January 2017

The Impact Of Social Norms On Young Women's Health-Related Risk Perceptions, Intentions, And Behaviors

Karen Elizabeth Vanderzanden

THE IMPACT OF SOCIAL NORMS ON YOUNG WOMEN'S HEALTH-RELATED
RISK PERCEPTIONS, INTENTIONS, AND BEHAVIORS

by

Karen Elizabeth Vanderzanden
Bachelor of Arts, Creighton University, 2013
Master of Arts, University of North Dakota, 2015

A Dissertation

Submitted to the Graduate Faculty

of the

University of North Dakota

in partial fulfillment of the requirements

for the degree of

Doctor of Philosophy

Grand Forks, North Dakota

December
2017

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

_____
Dr. Joelle Ruthig

_____
Dr. Andre Kehn

_____
Dr. Heather Terrell
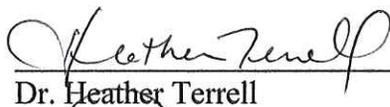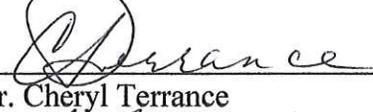
_____
Dr. Cheryl Terrance
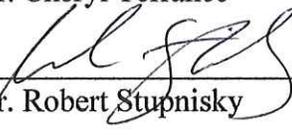
_____
Dr. Robert Stupnisky

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

_____
Grant McGimpsey
Dean of the School of Graduate Studies

November 29, 2017
_____
Date

PERMISSION

Title   The Impact of Social Norms on Young Women's Health-Related Risk
               Perceptions, Intentions, and Behaviors

Department   Psychology

Degree   Doctor of Philosophy

   In presenting this dissertation in partial fulfillment of the requirements for a
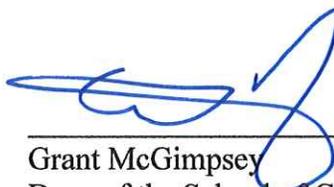graduate degree from the University of North Dakota, I agree that the library of this
University shall make it freely available for inspection. I further agree that permission for
extensive copying for scholarly purposes may be granted by the professor who supervised
my dissertation work or, in her absence, by the Chairperson of the department or the dean
of the School of Graduate Studies. It is understood that any copying or publication or
other use of this dissertation or part thereof for financial gain shall not be allowed without
my written permission. It is also understood that due recognition shall be given to me and
to the University of North Dakota in any scholarly use which may be made of any
material in my dissertation.

Karen Elizabeth Vanderzanden
December 4, 2017

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACKNOWLEDGMENTS

I wish to express my sincere gratitude to my advisor, Dr. Joelle Ruthig, for sharing her knowledge, advice, and expertise throughout the process of completing this dissertation. Her mentorship and encouragement during my time at the University of North Dakota has greatly contributed to my growth as a researcher, writer, and person. I would also like to thank Dr. Andre Kehn, Dr. Heather Terrell, Dr. Cheryl Terrance, and Dr. Robert Stupnisky for taking the time to serve as members of my committee and contributing valuable feedback that helped to shape this project. I am grateful to the Department of Psychology for making this project possible by providing financial assistance for data collection. I would not be where I am today without the love and support of my family and friends, especially my cohort. Finally, thank you to Kyle Bernhardt for the endless encouragement, patience, and understanding.

This dissertation is dedicated to Kyle Bernhardt,

for always believing in me.

ABSTRACT

Research has shown that social norms may influence individuals' engagement in potentially dangerous behaviors. The current study examined the influence of descriptive norms and injunctive norms on risk perceptions, intentions, and behavioral outcomes for tanning and binge drinking. Participants were 359 Caucasian women between the ages of 21 and 25 years old residing in the United States who completed online surveys via Amazon's Mechanical Turk (MTurk). The study employed a 3 (Descriptive norm information: high risk estimate vs. low risk estimate vs. none) x 3 (Injunctive norm information: approval vs. disapproval vs. none) x 2 (Target risk behavior: tanning vs. binge drinking) factorial design. It was expected that exposure to high risk (vs. low risk) estimate information and disapproval norm information (vs. approval norm information) would produce higher personal risk estimates, weaker intent to engage in the target behavior, and less engagement in that behavior during the follow-up period. The results showed that descriptive norms impacted risk estimates in the expected direction, and injunctive norms impacted behavior intentions in the expected direction. However, exposure to social norms did not influence subsequent behavioral outcomes. Findings provided insight into the varying relationships between social norms and young women's risk perceptions as a function of different types of health-related behaviors.

CHAPTER I

INTRODUCTION

Social norms are extremely influential and so pervasive that acting in accordance with them has become somewhat of an automatic response (Bicchieri, 2005). In fact, Bicchieri (2005) argued that individuals often conform to social norms without regard for other personal or social consequences. Likewise, research has shown that social norms may influence individuals' engagement in risky, potentially dangerous behaviors, such as alcohol use (Elek, Miller-Day, & Hecht, 2006), weight control (Mueller, Pearson, Muller, Frank, & Turner, 2010), and tanning (Day, Wilson, Hutchinson, & Roberts, 2016). Therefore, it is critical to understand the effect of social norms on individuals' health-related perceptions, intentions, and behavioral outcomes. The goal of the current study was to advance the understanding of such effects by investigating the impact of descriptive and injunctive norms on young women's health-related behaviors.

Risky Health-Related Behaviors among Young Women

In general, risk-taking behavior tends to be more prevalent among younger individuals and then decrease with age (Feldstein & Washburn, 1980; Rolison, Hanoch, Wood, & Liu, 2014). For instance, Powers, Anderson, Byles, Mishra, and Loxton (2015) conducted a longitudinal study in which they investigated women's drinking behavior from 1996 to 2012. The researchers found that high episodic risk drinking (i.e., having up to four drinks in one sitting at least once per month) decreased rapidly with age.

1

Similarly, multinational trends have provided support for the inverse relationship between age and heavy episodic drinking, particularly among women (Wilsnack, Wilsnack, Kristjanson, Vogeltanz-Holm, & Gmel, 2009). Centers for Disease Control and Prevention (2011) found that binge drinking among women was most common in 18 to 24 year olds and then declined with increasing age. For women who reported engagement in binge drinking, they averaged 3.2 episodes per month and 5.7 drinks during an episode. These averages were higher among the 18-24 year old age group at 3.6 episodes per month and 6.4 drinks during an episode. Excessive alcohol consumption can potentially lead to dangerous consequences for women, such as memory loss, heart damage, liver disease, breast cancer, and infertility (Centers for Disease Control and Prevention, 2016a). These trends highlight the importance of focusing on risky behaviors particularly in younger individuals as opposed to older adults.

Another risky health-related behavior that is prevalent among young women is tanning (Stellefson & Chaney, 2006). Research has shown that women use tanning beds and intentionally sunbathe more frequently than men (Branstrom, Kristjansson, & Ullen, 2005). Similarly, Hansen and Bentzen (2014) investigated factors that contributed to engagement in high-risk tanning behavior. In this case, high-risk tanning behavior was characterized as intentional exposure to ultraviolet radiation, either in tanning beds or outside. The researchers found that high-risk tanning behavior was associated with being younger and female. Moreover, the results showed that the older participants were, the less frequently they engaged in high-risk tanning behavior. Other research on the frequency of tanning behaviors among college-aged women found that 62% of young

women used tanning beds at least one time per week (Hemrich, Pawlow, Pomerantz, & Segrist, 2014). In fact, 13% of young women regularly used tanning beds four or more times per week. These statistics are concerning, as research has suggested that each tanning session increases one's risk for developing melanoma by 1.8% (Boniol, Autier, Boyle, & Gandini, 2012). Additionally, individuals who use tanning beds before the age of 35 increase their risk for melanoma by 87% as compared to individuals who have never used a tanning bed.

Along with developing skin cancer (American Cancer Society, 2016), excessive exposure to ultraviolet radiation is a major risk factor for premature aging of the skin (Adachi, Murakami, Tanaka, & Nakata, 2014; Davidson & Wolfe, 1986). Premature skin aging occurs as a result of exposure to ultraviolet radiation and manifests as dry, wrinkly skin with a sallow complexion (Hashizume, 2004). Although society tends to convey that the appearance of aging is undesirable (Coupland, 2003), women continue to engage in tanning behaviors. Therefore, it is vital to understand young women's tendencies to engage in such risky health-related behaviors. Given the potential negative outcomes associated with binge drinking and tanning among young women, it is important to consider factors that may influence or diminish engagement in these behaviors. In particular, social norms and social comparison play a significant role in individuals' attitudes and perceptions, which in turn manifest in their intentions and overt behaviors.

Social Comparison Theory

Social Comparison Theory (Festinger, 1954) and the social norms approach (Berkowitz, 2005) provide frameworks that are useful for understanding the underlying mechanisms

at work in the powerful influence of social norms. According to Social Comparison

Theory (Festinger, 1954; Suls & Wheeler, 2000), individuals have a strong motivation to

gain knowledge about themselves. This motivation involves evaluating one's abilities,

opinions, and behaviors. A common way that individuals evaluate themselves is by

making comparisons to a designated target. Festinger (1954) asserted that individuals

prefer to compare themselves to objective standards when available, as this should result

in more accurate self-evaluations. However, objective information is often not readily

available. Consequently, other individuals are frequently used as comparison targets

when engaging in self-evaluation. The self-evaluation process involves comparing one's

own views to others' in order to gain information about one's personal opinions. In other

words, the opinions and views of others are central to one's personal perceptions.

Furthermore, individuals tend to compare themselves to others who are similar on various

dimensions such as gender, age, and physical characteristics (Buunk, Gibbons, & Reis-

Bergan, 1997). Comparisons to similar targets provide individuals with information

describing how they ought to think or act. Overall, social comparison allows individuals

to determine the standard, typical behaviors for a designated situation (Scott, Mason, &

Mason, 2015).

Because social comparison is a robust tendency, this concept has been the focus

of much social psychological research. Festinger's (1954) theory has been applied to

various domains, such as depression, employment status (Sheeran, Abrams, & Orbell,

1995), and marital satisfaction (Buunk, Collins, Taylor, VanYperen, & Dakof, 1990).

Social Comparison Theory is especially applicable within the domain of risky health

behaviors (Buunk et al., 1997). For example, individuals who want to gauge their likelihood of developing a certain illness or experiencing negative consequences from risky behaviors may use other similar individuals as comparison targets. Not only do these comparisons provide individuals with self-knowledge, but they can also influence subsequent behavior (Scott et al., 2015). Thus, peer comparisons are critical in shaping individuals' health-related perceptions, intentions, and behaviors.

Lane, Gibbons, O'Hara, and Gerrard (2011) demonstrated the importance of how a comparison target is perceived and the subsequent effects on behavioral intentions. In their study, participants responded to questions regarding their typical weeknight activities, then, read a same-sex individual's (i.e., the comparison target) responses to the same questions. Finally, participants compared themselves to the target and indicated their willingness to engage in various behaviors. The results showed that when participants saw themselves as similar to the comparison target, and the comparison target indicated he/she drank alcohol regularly, the participant reported that he/she was more willing to drink alcohol as well. On the other hand, when participants compared themselves to a dissimilar target that drank alcohol, they reported less willingness to engage in drinking behavior. These results emphasize the importance of social comparison to a perceived similar target and its association with intent to engage in potentially risky behaviors.

Mueller et al. (2010) investigated another potentially risky health-related behavior. They examined how social comparison influenced behaviors related to weight-control (e.g., diet and exercise behaviors) in adolescent girls. The researchers sought to

determine what type of comparison target (e.g., all girls in the school, girls of similar weight and body type, or girls who most closely resembled the media/societal ideal) female students utilized in comparisons of weight and body type. The subsequent effects of these social comparisons on weight-control behavior were also examined. The results indicated that targets that were viewed as similar to the individual (i.e., similar weight and body type) had the most influence on the participants' behavior. Specifically, the more underweight girls in school perceived as trying to lose weight, the more likely that an underweight participant reported trying to lose weight as well. This same pattern also emerged among overweight girls. Not only do these results support the use of similar others as comparison targets, but they also highlight the potential for adolescents and young adults to engage in risky health-related behaviors as a result of social comparison.

