages skin Harms skin Bad for skin Harms skin Harms/damages skin Damaging to skin Health risks Bad for you Not healthy Not healthy	Money	money Waste of money Waste of money Waste of money Waste of money Costs money Waste of money		insecure It's superficial Girls who tan are stuck up Girls who tan are high maintenance Girls are stuck up It comes off as shallow Makes girls seem fake Girls who tan care too much about their appearance It's a vain thing to do Girls trying to look more attractive
		Makes Skin Look Orange	Orange skin Orange skin Orange skin Orange skin Orange skin Orange skin Orange skin Orange skin Unnatural looking Looks unnatural Looks fake Looks fake Looks gross Can look bad		
		Waste of Time	Waste of time Waste of time Waste of time Waste of time		
		Girls who tan care too much about their appearance	People who go have a lack of confidence People who tan are		
Waste of	Waste of				

## APPENDIX E

### FEMALE QUESTIONNAIRE

**Please answer each of the following questions by circling the number that best describes your opinion. Some of the questions may appear to be similar, but they do address somewhat different issues. Please read each question carefully.**

#### **(OUTCOME EVALUATIONS)**

1. My having clearer skin is
2. My having an improved mood is
3. My being more attractive is
4. My being tan is
5. My having a base tan before spring break is
6. My having an increased risk for skin cancer is
7. My spending a lot of money is
8. My damaging my skin is

*Good : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Bad*

#### **(BEHAVIORAL BELIEF STRENGTH)**

9. If I tan in tanning bed at least once in the next three months I would have clearer skin.
10. If I tan in a tanning bed at least once in the next three months I will have an improved mood.
11. If I tan in a tanning bed at least once in the next three months I will be more attractive.
12. If I tan in a tanning bed at least once in the next three months I will be more tan.
13. If I tan in a tanning bed at least once in the next three months I will have an increased risk for skin cancer.
14. My tanning in a tanning bed at least once in the next three months will require me to spend a lot of money.
15. If I tan in a tanning bed at least once in the next three months I will damage my skin.

*Likely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Unlikely*

**(MOTIVATION TO COMPLY)**

16. When it comes to tanning, I want to do what tanning salons think I should do.
17. When it comes to tanning, I want to do what my friends think I should do.
18. When it comes to tanning, I want to do what other University of Delaware females think I should do.
19. When it comes to tanning, I want to do what guys think I should do.
20. When it comes to tanning, I want to do what sorority girls think I should do.
21. When it comes to tanning, I want to do what doctors think I should do.
22. When it comes to tanning, I want to do what my parents think I should do.
23. When it comes to tanning, I want to do what organizations or people who know the health risks of tanning beds think I should do.

*Agree* : 1 : 2 : 3 : 4 : 5 : 6 : 7 : *Disagree*

**(INJUNCTIVE BELIEF STRENGTH)**

24. Tanning salons think that I should tan in a tanning bed at least once in the next three months.
25. My friends think that I should tan in a tanning bed at least once in the next three months.
26. Other University of Delaware females think that I should tan in a tanning bed at least once in the next three months.
27. Guys think that I should tan in a tanning bed at least once in the next three months.
28. Sorority girls think that I should tan in a tanning bed at least once in the next three months.
29. Doctors think that I should tan in a tanning bed at least once in the next three months.
30. My parents think that I should tan in a tanning bed at least once in the next three months.
31. Organizations or people who know the health risks of tanning beds think that I should tan in a tanning bed at least once in the next three months.

*Probable* : 1 : 2 : 3 : 4 : 5 : 6 : 7 : *Improbable*

**(IDENTIFICATION WITH REFERENT)**

32. When it comes to tanning, how much do you want to be like your friends?
33. When it comes to tanning, how much do you want to be like other University of Delaware females?
34. When it comes to tanning, how much do you want to be like sorority girls?
35. When it comes to tanning, how much do you want to be like celebrities?

36. When it comes to tanning before spring break or a formal, how much do you want to be like other girls going on spring break or to the formal?
37. When it comes to tanning, how much do you want to be like your family members?
38. When it comes to tanning, how much do you want to be like older people?
39. When it comes to tanning, how much do you want to be like people who are concerned about their health?