Social Norms Approach

Similar to Social Comparison Theory (Festinger, 1954; Suls & Wheeler, 2000), the social norms approach asserts that individuals' behavior is strongly influenced by their perceptions of others' attitudes and behaviors (Berkowitz, 2005). However, one problem arising from this common tendency is that individuals' perceptions of norms are often inaccurate. The social norms approach focuses on this discrepancy, as there are resulting behavioral implications. For example, research by Page, Scanlan, and Gilbert (1999) showed a positive relationship between the overestimation of excessive drinking behavior and rates of binge drinking in college students. In this case, individuals overestimated the actual rate of binge drinking and in turn, these inaccurate perceptions were related to higher rates of binge drinking among the participants. Similarly,

Ellickson, Bird, Orlando, Klein, and McCaffrey (2003) conducted research supporting the strong influence of perceived social norms among middle school students. The researchers asked participants about their frequency of smoking, along with the perceived frequency of smoking in their school. The results showed that the perception of a high rate of smoking among fellow students was associated with more frequent smoking behavior. Taken together, these findings underscore the powerful and potentially dangerous influence that social norms can have on one's health-related behaviors.

The major focus of the social norms approach involves addressing misperceptions of negative social norms (Berkowitz, 2005). As previously mentioned, college students tend to overestimate the degree to which other students consume alcohol, and this misperception is associated with higher consumption levels among students (e.g., Page et al., 1999). The social norms approach stresses the importance of correcting these inaccurate assumptions by providing individuals with more accurate norm information. To this end, Scholly, Katz, Gascoigne, and Holck (2005) examined perceived social norms regarding risky sexual behaviors and crafted an intervention in an attempt to combat these misperceptions. College students reported their frequency of various sexual behaviors, as well as perceptions of the frequency of sexual behaviors among undergraduates at their university. The results indicated that participants overestimated the frequency of sexual behavior among other undergraduate students. Additionally, participants overestimated the number of sexual partners, the number of unintended pregnancies, and the prevalence of sexually transmitted infections among their peers (Scholly et al., 2015). These results provide support for the notion that individuals often

7

have inaccurate perceptions about social norms. Scholly et al. attempted to counter students' misperceptions by hanging posters with accurate norm information around the university campuses. Although the intervention was not particularly effective in this case, the researchers gained valuable insight into factors that may contribute to more successful interventions in the future. Because of the connection to potential risky behaviors (Elek et al., 2006; Page et al., 1999), it is important to identify and attempt to correct inaccurate perceptions of social norms.

Along the same lines, research by Mahler, Kulik, Butler, Gerrard, and Gibbons (2008) suggested that strategically utilizing norm information could contribute to an increase in health-promoting behaviors. Specifically, the researchers presented participants with artificially high norm information regarding the frequency of sun protection use among their peers. Participants exposed to this information reported greater intentions to use sun protection and also engaged in more protective behaviors. The notion that norm information can be manipulated and strategically presented to promote healthy behaviors is central to the current study. Specifically, the current study focused on the effects of two types of social norms, descriptive norms and injunctive norms.

Descriptive Norms

Exposure to information about one's peers, such as their beliefs, perceptions, and attitudes, can exert a significant influence on an individual's personal views (Berkowitz, 2005; Festinger, 1954). Descriptive norms are one type of social norm that provide information about the "typical" or common behaviors of others (Cialdini, Reno, &

Kallgren, 1990; Smith-McLallen & Fishbein, 2008). Peer information regarding the risk perceptions of similar others for experiencing negative health consequences can be categorized as a descriptive norm.

The influence of peer information on personal risk estimates has been demonstrated in numerous past studies. Weinstein (1983) investigated the effects of peer information on subsequent risk estimates among college students. Some participants were provided with information detailing the estimates of a "typical, same sex peer" for a number of different risk factors, while other participants were not exposed to this information. Some of the risk factors were chance of developing diabetes, lung cancer, or suffering a heart attack. All participants were then asked to estimate their own risk on the same factors. Weinstein found that exposure to information detailing peers' risk estimates affected individuals' personal risk perceptions. Individuals who were exposed to the peer information reported higher personal risk estimates than those who were not provided with peer information. Thus, the presence of peer information exerted a significant influence on one's personal risk perceptions.

The relationship between exposure to peer information and conforming to the perceived social norms has been well established in this area of research. For example, Elek et al. (2006) asked students to report the amount and frequency of their alcohol use, while also estimating how often their peers consumed alcohol. The results indicated that when students believed substance use among others their age was common, they generally had more frequent use themselves and were also more likely to try substances when offered. These findings suggest that there is a relationship between one's

perceptions of social norms and personal behaviors, such that individuals strive to meet the perceived social norms.

Similarly, French, Sutton, Marteau, and Kinmonth (2004) investigated the impact of descriptive norms on participants' subsequent risk estimates by manipulating both personal and comparative risk information. Participants were exposed to information indicating their personal risk for a certain health issue, information indicating their risk in comparison to their peers' risk, both, or neither. The results showed that when participants viewed statements indicating their personal risk was high, their subsequent risk estimates were higher as well. On the contrary, when participants viewed statements indicating their personal risk was low, they subsequently estimated their risk as lower. This pattern of results supports the notion that descriptive norms influence subsequent perceptions of risk. Furthermore, when participants were told their risk was lower than others, their subsequent risk estimates were lower compared to those who were told their risk was higher than others (French et al., 2004).

Other research on descriptive norms conducted by Schmiege, Klein, and Bryan (2010) examined the effects of peer information on individuals' attitudes, intentions, and behavioral outcomes regarding flossing behavior. College students completed pre-test measures assessing their attitudes towards flossing, their flossing behavior in the previous three months, and their intention to floss in the future. Then, some participants were provided with information indicating that they flossed either the same amount as, or less than their peers. Following exposure to peer information, participants were again asked about their attitudes towards flossing and their future intentions to floss. A follow-up

assessment was included in order to measure participants' overt flossing behaviors three months after the manipulation. The results showed that when participants viewed peer information indicating their peers flossed more frequently than they themselves did, the participants had increased intentions to floss and also reported an increased frequency in flossing three months later. These findings suggest that individuals strive to conform to the social norms set by their peers. Together, these past studies emphasize the significant impact of exposure to descriptive norms on one's personal risk estimates, intentions, and behaviors. Thus, manipulating descriptive norms in the form of peer information was a pivotal component of the current study.

Injunctive Norms

Along with descriptive norms, injunctive norms are a type of social norm that are both prevalent and influential. According to Reid and Aiken (2013), injunctive norms provide information conveying society's approval or disapproval of a certain behavior. In other words, injunctive norms indicate how a person ought to behave in a given situation based on what society deems appropriate (Cialdini et al., 1990). This type of information has been shown to exert influence over the way individuals act. For example, Cialdini et al. (1990) found that people were more likely to litter in an environment where other litter was already present. The presence of litter in the environment served as a form of injunctive norm information, indicating that it was acceptable to litter. Thus, the perceived approval from society influenced individuals to conform to the social norms and behave in a similar fashion.

Talbott, Wilkinson, Moore, and Usdan (2014) investigated the relationship between injunctive norms and drinking behavior in college students. Participants were asked to estimate the degree to which they believed their friends approved or disapproved of drinking and to report the amount of alcohol they had consumed in the past month. The results indicated that believing one's friends approve of drinking positively predicted increased drinking behavior: when students believed their peers approved of drinking, they were more likely to consume greater amounts of alcohol themselves. Because increased drinking behavior can potentially lead to dangerous outcomes, such as memory loss, liver disease, and various types of cancer (Centers for Disease Control and Prevention, 2016a), these findings highlight the critical nature of gaining a deeper understanding of injunctive norms and their influence on health-related behaviors.

Reid and Aiken (2013) found additional support for the notion that individuals tend to conform to injunctive social norms in relation to tanning perceptions and behaviors. Female participants were asked to estimate how a typical woman residing in their city viewed tanned skin and wearing sun protection. The results indicated that participants overestimated the degree to which similar others viewed tanned skin in a positive way by 70%-80%. Conversely, participants underestimated the degree to which others positively viewed utilizing sun protection by 87%. Then, some of the participants were exposed to actual injunctive norm information compared to their previous estimates. Participants who were exposed to actual injunctive norm information indicating approval for sun protection reported higher intentions to use sun protection in the future. Later, these participants also reported more frequent use of sun protection. These results

demonstrate how individuals tend to conform to perceived social norms. Originally, participants believed society held a negative view about sun protection. However, upon learning that similar others generally approve of using sun protection, individuals' intentions and behaviors reflected that injunctive norm information. These findings underscore the strength of injunctive norms and the importance of further investigating the effects of such information on risky behaviors. Thus, manipulating injunctive norms was a central component of the current study.

The Current Study

The current study examined the effects of descriptive and injunctive norms on young women's risk perceptions, intentions, and behavioral outcomes for tanning and binge drinking using surveys at two time points (i.e., Time 1 and Time 2). The three main study objectives are subsequently described.

The first objective was to examine the impact of two types of social norms, descriptive norms and injunctive norms, on young women's risk perceptions and behavior intentions pertaining to tanning and binge drinking. In the Time 1 survey, descriptive norms were manipulated in the form of high versus low peer risk estimate information for suffering negative consequences related to tanning or binge drinking. Injunctive norms were manipulated in the form of approval versus disapproval for either tanning or binge drinking behavior. Because some participants viewed both types of norms, some only viewed one type of norm, and others did not view any norm information, it was possible to examine differences between the various groups. The design of the current study allowed for the comparison of participants' responses on the

risk estimate measures, as well as on the measures of behavior intentions. Based on research indicating that perceived risk plays a vital role in behavior intentions (Fishbein & Ajzen, 1975, 2010) and that individuals tend to conform to the perceived social norms (e.g., French et al., 2004; Schmiege et al., 2010), the following hypotheses were tested:

Hypothesis 1a: Participants exposed to low peer risk estimate information were expected to estimate their own risk as significantly lower and express significantly higher intent to engage in tanning or binge drinking compared to participants in the control condition and those exposed to high peer risk estimates.

Hypothesis 1b: Participants exposed to high peer risk estimate information were expected to estimate their own risk as significantly higher and express significantly lower intent to engage in tanning or binge drinking compared to participants in the control condition.

Hypothesis 1c: Participants exposed to approval injunctive norms were expected to estimate their own risk as significantly lower and express significantly higher intent to engage in tanning or binge drinking compared to participants in the control condition and those exposed to disapproval injunctive norms.

Hypothesis 1d: Participants exposed to disapproval injunctive norms were expected to estimate their own risk as significantly higher and express significantly lower intent to engage in tanning or binge drinking compared to participants in the control condition.

The second main study objective was to determine whether social norms influenced one type of behavior more than another (i.e., tanning or binge drinking behavior). By including conditions related to both tanning and binge drinking, it was possible to examine the influence of social norms on multiple health-related behaviors. Past research has generally focused on one particular type of behavior in a single investigation (e.g., Day et al., 2016; Reid & Aiken, 2013; Talbott et al., 2014). However, the design of the current study allowed for the comparison of tanning and binge drinking behavior outcomes, which added important insight to the existing literature. Pinpointing which behaviors are especially susceptible to social norms provides valuable guidance and direction for future behavior interventions. Because tanning and binge drinking behaviors have not been directly compared within a single investigation in the past, this exploratory objective did not have formal hypotheses.

The third and final objective was to examine the effects of norm exposure on overt behaviors following the intervention. In order to obtain information regarding participants' behaviors after the Time 1 survey, they were asked to complete a short follow-up survey about one month after initial participation (Time 2). In the Time 2 survey, they were asked to report the number of times that they engaged in tanning and binge drinking behaviors during the previous month. Participants' responses on the behavior survey provided information regarding whether exposure to descriptive and/or injunctive norms influenced the frequency of engagement in the targeted risky behaviors. Based on past research suggesting that individuals' behavior tends to reflect their

perceptions of social norms (e.g., Elek et al., 2006; Talbott et al., 2014), the following hypotheses were tested:

Hypothesis 2a: Participants exposed to low peer risk estimate information were expected to report significantly more frequent tanning or binge drinking over the follow-up period compared to participants in the control condition and those exposed to high peer risk information.

Hypothesis 2b: Participants exposed to high peer risk estimate information were expected to report significantly less frequent tanning or binge drinking over the follow-up period compared to participants in the control condition.

Hypothesis 2c: Participants exposed to approval injunctive norms were expected to report significantly more frequent tanning or binge drinking over the follow-up period compared to participants in the control condition and those exposed to disapproval injunctive norms.

Hypothesis 2d: Participants exposed to disapproval injunctive norms were expected to report significantly less frequent tanning or binge drinking over the follow-up period compared to participants in the control condition.

To address these objectives, the current study employed a 3 (Descriptive norm information: high risk estimate vs. low risk estimate vs. none) x 3 (Injunctive norm information: approval vs. disapproval vs. none) x 2 (Target risk behavior: tanning vs. binge drinking) factorial design. The study also included education level, personal history of skin cancer or alcohol abuse, family history of skin cancer or alcohol abuse, knowing

16

someone who has skin cancer or struggles with alcohol abuse, and past behavior as possible covariates.

Sample

The current study's targeted sample was Caucasian women between the ages of 21 and 25 years old residing in the Southern United States. Because the frequency of engaging in risky behaviors tends to decrease as one ages (Gardner & Steinberg, 2005; Hansen & Bentzen, 2014; Powers et al., 2015), the study focused on young adults between the ages of 21 and 25. Not only is risky behavior prevalent among this age group, but these individuals are also more strongly influenced by their peers (e.g., Andrews, Tildesley, Hops, & Li, 2002). In addition, because the legal drinking age in the United States is 21 years old, eligibility to participate in the study was restricted to only those who are of legal age to consume alcohol.

Although both men and women engage in tanning and binge drinking behaviors, there are differences in the frequency with which these behaviors occur as a function of gender. For instance, men have higher binge drinking rates than women (Centers for Disease Control and Prevention, 2012), while women have higher tanning rates than men (Centers for Disease Control and Prevention, 2015b). Moreover, due to differences in rates of reaching a blood alcohol content (BAC) of 0.08 and subsequent impairment as a result of alcohol consumption (Mumenthaler, Taylor, O'Hara, & Yesavage, 1999), binge drinking is defined differently for men and women. Specifically, less alcohol is required for women than men to reach a BAC of 0.08. Additionally, after consuming similar amounts of alcohol, women show greater impairment in delayed recall tasks and retrieval

from long-term memory compared to men. Therefore, the National Institute on Alcohol Abuse and Alcoholism (2004) has defined binge drinking as 5 or more standard drinks (i.e., a 12 oz. beer, a 5 oz. glass of wine, or a 1.5 oz. shot of distilled spirits) in about 2 hours for men and 4 or more standard drinks in about 2 hours for women. In order to control for differences due to gender, the current study exclusively examined the perceptions, intentions, and behaviors of women.

Because the current study assessed perceived risk of tanning, as well as tanning intentions and behaviors, the sample was limited to Caucasian women. Research has shown that tanning behaviors and risk of skin cancer differ as a function of race, with non-Hispanic white women tanning most frequently (Centers for Disease Control and Prevention, 2015b) and also having the highest risk of skin cancer (Centers for Disease Control and Prevention, 2015a). Thus, limiting the sample to Caucasian participants controlled for differences in actual risk due to race.

Additionally, this study only included women residing in the Southern United States for the first month of data collection. According to the United States Census Bureau (2015), the Southern region includes the following states: Alabama, Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia, Kentucky, Mississippi, Tennessee, Arkansas, Louisiana, Oklahoma, and Texas. Because of their warm, sunny climates, women residing in Arizona and New Mexico were eligible to participate as well. The warmer climate of the southern states provides more opportunities to be outside in the sun, whereas individuals living in northern areas experience a limited time frame to tan outdoors. As such,

restricting the location of participants to the Southern United States for the first month of data collection controlled for potential behavioral differences due to weather and climate. One month into data collection, the Time 1 survey was opened up to all individuals in the United States, as temperatures across the country had substantially increased.

CHAPTER II

METHOD

Participants

Participants were 410 Caucasian women between the ages of 21 and 25 years old

residing in the United States. G*Power 3.1.9 (Faul, Erdfelder, Buchner, & Lang, 2009)

was used to conduct a power analysis for the current study. This analysis indicated that

303 participants were needed to detect moderate effects and achieve power of .95.

Although power is often set at a value of .80, researchers have suggested that study

designs with practical value and potential intervention applications should utilize a power

of .95 in order to detect effects (Lipsey & Hurley, 2009). Because the results of this

research have practical applications to enhance interventions for healthy behavior, using a

power of .95 is appropriate. Furthermore, because the current study included an

additional follow-up survey, more participants were initially required in order to account

for inevitable attrition prior to Time 2. According to a meta-analysis conducted by

Crutzen, Viechtbauer, Spigt, and Kotz (2015), the average attrition rate for health

behavior research is between 10% and 20%. Therefore, this study included a greater

number of participants than originally suggested by G*Power.

Participants were recruited through Amazon's Mechanical Turk (MTurk) and

received $0.25 as compensation for completing the Time 1 survey, as well as an

additional \$0.25 for completing the Time 2 survey. Past research has found that MTurk is a reliable method of collecting quality data from many participants in a short amount of time (Bates & Lanza, 2013; Buhrmester, Kwang, & Gosling, 2011; Casler, Bickel, & Hackett, 2013).

<div align="center">**Independent Variables**</div>

Target Behavior Manipulation

Participants were randomly assigned to either view norms about tanning, norms about binge drinking, or no norm information. Participants in the tanning behavior condition viewed descriptive norms information and/or injunctive norms information regarding tanning behavior and negative consequences of excessive exposure to UV rays. The various measures concerned tanning behaviors as well. Participants assigned to the binge drinking behavior condition viewed descriptive norms information and/or injunctive norms information regarding binge drinking and negative consequences of excessive alcohol consumption. Furthermore, all of the measures asked about drinking behaviors. Participants in the binge drinking condition were informed of the definition of binge drinking as stated by the National Institute on Alcohol Abuse and Alcoholism (NIAAA). According to the NIAAA (2004), binge drinking occurs when women consume 4 or more standard drinks (i.e., a 12 oz. beer, a 5 oz. glass of wine, or a 1.5 oz. shot of distilled spirits) in about 2 hours. Participants assigned to the control condition did not view descriptive norms or injunctive norms regarding either behavior. However, these participants did respond to the tanning or binge drinking dependent measures.

These participants served as comparison groups for assessing the effects of the social norms manipulations.

Descriptive Norms Manipulation

Previous research has shown that providing participants with descriptive norms in the form of peer risk estimate information influences their personal risk estimates (Weinstein, 1983). Furthermore, research suggests that after viewing peer risk information, individuals may estimate their personal risk similarly to that of their peers in order to conform to the perceived social norms (e.g., French et al., 2004). In the current study, peer risk estimate information was manipulated to reflect either high or low risk. Participants in the tanning condition viewed the following information: "Other women your age and skin tone estimated their risk of suffering negative consequences from excessive exposure to UV rays (e.g., painful sunburn, premature aging of the skin, skin cancer, etc.) in the future as 15% [75%]." Participants in the binge drinking condition viewed the following information: "Other women your age estimated their risk of suffering negative consequences from binge drinking (4+ standard drinks in about 2 hours) (e.g., alcohol poisoning, physical injury, blacking out, etc.) in the future as 15% [75%]."

Injunctive Norms Manipulation

Previous research has shown that injunctive norms impact individuals' future intentions and behaviors (Caildini et al., 1990; Reid & Aiken, 2013). Participants were randomly assigned to view or not view injunctive norm information. Those participants exposed to injunctive norms viewed a statement that reflected a relevant peer group's

approval or disapproval for either tanning or binge drinking behavior. In the tanning

condition, participants viewed the following statement: "A majority of women ages 21-25

strongly approve [disapprove] of intentionally exposing oneself to UV rays (e.g., using

tanning beds, laying outside in the sun without sunscreen, etc.) in order to get tan." Along

with this statement, participants also viewed two quotes from women their age expressing

either approval or disapproval for tanning (See Appendix A).

In the binge drinking condition, participants viewed the following statement: "A

majority of women ages 21-25 strongly approve [disapprove] of binge drinking (4+

standard drinks in about 2 hours)." Along with this statement, participants also viewed

two quotes from women their age expressing either approval or disapproval for binge

drinking (See Appendix A).

Dependent Variables

Time 1: Absolute Risk Estimate

Participants' personal risk perceptions were assessed by having them estimate

their chances of suffering negative consequences from binge drinking [or from excessive

exposure to UV rays] in the future by providing a percentage from 0% - 100%. This was

assessed following the presentation of descriptive and/or injunctive norm information.

Individuals in the control condition were not exposed to norm information and therefore,

responded to this measure after verifying their eligibility to participate in the study.

Time 1: Comparative Risk Estimate

Participants also estimated their risk compared to the average woman of the same

age. The measure, which was adapted from Weinstein (1982), read: "Compared to other

women of the same age [and skin tone], my chances of suffering negative consequences from binge drinking [suffering negative consequences from excessive exposure to UV rays] in the future are ____." The scale of response options ranged from -3 (*much below average*) to +3 (*much above average*), with a midpoint of 0 (*the same*). This was assessed following the presentation of descriptive and/or injunctive norm information. For individuals in the control condition, this estimate was assessed after verifying their eligibility to participate in the study.

Time 1: Future Behavioral Intentions

Participants' future behavioral intentions regarding tanning were assessed with five questions. Three questions modified from Elliott and Ainsworth (2012) were as follows: "Do you plan to tan over the next month?" 1 (*definitely no*) to 7 (*definitely yes*), "To what extent do you intend to tan over the next month?" 1 (*no extent at all*) to 7 (*a great extent*), and "How much do you want to engage in tanning over the next month?" 1 (*not at all*) to 7 (*a lot*). The average of these three responses provided a single value reflecting each participant's future tanning intentions ($\alpha = .97$). Higher scores were indicative of stronger intentions to tan, whereas lower scores were indicative of weaker intentions to tan. To gain additional insight into participants' tanning intentions, they were also asked, "Will you tan over the next month?" (yes/no) and "How many times will you tan over the next month?" with a text box where they could enter a numerical value.

Similarly, participants' future behavioral intentions regarding binge drinking were assessed with five parallel questions in which tanning was replaced with binge drinking. The mean of the responses to the three questions modified from Elliott and Ainsworth

24

(2012) was calculated to create a single score of intention to binge drink for each participant (α = .94). Higher mean values were indicative of stronger intentions to binge drink, whereas lower mean values were indicative of weaker intentions to binge drink. Likewise, participants were also asked, "Will you binge drink over the next month?" (yes/no) and "How many times will you binge drink over the next month?" with a text box where they could enter a numerical value. Both tanning and binge drinking intentions were assessed at the same time point as the risk estimate measures. Again, for individuals in the control condition, intentions were assessed after verifying their eligibility to participate in the study.

Time 2: Health Behavior Outcomes

In order to assess participants' tanning and binge drinking behavior outcomes following the manipulations, they completed one short survey about one month after their participation in Time 1 of the study ($M = 34.30$ days, $SD = 17.62$, $Range = 14.00$ - 109.00 days). The Time 2 survey asked all participants to report how many times in the past month they engaged in both tanning and binge drinking behaviors. Regarding tanning behavior, participants were asked: "How many times in the past month did you use a tanning bed?" "How many times in the past month did you use a tanning accelerant (such as tanning oil) in order to tan more quickly?" and "How many times in the past month did you intentionally expose yourself to the sun in order to get a tan?" There was a text box underneath each question where participants typed their numerical responses.