*Very much* : 1 : 2 : 3 : 4 : 5 : 6 : 7 : *Not at all*

### **(DESCRIPTIVE BELIEF STRENGTH)**

40. My friends will tan in a tanning bed at least once in the next three months.
41. Other University of Delaware females will tan in a tanning bed at least once in the next three months.
42. Sorority girls will tan in a tanning bed at least once in the next three months.
43. Celebrities will tan in a tanning bed at least once in the next three months.
44. Girls going on spring break or to a formal will tan in a tanning bed at least once in the next three months
45. My family members will tan in a tanning bed at least once in the next three months.
46. Older people will tan in a tanning bed at least once in the next three months.
47. People who are concerned about their health will tan in a tanning bed at least once in the next three months.

*Probable* : 1 : 2 : 3 : 4 : 5 : 6 : 7 : *Improbable*

### **(POWER OF CONTROL FACTORS)**

48. Having more money would enable me to tan in a tanning bed at least once in the next three months.
49. The existence of non-harmful tanning beds would enable me to tan in a tanning bed at least once in the next three months.
50. Having more convenient tanning salons would enable me to tan in a tanning bed at least once in the next three months.
51. Having spring break or formal plans would enable me to tan in a tanning bed at least once in the next three months.
52. Having my friends going tanning would enable me to tan in a tanning bed at least once in the next three months.
53. Having less time would make it difficult for me to tan in a tanning bed at least once in the next three months.

*Agree* : 1 : 2 : 3 : 4 : 5 : 6 : 7 : *Disagree*

**(CONTROL BELIEF STRENGTH)**

54. I will have more money in the next three months.  
55. Non-harmful tanning beds will exist in the next three months.  
56. Tanning salons will be more convenient in the next three months.  
57. I will have spring break or formal plans in the next three months.  
58. My friends will go tanning in the next three months.  
59. I will have less time in the next three months.

*Likely* : 1 : 2 : 3 : 4 : 5 : 6 : 7 : *Unlikely*

**(DIRECT ATTITUDE SCALES)**

- 59-62. My tanning in a tanning bed in the next three months is:

*Good* : 1 : 2 : 3 : 4 : 5 : 6 : 7 : *Bad*

*Unpleasant* : 1 : 2 : 3 : 4 : 5 : 6 : 7 : *Pleasant*

*Harmful* : 1 : 2 : 3 : 4 : 5 : 6 : 7 : *Beneficial*

*Interesting* : 1 : 2 : 3 : 4 : 5 : 6 : 7 : *Boring*

**(DIRECT PERCEIVED NORM SCALES)**

63. Most people who are important to me think that I should tan in a tanning bed at least once in the next three months.

*True* : 1 : 2 : 3 : 4 : 5 : 6 : 7 : *False*

64. Most people whose opinions I value would approve of my tanning in a tanning bed at least once in the next three months.

*Improbable* : 1 : 2 : 3 : 4 : 5 : 6 : 7 : *Probable*

65. Most people I respect and admire will tan in a tanning bed at least once in the next three months.

*Unlikely* : 1 : 2 : 3 : 4 : 5 : 6 : 7 : *Likely*

67. Most people like will tan in a tanning bed at least once in the next three months.

*Agree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Disagree*

**(DIRECT PERCEIVED CONTROL SCALES)**

68. I am confident that I can tan in a tanning bed at least once in the next three months.

*True : 1 : 2 : 3 : 4 : 5 : 6 : 7 : False*

69. My tanning in a tanning bed at least once in the next three months is completely up to me.

*Disagree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Agree*

70. If I really wanted to, I could tan in a tanning bed at least once in the next three months.

*Likely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Unlikely*

71. For me to tan in a tanning bed at least once in the next three months is under my control.

*Not at all : 1 : 2 : 3 : 4 : 5 : 6 : 7 : completely*

**(BEHAVIORAL INTENTION SCALES)**

72. I intend to tan in a tanning bed at least once in the next three months.

*Definitely do : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Definitely do not*