All participants also responded to the following three survey questions regarding binge drinking behaviors: "How many times in the past month did you binge drink (4+

standard drinks in about 2 hours)?" "How many times in the past month did you have trouble remembering events while drinking alcohol?" and "How many times in the past month did you suffer negative consequences from excessive alcohol consumption?" There was a text box underneath each question where participants typed their numerical responses.

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

Because of the possible influence on the dependent measures, participants were also asked to report the following information at the end of the Time 1 survey: education level, personal history of skin cancer or alcohol abuse, family history of skin cancer or alcohol abuse, and whether they knew someone who has skin cancer or struggles with alcohol abuse (See Appendix B). Correlation analyses were conducted to determine if any of these factors related to the dependent measures, in which case they were included as covariates in the main analyses.

Additionally, participants' relevant tanning or binge drinking behavior prior to the Time 1 survey was used as a covariate in order to control for preexisting behavioral tendencies. Participants were asked: "How many times in the past month did you intentionally expose yourself to UV rays (use a tanning bed or spend time outside in the sun without sunscreen) to get a tan?" and "How many times in the past month have you engaged in binge drinking (4+ standard drinks in about 2 hours)?" Participants typed their numerical response in a text box underneath each question. Responses provided a baseline of participants' behaviors prior to experiencing the manipulations of the current study. Furthermore, this variable was used as a covariate in the main analyses to

determine the effects of the independent variables after accounting for previous behavior. This measure of past behavior was the final question prior to the demographic questionnaire. This ordering strategy decreased the likelihood that responses on the risk estimate and behavior intentions measures were influenced by the past behavior assessment.

Procedure

Participants logged on to MTurk to complete the Time 1 survey about young women's social and health-related behaviors. They were informed that they must identify as female and Caucasian, be between the ages of 21 and 25, and reside in the Southern United States (if taken during the first month of data collection) in order to participate. A list of states considered to be part of the South, as indicated by the United States Census Bureau (2015), was provided for participants. Individuals consented to participate in the study by clicking on the provided study link. Participants were then asked to indicate their gender, race, age, and whether or not they resided in the United States. Participants who identified as female, Caucasian, between 21 and 25 years old, and a US resident continued with the study, while any individuals who did not meet these designated participation requirements were not permitted to access the study.

Participants were randomly assigned to the tanning condition or the binge drinking condition and any subsequent exposure to manipulations reflected that assignment. Next, based on random assignment, participants either viewed or did not view descriptive norm information indicating how other young women their age rated their future risk for a particular health issue. The peer information appeared on the screen

27

for 25 seconds. Following exposure to this information, participants responded to a manipulation check in the form of a single multiple-choice question. The question asked participants how other women their age rated their risk for the specific health issue. They were provided with three response options, two incorrect options and one that matched the value they had just seen. This manipulation check was included to ensure that participants were aware of the risk level to which they were exposed.

Then, participants viewed injunctive norm information, along with quotes from women their age, reflecting society's approval or disapproval for a certain health behavior. This information appeared on the computer screen for 25 seconds. Those in the no injunctive norm condition did not receive any information regarding society's views. Exposure to these manipulations was counterbalanced in order to account for any possible order effects.

Following the manipulations, participants completed the dependent measures. They estimated both their absolute risk and their comparative risk for the assigned target behavior. Participants also responded to five questions assessing their future behavioral intentions. Next, participants answered the two questions assessing their tanning and binge drinking behavior over the previous month. Then, participants filled out the demographic information (i.e., education level, personal history of skin cancer or alcohol abuse, family history of skin cancer or alcohol abuse, and whether they knew someone who has skin cancer or struggles with alcohol abuse). Following the demographic questions, participants were notified of an opportunity to receive additional compensation for completing the Time 2 survey on MTurk in the future. They were also asked to

provide their MTurk worker identification code. Lastly, they were compensated with $0.25 for completing the study.

Participants were contacted using their MTurk worker identification codes when the Time 2 survey was available. In the notification message, they were provided with instructions for completing the survey and an invitation code. They accessed the survey via MTurk and were asked to enter their MTurk worker identification code, as well as the invitation code. Then, all participants completed three questions regarding their tanning behavior in the past month and three questions regarding their drinking behavior in the past month. They received $0.25 for participating in the survey. All participants were debriefed after the completion of the follow-up period, regardless of whether or not they participated in the Time 2 survey (See Appendix C).

CHAPTER III

RESULTS

Preliminary Analyses

Time 1 data were examined for missing values. Two of the 410 participants failed to complete all of the behavior intention measures and were excluded from the analyses using listwise deletion. Twenty-nine other participants failed the manipulation check and were also excluded from subsequent analyses. Additional exclusions were two more participants in the tanning condition who indicated that they had been diagnosed with skin cancer, and 17 other participants in the binge drinking condition who indicated that they had personally struggled with alcohol abuse. Finally, tests for normality and outliers indicated one extreme outlier on the measure of past tanning behavior, which was also excluded from subsequent analyses. The final Time 1 sample was 359 participants (87.5% of the initial sample) on which all Time 1 cross-sectional analyses were based.

Regarding assignment to target health behaviors, 186 (51.8%) participants received the tanning condition, while 173 (48.2%) participants were in the binge drinking condition. For descriptive norms assignment, 118 (32.9%) participants viewed low descriptive norms, 106 (29.5%) viewed high descriptive norms, and 135 (37.6%) did not view any descriptive norms. Regarding injunctive norms, 125 (34.8%) participants viewed norms indicating approval, 118 (32.9%) viewed norms indicating disapproval,

and 116 (32.3%) participants did not view any injunctive norms information. As shown in Table 1, group size for the 18 different potential condition combinations ranged from 15 to 28 participants.

Table 1

Number of Participants in Each Condition

Panel A: Tanning Conditions

	Low Descriptive	High Descriptive	No Descriptive
Approval Injunctive	21	17	26
Disapproval Injunctive	18	22	20
No Injunctive	18	16	28

Panel B: Binge Drinking Conditions

	Low Descriptive	High Descriptive	No Descriptive
Approval Injunctive	22	20	19
Disapproval Injunctive	20	16	22
No Injunctive	19	15	20

Descriptive statistics for the demographic information and potential covariates are detailed in Table 2. Over half of participants had a family member who struggled with alcohol abuse (53.20%), knew someone who struggled with alcohol abuse (72.14%), and/or knew someone who had been diagnosed with skin cancer (52.09%), whereas less than half of participants had a family member diagnosed with skin cancer (32.59%). Furthermore, on the Time 1 measure of prior health behavior, participants reported tanning more times on average ($M = 1.60$, $SD = 3.54$) compared to binge drinking ($M = 1.13$, $SD = 2.36$), $t(358) = 2.34$, $p = .02$.

Table 2

Descriptive Statistics of Demographics and Potential Covariates

Total N = 359	*Mean (n)*	*SD (%)*	*Minimum*	*Maximum*
Highest Level of Education				
Master's Degree or higher	(27)	(7.52%)		
Bachelor's Degree	(140)	(39.00%)		
Associate's Degree	(41)	(11.42%)		
Some college	(113)	(31.48%)		
High school diploma/GED	(36)	(10.03%)		
Less than high school	(2)	(0.56%)		
Family Member With Skin Cancer				
Yes	(117)	(32.59%)		
Know Someone With Skin Cancer				
Yes	(187)	(52.09%)		
Family Member Alcohol Abuse				
Yes	(191)	(53.20%)		
Know Someone Alcohol Abuse				
Yes	(259)	(72.14%)		
Times Tanned in Past Month	1.60	3.54	0.00	30.00
Times Binge Drank in Past Month	1.13	2.36	0.00	21.00

Table 3 details the descriptive statistics for each dependent measure. Participants viewed their absolute risk of suffering negative consequences from excessive exposure to UV rays as higher ($M = 52.62\%$, $SD = 27.23$) than their risk of suffering negative

32

consequences from binge drinking ($M = 41.15\%$, $SD = 31.62$), $t(357) = 3.69$, $p < .001$.

Similarly, participants in the tanning condition estimated their comparative risk as higher

than average and higher ($M = .30$, $SD = 1.59$) compared to those in the binge drinking

condition, whom also viewed their comparative risk as below average ($M = -.42$, $SD =$

1.87), $t(357) = 3.93$, $p < .001$. Interestingly, participants reported higher average

intentions to tan in the future ($M = 2.50$, $SD = 1.78$) than to binge drink ($M = 2.03$, $SD =$

1.49), $t(357) = 2.73$, $p = .007$, as well as intentions to tan more frequently in the future (M

$= 1.74$, $SD = 3.19$) than to binge drink ($M = 0.80$, $SD = 1.80$), $t(357) = 3.38$, $p = .001$.

Table 3

Descriptive Statistics of Time 1 Dependent Measures

N = 359	*Mean (n)*	*SD (%)*	*Range*	*Possible Range*
Tanning Measures				
Absolute Risk	52.62	27.23	100.00	0% - 100%
Comparative Risk	0.30	1.59	6.00	-3 - +3
Strength of Intentions*	2.50	1.78	6.00	1.00 – 7.00
Intended Frequency*	1.74	3.19	15.00	
Will You Tan*				
Yes	(69)	(37.10%)		
Binge Drinking Measures				
Absolute Risk	41.15	31.62	100.00	0% - 100%
Comparative Risk	-0.42	1.87	6.00	-3 - +3
Strength of Intentions*	2.03	1.49	6.00	1.00 – 7.00
Intended Frequency*	0.80	1.80	10.00	
Will you Binge Drink*				
Yes	(42)	(24.28%)		

*Note: Intentions to engage in the target behavior over the next month

Bivariate correlations between the dependent measures and potential covariates (i.e., past behavior, education level, family history of skin cancer or alcohol abuse, and knowing someone who has skin cancer or struggles with alcohol abuse) were examined to identify covariates to be included, along with past behavior, in the main analyses (see Tables 4 and 5). Tanning frequency in the past month and having a family member diagnosed with skin cancer were significantly associated with all of the tanning intentions measures. More frequent tanning in the past month was associated with: greater intention to tan in the future ($r = .41$, $p < .01$), intentions to tan more often in the future ($r = .45$, $p < .01$), and responding "yes" to the dichotomous intentions question ($r = .34$, $p < .01$). Conversely, having a family member who was diagnosed with skin cancer was associated with significantly lower intentions to tan in the future ($r = -.21$, $p < .01$), intentions to tan less often in the future ($r = -.18$, $p < .05$), and responding "no" to the dichotomous intentions question ($r = -.18$, $p < .05$). Additionally, knowing someone who was diagnosed with skin cancer was associated with significantly higher absolute risk estimates ($r = .21$, $p < .01$). Therefore, past tanning behavior, having a family member diagnosed with skin cancer, and knowing someone who had been diagnosed with skin cancer were included as covariates in the MANCOVA as described in the Main Analyses section below.

Table 4

Bivariate Correlations among Dependent Measures and Potential Covariates for Tanning Condition

	Tan Past Month	Edu. Level	Fam Skin Cancer	Anyone Skin Cancer
Absolute Risk	.01	.03	.13	.21**
Comp. Risk	.09	.05	.002	.09
Avg. Intent	.41**	.09	-.21**	-.11
Will You Tan	.34**	.11	-.18*	-.04
How Many Times	.45**	.05	-.18*	-.06

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

Examining correlations among the potential covariates and binge drinking measures revealed that the number of times an individual binge drank in the past month was significantly associated with each of the binge drinking intentions measures. More frequent binge drinking in the past month was related to significantly greater intentions to binge drink in the future ($r = .74$, $p < .01$), intentions to binge drink more often in the future ($r = .83$, $p < .01$), and responding "yes" to the dichotomous intentions question ($r = .64$, $p < .01$). Additionally, higher education levels were associated with higher average intentions to binge drink ($r = .17$, $p < .05$). Therefore, past binge drinking behavior and education level were included as additional covariates in the MANCOVA subsequently detailed in the following section.

Table 5

Bivariate Correlations among Dependent Measures and Potential Covariates for Binge Drinking Condition

	BD Past Month	Edu. Level	Fam Alc. Abuse	Anyone Alc. Abuse
Absolute Risk	.001	.06	-.06	.00
Comp. Risk	.11	-.01	-.10	-.02
Avg. Intent	.74**	.17*	-.08	-.08
Will You BD	.64**	.12	-.07	-.09
How Many Times	.83**	.10	-.07	-.09

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

Main Analyses

Time 1 Analyses

A 3 (Descriptive norm information: high risk vs. low risk vs. none) x 3 (Injunctive norm information: approval vs. disapproval vs. none) x 2 (Target Risk Behavior: tanning vs. binge drinking) multivariate analysis of covariance (MANCOVA) with past tanning behavior, past binge drinking behavior, education level, having a family member diagnosed with skin cancer, and knowing someone who had been diagnosed with skin cancer as covariates was computed on four of the five dependent measures. The dichotomous measure of target behavior intentions was not included in the overall MANCOVA and was analyzed separately using Pearson's chi-square test. Conducting the MANCOVA enabled the examination of the effects of independent variables on the combination of multiple dependent variables (Mertler & Vannatta, 2010), and it tested for significant group differences, while removing any effects of the designated covariates, in

36

order to more clearly discern the effects of the independent variables. Conducting one overall MANCOVA with both the tanning and binge drinking measures reduced the risk of committing a type I error and increased the power of the analysis (Field, 2009). The MANCOVA showed that Box's Test of Equality of Covariance Matrices was significant, indicating the assumption of homogeneity of covariances was violated. Further, examining Levine's Test showed four of the five dependent measures were significant (absolute risk, average behavior intentions, dichotomous behavior intention, and intended frequency of behavior). Therefore, these four variables were transformed using the log technique, as well as the square root technique to determine if this would correct the problem (Field, 2009). However, both Box's Test and Levine's Test remained significant despite the transformations. Thus, the MANCOVA was conducted using the original, non-transformed dependent measures. Moreover, Pillai's Trace values were reported, as this statistic is most robust to violations of assumptions (Bray & Maxwell, 1985; Mertler & Vannatta, 2010).

Examining the results of the overall MANCOVA revealed that the covariates of education level, having a family member diagnosed with skin cancer, and knowing someone who had been diagnosed with skin cancer were nonsignificant. Therefore, these covariates were excluded from the analysis and the MANCOVA was recomputed including only significant covariates (i.e., frequency of tanning in the past month and frequency of binge drinking in the past month).

The recomputed overall MANCOVA indicated that there was a significant two-way interaction for Target Behavior x Injunctive Norms [Pillai's Trace = .06, $F(8, 674)$ =

2.57, $p = .01$, $\eta_p^2 = .030$]. Additionally, there were significant main effects for Injunctive

Norms [Pillai's Trace = .07, $F(8, 674) = 3.09$, $p = .002$, $\eta_p^2 = .035$], Descriptive Norms

[Pillai's Trace = .15, $F(8, 674) = 6.73$, $p < .001$, $\eta_p^2 = .074$], and Target Behavior

[Pillai's Trace = .09, $F(4, 336) = 8.72$, $p < .001$, $\eta_p^2 = .094$]. Regarding covariates, there

were significant main effects for frequency of tanning in the past month [Pillai's Trace =

.07, $F(4, 336) = 5.88$, $p < .001$, $\eta_p^2 = .065$] and frequency of binge drinking in the past

month [Pillai's Trace = .13, $F(4, 336) = 12.73$, $p < .001$, $\eta_p^2 = .132$]. There were no other

significant main or interaction effects in the overall MANCOVA.

In order to test the hypotheses of the current study, analyses of covariance

(ANCOVAs) with pairwise comparisons using Bonferroni correction for multiple

comparisons were used to probe effects on each of the dependent measures and to

contrast specific groups of interest. ANCOVAs are commonly used to better understand

significant effects revealed via MANCOVA. Adjusted means were reported due to the

inclusion of covariates in the analyses.

First, the main effect of Descriptive Norms was examined in order to test

Hypotheses 1a: "Participants exposed to low peer risk estimate information were

expected to estimate their own risk as significantly lower and express significantly higher

intent to engage in tanning or binge drinking compared to participants in the control

condition and those exposed to high peer risk estimates" and Hypothesis 1b: "Participants

exposed to high peer risk estimate information were expected to estimate their own risk

as significantly higher and express significantly lower intent to engage in tanning or

binge drinking compared to participants in the control condition." The results indicated a

significant effect of Descriptive Norms on the absolute risk measure, $F(2, 339) = 12.07$, p

$< .001$, $\eta_p^2 = .066$. Specifically, pairwise comparisons showed that participants who

viewed low risk descriptive norms estimated their own absolute risk of suffering negative

consequences from tanning or binge drinking as significantly lower ($M = 36.32\%$, $SE =$

2.60) than participants who viewed high risk descriptive norms ($M = 49.60\%$, $SE = 2.76$)

and those who did not view any descriptive norm information ($M = 53.21\%$, $SE = 2.44$;

see Figure 1). There was no significant effect of Descriptive Norms on comparative risk

estimates. Thus, Hypothesis 1a was partially supported in that participants who viewed

low risk descriptive norms estimated their own risk as significantly lower than those in

the control or high risk descriptive norms conditions on the absolute risk estimate

measure. Similarly, Hypothesis 1b was partially supported, as participants who viewed

high risk descriptive norms estimated their risk as significantly higher than those who

viewed low risk descriptive norms on the absolute risk estimate measure. However, there

were no significant differences on measures of target behavior intentions among the high

risk, low risk, and no descriptive norms groups.
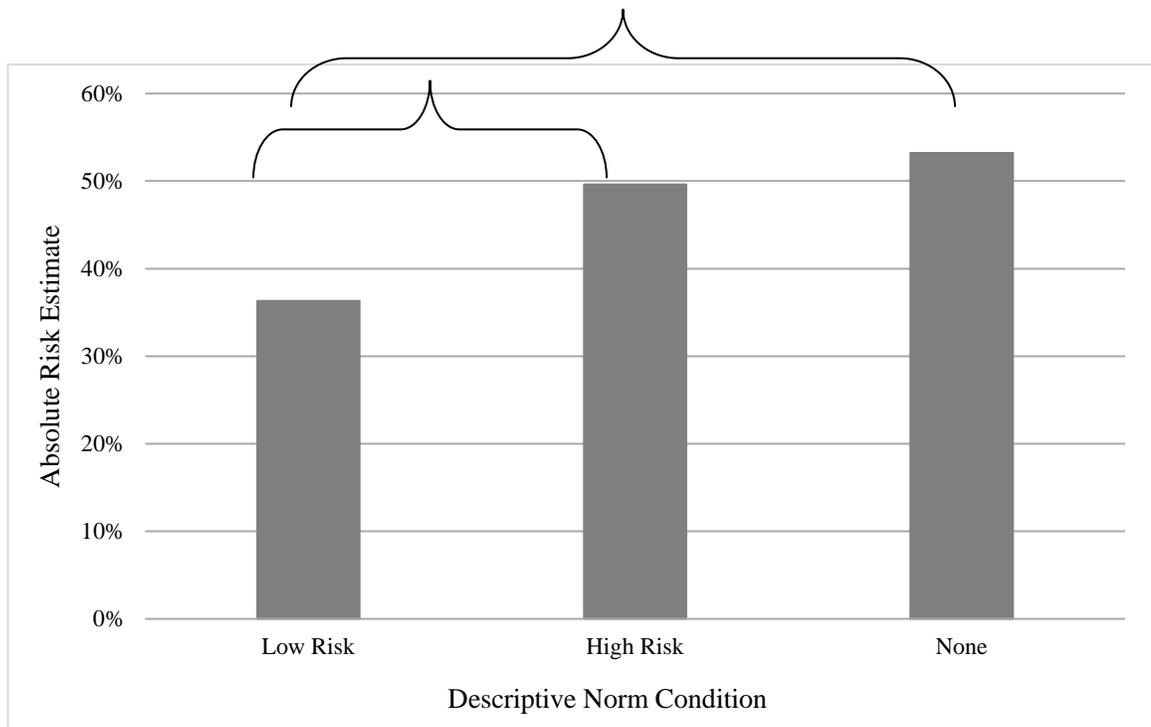
Figure 1. Main effect of descriptive norms on absolute risk estimates.

The main effect of Injunctive Norms was further examined in order to test Hypothesis 1c: "Participants exposed to approval injunctive norms were expected to estimate their own risk as significantly lower and express significantly higher intent to engage in tanning or binge drinking compared to participants in the control condition and those exposed to disapproval injunctive norms." and Hypothesis 1d: "Participants exposed to disapproval injunctive norms were expected to estimate their own risk as significantly higher and express significantly lower intent to engage in tanning or binge drinking compared to participants in the control condition and those exposed to approval injunctive norms." The results revealed significant effects of Injunctive Norms on the measures of absolute risk [$F(2, 339) = 6.25$, $p = .002$, $\eta_p^2 = .036$], comparative risk [$F(2,$

339) $= 4.27$, $p = .015$, $\eta_p^2 = .025$], and average intentions to engage in the target behavior

[$F(2, 339) = 3.23$, $p = .041$, $\eta_p^2 = .019$]. Unexpectedly, pairwise comparisons indicated

that those who viewed approval injunctive norms estimated their absolute risk of

suffering negative consequences from tanning or binge drinking as significantly higher

($M = 52.33\%$, $SE = 2.53$) than those who did not view any injunctive norms ($M =$

39.35%, $SE = 2.67$; see Figure 2). Similarly, those who viewed approval injunctive norms

estimated their comparative risk as significantly higher ($M = 0.27$, $SE = 0.15$) than those

who viewed no injunctive norms ($M = -0.39$, $SE = 0.16$). Examining average strength of

behavior intentions showed that those who viewed approval injunctive norms had

significantly stronger intentions to engage in the target behavior ($M = 2.46$, $SE = 0.13$)

compared to those who viewed disapproval injunctive norms ($M = 1.98$, $SE = 0.14$; see

Figure 3). These results provide partial support for Hypotheses 1c and 1d in that

participants who viewed approval injunctive norms had significantly higher intentions to

engage in the target behavior, whereas those who viewed disapproval injunctive norms

had significantly lower intentions to engage in the target behavior. However, the

relationship between exposure to approval injunctive norms and subsequent risk
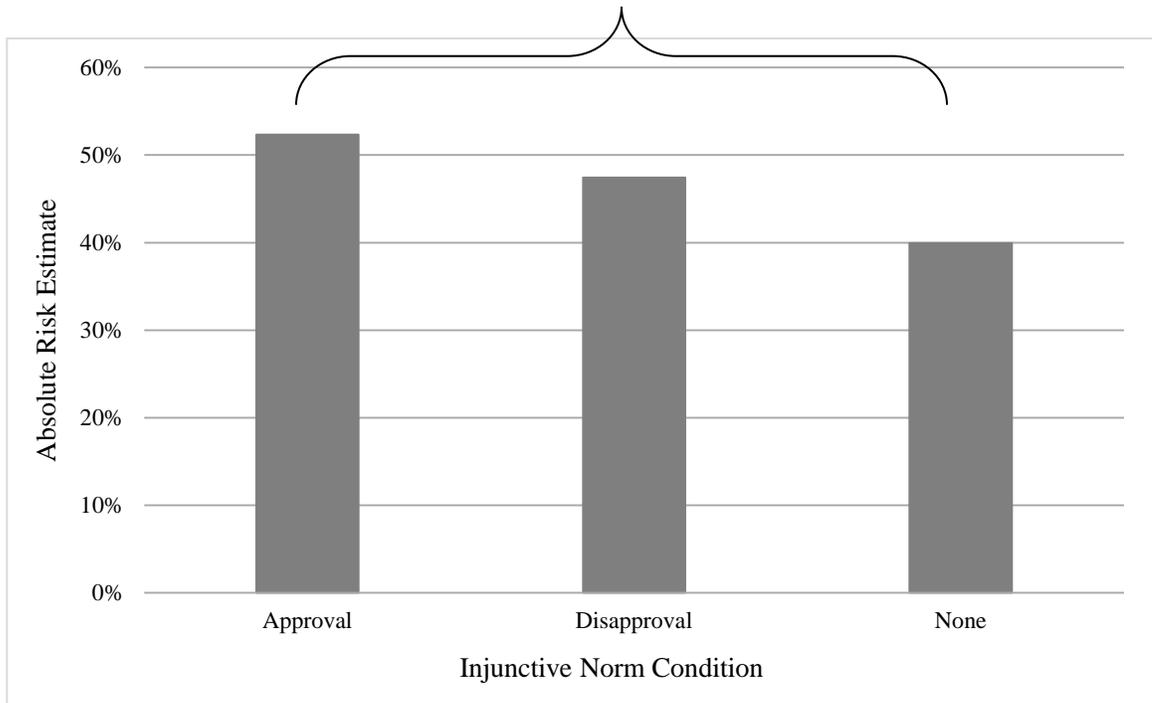
estimates was opposite of the predicted direction.