73. I will tan in a tanning bed at least once in the next three months.

*Likely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : unlikely*

74. I am willing to tan in a tanning bed at least once in the next three months.

*False : 1 : 2 : 3 : 4 : 5 : 6 : 7 : True*

75. I plan to tan in a tanning bed at least once in the next three months.

*Agree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Disagree*

**(PAST BEHAVIOR AND BEHAVIOR ASSESSED 3 MONTHS LATER)**

76. In the past three months, how often have you tanned in a tanning bed?

*Never* : 1 : 2 : 3 : 4 : 5 : 6 : 7 : *Almost Always*

77. I have tanned in a tanning bed at least once in the past three months.

*True* : 1 : 2 : 3 : 4 : 5 : 6 : 7 : *False*

**(DEMOGRAPHICS)**

78. How would you describe your natural skin tone:

- a. White (very fair)
- b. Fair or light-skinned European
- c. Medium, dark-skinned European
- d. Dark Brown
- e. Black

79. I am:

- a. In a sorority
- b. Not in a sorority

## APPENDIX F

### MALE QUESTIONNAIRE

**Please answer each of the following questions by circling the number that best describes your opinion. Some of the questions may appear to be similar, but they do address somewhat different issues. Please read each question carefully.**

#### **(OUTCOME EVALUATIONS)**

1. College females having high self-esteem is
2. College females having a tan year-round is
3. College females looking attractive is
4. College females looking healthy is
5. College females having an increased risk for skin cancer is
6. College females wasting their money is
7. College females having orange skin is
8. College females wasting their time is
9. College females caring too much about their appearance is

*Good : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Bad*

#### **(BEHAVIORAL BELIEF STRENGTH)**

10. If college females tan in a tanning bed at least once in the next three months they will have higher self-esteem.
11. If college females tan in a tanning bed at least once in the next three months they will have a tan before summer.
12. If college females tan in a tanning bed at least once in the next three months they will look more attractive.
13. If college females tan in a tanning bed at least once in the next three months they will look healthier.
14. If college females tan in a tanning bed at least once in the next three months they will have an increased risk for skin cancer.
15. If college females tan in a tanning bed at least once in the next three months they will be wasting their money.
16. If college females tan in a tanning bed at least once in the next three months they will have orange skin.



17. If college females tan in a tanning bed at least once in the next three months they will be wasting their time.
18. College females who tan in a tanning bed at least once in the next three months care too much about their appearance.

*Likely* : 1 : 2 : 3 : 4 : 5 : 6 : 7 : *Unlikely*

## **APPENDIX G**

### **IRB APPROVAL LETTER – PILOT STUDY**

DATE: January 17, 2013

TO: Christine Flynn  
FROM: University of Delaware IRB

STUDY TITLE: [418350-1] The Indoor Tanning Behaviors of Undergraduate Women: A Theory of Planned Behavior Approach

SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF EXEMPT STATUS  
DECISION DATE: January 17, 2013

REVIEW CATEGORY: Exemption category # 2

Thank you for your submission of New Project materials for this research study. The University of Delaware IRB has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

We will put a copy of this correspondence on file in our office. Please remember to notify us if you make any substantial changes to the project.

If you have any questions, please contact Jody-Lynn Berg at (302) 831-1119 or [jlberg@udel.edu](mailto:jlberg@udel.edu). Please include your study title and reference number in all correspondence with this office.

## **APPENDIX H**

### **IRB APPROVAL LETTER – FINAL STUDY**

DATE: March 13, 2013

TO: Christine Flynn  
FROM: University of Delaware IRB

STUDY TITLE: [442768-1] Thesis: The Indoor Tanning Behaviors of Undergraduate Women: A Theory of Planned Behavior Approach

SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF EXEMPT STATUS  
DECISION DATE: March 13, 2013

REVIEW CATEGORY: Exemption category # 2

Thank you for your submission of New Project materials for this research study. The University of Delaware IRB has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

We will put a copy of this correspondence on file in our office. Please remember to notify us if you make any substantial changes to the project.

If you have any questions, please contact Jody-Lynn Berg at (302) 831-1119 or [jlberg@udel.edu](mailto:jlberg@udel.edu). Please include your study title and reference number in all correspondence with this office.