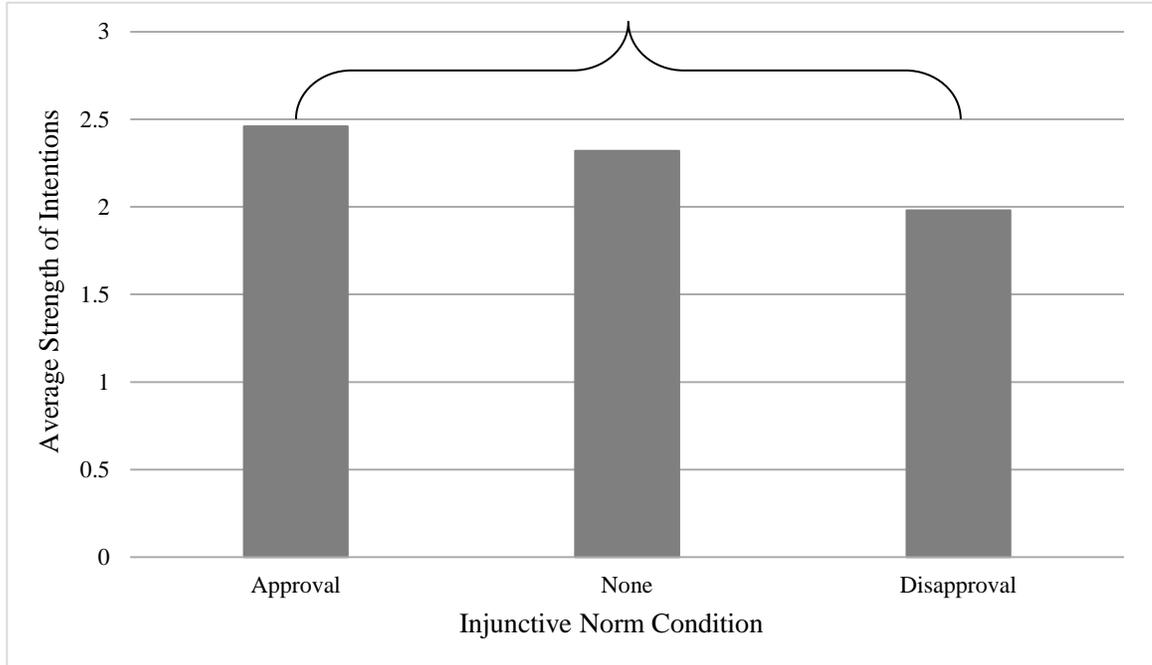*Figure 2.* Main effect of injunctive norms on absolute risk estimates.

Figure 3. Main effect of injunctive norms on average strength of intentions to engage in the target behavior.

Although no hypotheses were formulated, one main objective of the current study was to determine whether social norms influenced one type of behavior more than another (i.e., tanning or binge drinking behavior). To this end, follow-up ANCOVAs were conducted to examine the effects of Target Behavior. The results revealed significant differences on the measures of absolute risk [$F(1, 339) = 16.77$, $p < .001$, $\eta_p^2 = .047$], comparative risk [$F(1, 339) = 18.35$, $p < .001$, $\eta_p^2 = .051$], average intentions [$F(1, 339) = 7.15$, $p = .008$, $\eta_p^2 = .021$], and frequency of intentions to engage in the target behavior [$F(1, 339) = 12.15$, $p = .001$, $\eta_p^2 = .035$]. Those in the tanning condition estimated their absolute risk as significantly higher ($M = 52.55\%$, $SE = 2.10$) than those in the binge drinking condition ($M = 40.20\%$, $SE = 2.15$). Similarly, those in the tanning condition estimated their comparative risk as significantly higher ($M = .32$, $SE = .13$) compared to those in the binge drinking condition ($M = -.47$, $SE = .13$). Regarding behavior intentions, participants reported higher intentions to tan on average ($M = 2.47$, $SE = .11$) than to binge drink ($M = 2.04$, $SE = .11$). Finally, individuals in the tanning condition reported intentions to tan more frequently in the upcoming month ($M = 1.69$, $SE = .18$) compared to those asked about their intended frequency of binge drinking ($M = .81$, $SE = .18$).

Pearson's chi-square test was used to examine the effects of the manipulations on the dichotomous intentions measure. The results revealed a significant association between the target behavior and whether or not participants intended to engage in that behavior in the upcoming month, $X^2 (1) = 6.90$, $p = .009$. More participants reported intending to tan in the future ($n = 69$, 37.10%) compared to binge drinking ($n = 42$,

24.28%). There were no other significant effects on the dichotomous measure of target behavior intentions.

The interaction between Injunctive Norms and Target Behavior was deconstructed to examine the relationship between these variables. Follow-up ANCOVAs indicated significant differences on the measures of absolute risk [$F(2, 339) = 6.19$, $p = .002$, $\eta_p^2 = .035$], comparative risk [$F(2, 339) = 4.03$, $p = .019$, $\eta_p^2 = .023$], and intended frequency of engaging in the target behavior [$F(2, 339) = 3.08$, $p = .047$, $\eta_p^2 = .018$]. Pairwise comparisons indicated that there were significant differences between those who viewed disapproval injunctive norms and those who viewed no injunctive norms for the target behaviors on both absolute risk and comparative risk measures (see Figures 4 and 5). In the tanning condition, participants' risk estimates remained fairly consistent regardless of which type of injunctive norms (if any) to which they were exposed. On the contrary, the binge drinking group demonstrated a notable decline in risk estimates moving from approval to disapproval to no injunctive norms. Moreover, the tanning and binge drinking control conditions significantly differed on the aforementioned intentions measure. Participants in the tanning control condition reported significantly more frequent intentions to engage in the target behavior in the future ($M = 2.22$, $SE = 0.31$) compared to participants in the binge drinking control condition ($M = 0.50$, $SE = 0.33$).
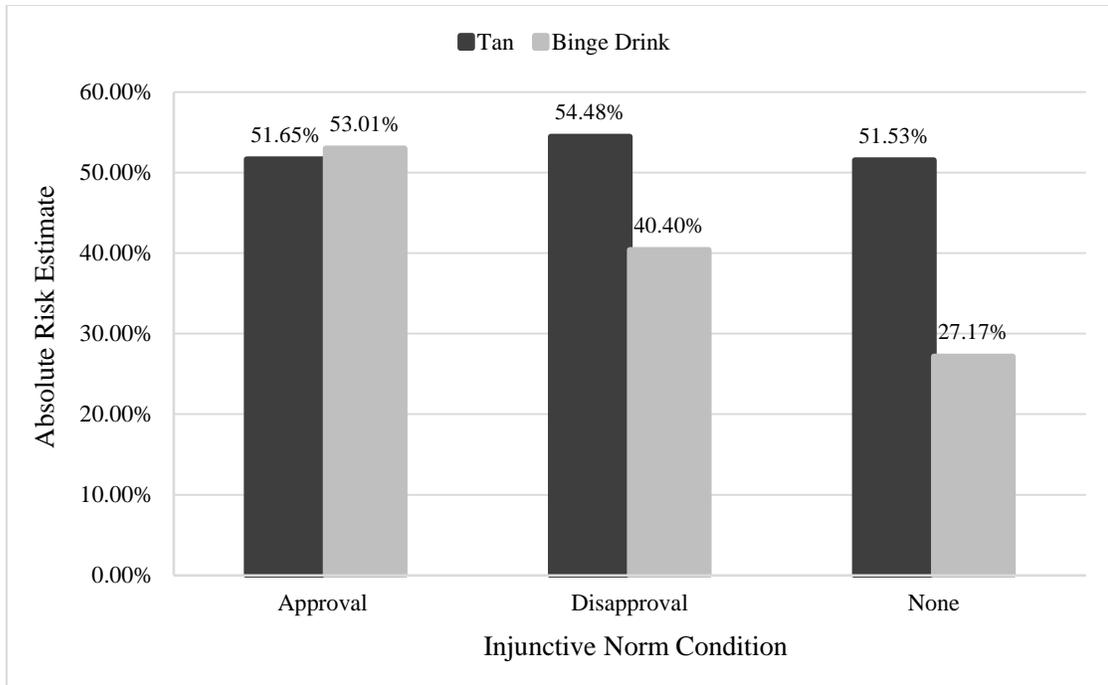
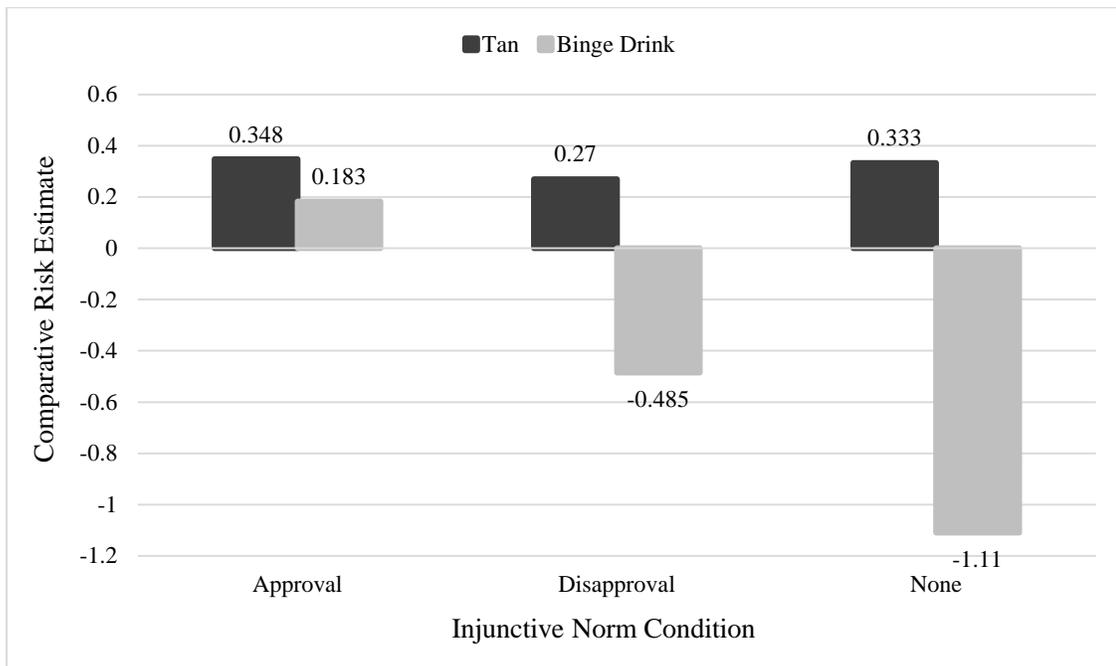*Figure 4.* Absolute risk estimates as a function of injunctive norms condition and target behavior.

Figure 5. Comparative risk estimates as a function of injunctive norms condition and target behavior.

Time 2 Analyses

Of the original 410 participants, 167 individuals participated in the Time 2 survey and of those, 146 participants were determined to have valid and complete Time 1 responses and were included in the subsequent analyses. First, Time 2 data were examined for missing values. One participant failed to answer all of the measures and was excluded from the analyses, resulting in a total of 145 participants (35.37% of the initial sample) in the Time 2 analyses. Descriptive statistics for the six outcome measures are shown in Table 6. In the previous month participants reported intentionally exposing themselves to the sun in order to get a tan more frequently ($M = 2.01$ times) than they engaged in binge drinking ($M = 1.12$ times). When separated by Time 1 target behavior condition, frequency analyses revealed that 74 of the participants were in the tanning condition, while 71 participants were in the binge drinking condition.

Table 6

Descriptive Statistics of Time 2 Dependent Measures*

Total N = 145	*Mean*	*SD*	*Minimum*	*Maximum*
Tanning Measures				
Used Tanning Bed	0.56	1.80	0	12
Used Tanning Accelerant	0.76	1.88	0	10
Intentional Sun Exposure	2.01	2.93	0	15
Binge Drinking Measures				
Binge Drank	1.12	2.25	0	20
Trouble Remembering	0.34	0.85	0	5
Negative Consequences	0.37	0.90	0	7

*All measures refer to frequency (number of times) of the behavior/event in the past month

Bivariate correlations between the Time 1 intentions measures and the Time 2

behavioral outcome measures were conducted separately for each target behavior

condition in order to assess the relationship between intentions and overt behaviors. As

shown in Table 7, each of the intentions measures was significantly and positively related

to each of the outcome measures. This pattern of results indicates that participants

reporting higher intentions to engage in the target behavior at Time 1 tended to actually

engage in the behavior more frequently.

Table 7

*Bivariate Correlations among Time 1 Intention Measures and Time 2 Outcome Measures
for Target Behavior Conditions*

Panel A: Tanning Measures

	Avg. Tan Intent	Will You Tan	Freq. Tan Intent
Freq. Tan Bed	.28*	.35**	.35**
Freq. Tan Accelerant	.43**	.47**	.40**
Freq. Sun Exposure	.52**	.50**	.46**

Panel B: Binge Drinking Measures

	Avg. BD Intent	Will You BD	Freq. BD Intent
Freq. Binge Drink	.56**	.65**	.39**
Freq. Trouble Remembering	.43**	.44**	.27*
Freq. Negative Consequences	.34**	.38**	.26*

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

Two-way analyses of covariance (ANCOVAs) with descriptive and injunctive

norms as independent variables and the Time 1 past behavior measures as covariates

were conducted to test Hypotheses 2a – 2d and determine if there were differences among

groups in frequency of the target behaviors. The ANCOVAs assessing participants'

tanning behaviors did not reveal any significant main or interaction effects. Regarding

binge drinking, there was a significant interaction of Descriptive Norms and Injunctive

Norms for the frequency of binge drinking in the previous month [$F(4, 61) = 2.69$, $p =$

.039, $\eta_p^2 = .150$], as well as for frequency of suffering negative consequences from

excessive alcohol consumption in the previous month [$F(4, 61) = 2.79$, $p = .034$, $\eta_p^2 =$

.154]. Conducting pairwise comparisons using Bonferroni corrections showed only one

marginally significant difference ($p = .058$) between groups on the measure of frequency

of suffering negative consequences from excessive alcohol consumption. Examining

adjusted means revealed that among participants who viewed approval injunctive norms,

those who viewed high risk descriptive norms experienced negative consequences

significantly more frequently ($M = 0.48$, $SE = 0.14$) than those who did not view any

descriptive norms ($M = -0.05$, $SE = 0.17$). Contrary to Hypothesis 2b that exposure to

high risk descriptive norms would diminish engagement in the target behavior, it had the

opposite effect in that individuals experienced negative consequences from excessive

alcohol consumption more frequently. Thus, Hypotheses 2a – 2d were not supported, as

no other significant differences in target behavior outcomes were found.

CHAPTER IV

DISCUSSION

The current study focused on two potentially harmful health-related behaviors in which young women commonly engage: tanning and binge drinking. Research has firmly established a link between tanning and increased risk and incidence of skin cancer (e.g., Boniol et al., 2012; Colantonio, Bracken, & Beecker, 2014), yet approximately one-third of Americans have used indoor tanning beds (Wehner et al., 2014) and young women in particular continue to frequently engage in harmful tanning behaviors (Guy Jr, Berkowitz, Watson, Holman, & Richardson, 2013). Likewise, the prevalence of binge drinking among young adults is 39.5% (Substance Abuse and Mental Health Services Administration, 2013), more than double the prevalence rates of American adults in general (i.e., 18.4%; Kanny, Liu, Brewer, & Lu, 2013). This greater frequency among young adults is particularly concerning given the risks associated with binge drinking, such as memory loss, heart damage, sexual assault, and various forms of cancer (Centers for Disease Control and Prevention, 2016a).

In response to the prevalence rates of these harmful behaviors among young adults, public health experts have devoted an abundance of time and resources to understanding and attempting to diminish engagement in these types of risky behaviors. Such intervention efforts have often involved the use of social norms because of their central role in human behavior. Researchers have continuously examined the effects of

social norms in regards to health-related perceptions, intentions, and behaviors (e.g., Elek et al., 2006; Schmiege et al., 2010; Talbott et al., 2014). The current study involved direct manipulation of two specific types of social norms, descriptive norms (i.e., peer group's risk estimate of suffering negative consequences associated with the behavior) and injunctive norms (i.e., peers' approval or disapproval of the behavior), in an attempt to alter young women's engagement in the risky health-related behaviors of tanning and binge drinking.

In an attempt to increase perceived risk and reduce engagement in risky tanning or binge drinking behaviors, young women were exposed to various combinations of descriptive norms and/or injunctive norms, with the expectation that those who received low risk descriptive norm information (i.e., peer group's estimate of suffering negative consequences is 15% chance) would estimate their own risk as significantly lower than those in the control or high risk descriptive norms (i.e., peer group's estimate of suffering negative consequences is 75% chance) conditions. Similarly, it was expected that young women who received high risk descriptive norms would estimate their own risk associated with negative consequences of tanning or binge drinking as significantly higher than those who viewed low risk descriptive norms. Mimicking past research findings (e.g., French et al., 2004), this same pattern was demonstrated in the current study. However, these differences only emerged on the absolute risk measure, not the comparative risk measure, suggesting that the presence of a comparison target (in this case, other women of the same age) may nullify the effect of exposure to descriptive norms. Additionally, given that the descriptive norms were presented as percentages, that

50

information may have more easily mapped onto the absolute risk measure (response

options: 0% - 100%) than the comparative risk measure (response options: -3 to +3).

Moreover, there were no significant differences on measures of target behavior intentions

among the high risk, low risk, and no descriptive norms groups. These results suggest

that exposure to descriptive norms in the form of peer risk estimate information do not

influence young women's intentions to engage in tanning or binge drinking behaviors.

It was also expected that young women who were exposed to approval injunctive

norms (i.e., a majority of women ages 21-25 approve of tanning or binge drinking) would

provide lower risk estimates than those exposed to disapproval injunctive norms (i.e., a

majority of women ages 21-25 disapprove of tanning or binge drinking) or no injunctive

norms. Contrary to this prediction, both absolute and comparative risk estimates were

higher among young women who viewed approval injunctive norms compared to those

who did not view injunctive norm information. This trend suggests that perceived societal

approval of a risk behavior does not lead to lower perceptions of risk, but instead results

in the opposite. Although these results for risk perceptions were unexpected, injunctive

norms affected target behavior intentions in the predicted direction. Specifically,

exposure to approval injunctive norms led to stronger average intentions to engage in the

target behavior over the upcoming month. Together, these results suggest that while

injunctive norms may not be useful in altering risk perceptions in the predicted direction,

they do have an impact on young women's intentions to engage in the targeted behaviors

of tanning and binge drinking. In other words, knowing that one's peers generally

approve of tanning or binge drinking led participants to harbor stronger intent to engage

51

in the target behavior over the upcoming month. This finding aligns with past research

demonstrating that perceived injunctive norms are related to health behavior intentions

(Smith-McLallen & Fishbein, 2008; Zaleski, & Aloise-Young, 2013).

While past research has generally focused on one health behavior at a time (e.g.,

Day et al., 2016; Reid & Aiken, 2013; Talbott et al., 2014), this study examined both

tanning and binge drinking in a single investigation, thus expanding upon the existing

literature. The current pattern of results revealed interesting differences between the two

health-related risk behaviors. Despite estimating both their absolute and comparative risk

as higher for tanning compared to binge drinking, young women in the study reported

stronger intentions to tan in the future than to binge drink. This finding suggests that the

perceived benefits of tanning outweigh the potential costs, such as sunburn or even skin

cancer. Robinson (1990) found a powerful manifestation of this notion among individuals

diagnosed with non-melanoma skin cancer. After having the cancerous area removed and

receiving extensive education regarding protective sun behaviors (e.g., sunscreen use),

38% of individuals had not changed their sun-related behaviors one year later. Thus,

together with prior research, the current results suggest that potential consequences are

not necessarily a sufficient deterrent to engaging in tanning behavior among young

women. The findings of the current study may also imply that young women view the

negative consequences associated with binge drinking as more severe or detrimental

compared to those associated with tanning. Most individuals have likely experienced a

sunburn at some point in their lives, which may lessen its strength as a deterrent for

tanning. Overall, these results highlight an important difference in perceptions between

52

the two risk behaviors of tanning and binge drinking: that the benefit to cost ratio is not equivalent.

The interaction between injunctive norms and target behavior provides additional support for the notion that social norms do not affect all risky health-related behaviors in the same way. While tanning risk estimates remained consistent regardless of injunctive norms condition, binge drinking risk estimates notably declined moving from approval to disapproval to no injunctive norm exposure. That is, young women who were told their peers approved of binge drinking perceived their risk of suffering negative consequences as higher compared to those who were told their peers disapproved of binge drinking. Although this relationship was opposite from the predicted direction, the results nonetheless reveal an important difference in the way that social norms affect various health-related risk behaviors.

Although exposure to high risk descriptive norms was intended to diminish engagement in the target behavior, the opposite effect was observed in the current study. Specifically, young women who were exposed to high risk descriptive norms (i.e., told that their peers estimated their own risk of suffering negative consequences from binge drinking as 75%) reported suffering more negative consequences from binge drinking over the previous month compared to those who did not view any descriptive norms. However, it is important to note that these individuals had been exposed to approval injunctive norms as well (i.e., told that a majority of women ages 21-25 approve of binge drinking). Perhaps when exposed to both types of social norms, the influence of injunctive norms outweighs that of descriptive norms. Research conducted by Mollen,

53

Rimal, Ruiter, Jang, and Kok (2013) supports this notion, as they found that injunctive, but not descriptive, norms affected participants' behavior four weeks post-intervention.

Examining Time 2 data showed that stronger intentions to engage in the target behavior were related to more frequent engagement in the target behavior, supporting the general finding that intentions predict behaviors to some degree (e.g., Reid & Aiken, 2013; Schmiege et al., 2010). This also aligns with the Theory of Planned Behavior (Ajzen, 1985) and the Precaution Adoption Process Model (Weinstein, 1988). The Theory of Planned Behavior asserts that intentions play a central role in the performance of a behavior. Likewise, the Precaution Adoption Process Model posits that there is a step by step psychological process which leads to engagement in a behavior. More specifically, one of the steps involves the decision to engage in a particular behavior (i.e., intent) prior to actually performing the behavior. However, in accordance with past research (Sheeran, 2002), the findings of the current study indicate that despite altering one's intentions, there often remains a gap between these intentions and an individual's actual behaviors.

<center>**Implications**</center>

The current findings yield several practical implications pertaining to the creation of future behavioral health campaigns. The study results suggest that young women's desire to engage in tanning outweighed the perceived risk. Research has demonstrated that a dark tan is perceived as both attractive and healthy (Banerjee, Campo, & Greene, 2008). These social perceptions of attractiveness may contribute to women's desire to engage in tanning behaviors. Indeed, Leary and Jones (1993) found that concern for

appearance and the belief that tanned skin enhances one's attractiveness were the strongest predictors of the degree to which individuals exposed themselves to UV rays. With this in mind, it is critical to identify ways to reduce the perceived benefits of tanning and lessen its desirability. Hillhouse and Turrisi (2002) found that an appearance-focused intervention was effective in reducing not only positive attitudes toward tanning, but also in reducing intentions and engagement in tanning behavior. As such, future health interventions should continue to focus on the negative appearance-related consequences of excessive exposure to UV rays.

Tanning behaviors were not impacted by exposure to descriptive and/or injunctive norms in the current study, suggesting that interventions based on certain social norms may be less effective for particular risk behaviors. Therefore, pinpointing which behaviors are especially susceptible to social norms provides valuable guidance and direction for future behavior interventions. Research has shown that health interventions specifically tailored towards a particular target group are more relevant, and thus more effective, than mass communication in which everyone is exposed to identical messages (Kreuter, Bull, Clark, & Oswald, 1999; Kreuter & Wray, 2003). In a similar way, health campaigns should strategically utilize different tactics depending on the targeted risk behavior in order to enhance their efficacy. For example, although Hillhouse and Turrisi (2002) found that an appearance-focused intervention successfully reduced tanning behavior, it is reasonable to believe that this same type of intervention would not necessarily be effective for binge drinking.

The results of the current study imply that descriptive norms have a stronger effect on risk estimates, and injunctive norms have a stronger effect on behavior intentions. This makes logical sense, as the descriptive norms consisted of high or low peer risk estimate information, while the injunctive norms consisted of approval or disapproval for engaging in the target behavior. There are differences in the inherent nature of these two types of social norms, so it is reasonable that these norms would not operate identically. From this perspective, it may not be particularly effective to utilize both types of norms in a single health behavior intervention. Instead, the focus should be placed on injunctive norms, as they appear to exert a stronger influence than descriptive norms (e.g., Mollen et al., 2013).

Although exposure to injunctive norms led to higher average intentions to engage in the target behaviors, these intentions did not translate into differences in behaviors at Time 2. Even if social norms can modify one's intentions to engage in a particular behavior, it remains difficult to impact an individual's overt behaviors (Sheeran, 2002). Therefore, it is crucial to continue investigating factors that lead to diminished engagement in risky health-related behaviors, such as perceived behavioral control (Hillhouse, Turrisi, & Kastner, 2000), attitudes, self-efficacy (Sheeran et al., 2016), and self-presentational motives (Leary & Jones, 1993). As younger individuals often feel "invincible" when it comes to risky behaviors (Ravert et al., 2009), the sample in the current study may have been less susceptible to the manipulations compared to older age groups. On the other hand, older individuals may experience less pressure to conform to the actions of their peers (Parker, Manstead, Stradling, Reason, & Baxter, 1992;

Robinson, 1990). Thus, particular consideration must be given to the age of the group being targeted and whether or not various social norms will be impactful.

Limitations and Future Directions

One limitation of the current study was the inability to explicitly control the time lapse between each participants' completion of the Time 1 and Time 2 surveys. The intention was for individuals to complete the Time 1 and Time 2 surveys one month apart. However, as participants were free to complete the surveys at their convenience, the gap between the Time 1 and Time 2 surveys being completed ranged from 14 days to 109 days ($M = 34.30$). The Time 1 intentions measures asked about the frequency of engaging in target behaviors over the following month, while the Time 2 behavior measures asked about frequency of target behaviors over the previous month. As a result, there was a disconnect in measurement between intentions and behaviors for about 44% of participants. In other words, some participants' Time 1 intentions and Time 2 behaviors were not referring to or measuring the same month-long time period. In order to more accurately assess the relationship between intentions and overt behaviors, future studies should identify ways to exercise more control over the amount of time between surveys for online investigations.

Also, accompanying longitudinal research is the unique challenge of a potentially decreasing sample size over time. In the current study, less than 50% of the initial sample returned to complete the Time 2 survey. Not only did the small Time 2 sample potentially contribute to a lack of significant findings, but it also limited the overall assessment of the relationship between intentions and behaviors after exposure to various social norms.

Thus, future research should aim for larger initial sample sizes in order to compensate for high attrition rates.

Because the current study focused exclusively on Caucasian women between the ages of 21 and 25 years old residing in the United States, the results are not generalizable to the general population. Future research should investigate the effects of social norms on health-related risk perceptions, intentions, and behaviors among other demographic groups, such as men, older adults, and racial minorities. In regards to the two risk behaviors in the current study, men tend to binge drink more frequently than women (Centers for Disease Control and Prevention, 2012), while women tend to tan more frequently than men (Centers for Disease Control and Prevention, 2015b). Based on these differential rates of engagement, it is conceivable that differences in risk perceptions, intentions, and behaviors would emerge among the genders.

The method of presenting social norms (i.e., online and anonymously) in the current study likely diminished their impact. Although participants were told that the social norms corresponded to individuals of their same age and gender, there was no direct way of verifying that information. Presenting social norm information in a more public manner may have led to greater feelings of accountability and thus, stronger effects on risk perceptions, intentions, and behavior outcomes. For example, small discussion groups could be conducted with confederates who present social norm information as their personal beliefs. This would place stronger social pressure on the participants and potentially result in more notable effects.

While research has shown that social norms affect individuals' intentions and behaviors, the current study did not assess *changes* in perceptions of social norms as a result of the manipulations. In other words, there were no pre-post measures of perceptions of social norms that could be used to determine if exposure to norm information did change the young women's preconceived notions in any way. Sheeran et al.'s (2016) meta-analysis showed that altering factors such as attitudes, norms, and self-efficacy leads to changes in health-related intentions and behaviors. Therefore, examining changes in norm perceptions may be an important step in successfully altering health-related intentions and behaviors. Perhaps the manipulations of the current study were not strong enough to alter perceptions of social norms, which may explain the lack of significant differences in behavior found at Time 2. Future research in this area should include pre- and post-measures of social norm perceptions in order to determine if the manipulations are truly impactful.

In conclusion, the current study provides valuable information regarding the influence of social norms on health-related risk perceptions, intentions, and behaviors. Although social norms did influence risk perceptions and intentions, behavior outcomes were ultimately not impacted by norm exposure. The current findings have significant implications for understanding the complex relationships that contribute to engagement in health-related behaviors. Furthermore, as individuals continue to engage in risky health behaviors, the current study highlights the need for additional research regarding social norms or other factors that could diminish engagement in such behaviors.

APPENDICES

Injunctive Norm Quotes

Injunctive Norm Quotes Regarding Tanning

Approval:

> "I love being tan. It makes me feel so much more confident and I get a ton of compliments!"
> "People look so much better when they are tan."

Disapproval:

> "Getting a tan is not worth the risk of skin cancer or having skin that looks like leather."
> "People who tan all the time just look fake."

Injunctive Norm Quotes Regarding Binge Drinking

Approval:

> "Parties are so much more fun when you drink a lot."
> "Drinking a lot helps me let loose and be more outgoing."

Disapproval:

> "You can still have fun at a party without binge drinking."
> "I'd way rather limit myself to a couple drinks than binge drink and end up doing something I regret."

Appendix B
Demographics Questionnaire

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

2. Have you ever been diagnosed with skin cancer?
      Yes/No

3. Has anyone in your family ever been diagnosed with skin cancer?
      Yes/No

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

5. Have you ever struggled with alcohol abuse?
      Yes/No

6. Has anyone in your family ever struggled with alcohol abuse?
      Yes/No

7. Do you know anyone who has struggled with alcohol abuse?
      Yes/No

Appendix C
Debriefing Information

Thank you for participating in this study. The purpose of this study is to gain a better understanding of how young women view tanning and drinking behaviors. The risk estimates and approval/disapproval values shown were not accurate and were created solely for use in this study.

According to the American Cancer Society (2014), there are a number of things that you can do to protect yourself from skin cancer:
- Wear sunglasses
- Wear a hat
- Wear sunscreen and reapply every few hours
- Sit in the shade and avoid exposure to direct sunlight
- Avoid using tanning beds

According to the Centers for Disease Control and Prevention (2016b), there are a number of things that you can do to prevent excessive alcohol use:
- Choose not to drink too much yourself and help others not do it.
- If you choose to drink alcohol, follow the U.S. Dietary Guidelines on moderate alcohol consumption (no more than one drink per day for women and no more than 2 drinks per day for men).
- Support effective community strategies to prevent excessive alcohol use.
- Not serve or provide alcohol to those who should not be drinking, including those who have already drank too much.
- Talk with your health care provider about your drinking behavior and request counseling if you drink too much.

REFERENCES

Adachi, H., Murakami, Y., Tanaka, H., & Nakata, S. (2014). Increase of stratifin triggered by ultraviolet irradiation is possibly related to premature aging of human skin. *Experimental Dermatology, 23,* 32-36.

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl & J. Beckmann (Eds.), *Action-control: From cognition to behavior* (pp. 11-39). Heidelberg: Springer.

American Cancer Society. (2016, April 19). Skin cancer facts. Retrieved from http://www.cancer.org/cancer/cancercauses/sunanduvexposure/skin-cancer-facts

Andrews, J. A., Tildesley, E., Hops, H., & Li, F. (2002). The influence of peers on young adult substance use. *Health Psychology, 21,* 349-357.

Banerjee, S. C., Campo, S., & Greene, K. (2008). Fact or wishful thinking? Biased expectations in "I think I look better when I'm tanned." *American Journal of Health Behavior, 32*(3), 243-252.

Bates, J. A., & Lanza, B. A. (2013). Conducting psychology student research via the mechanical turk crowdsourcing service. *North American Journal of Psychology, 15,* 385-394.

Berkowitz, A. D. (2005). An overview of the social norms approach. In *Changing the culture of college drinking: A socially situated health communication campaign* (pp. 193-214). New York, NY: Hampton.

Bicchieri, C. (2005). *The grammar of society: The nature and dynamics of social norms.* New York, NY: Cambridge.

Boniol, M., Autier, P., Boyle, P., & Gandini, S. (2012). Cutaneous melanoma attributable to sunbed use: Systematic review and meta-analysis. *British Medical Journal, 345,* e4757.

Branstrom, R., Kristjansson, S., & Ullen, H. (2005). Risk perception, optimistic bias, and readiness to chance sun related behavior. *European Journal of Public Health, 16,* 492-497.

Bray, J. H., & Maxwell, S. E. (1985). *Multivariate analysis of variance*. Newbury Park, CA: SAGE.

Buhrmester, M., Kwang, T., & Gosling, S. D. (2011). Amazon's Mechanical Turk: A new source of inexpensive yet high-quality, data? *Perspectives on Psychological Science, 6,* 3-5.

Buunk**,** B. P., Collins, R. L., Taylor, S. E., VanYperen, N. W., & Dakof, G. A. (1990). The affective consequences of social comparison: Either direction has its ups and downs. *Journal of Personality and Social Psychology, 59,* 1238-1249.

Buunk, B. P., Gibbons, F. X., & Reis-Bergan, M. (1997). Social comparison in health and illness: A historical overview. In *Health, coping, and well-being: Perspectives from social comparison theory* (pp. 1-23). Mahwah, NJ: Lawrence Erlbaum Associates.

Casler, K., Bickel, L., & Hackett, E. (2013). Separate but equal? A comparison of

participants and data gathered via Amazon's MTurk, social media, and face-to-

face behavioral testing. *Computers in Human Behavior, 29,* 2156-2160.

Centers for Disease Control and Prevention. (2011). *Vital Signs: Binge Drinking Among*

Women and High School Girls – United States, 2011. MMWR. Morbidity and

mortality weekly report, 62(1), 9-13.

Centers for Disease Control and Prevention. (2012). *Vital Signs: Binge Drinking*

Prevalence, Frequency, and Intensity Among Adults — United States, 2010.

MMWR. Morbidity and mortality weekly report, 61(1), 14-19.

Centers for Disease Control and Prevention. (2015a, August 20). Skin cancer rates by

race and ethnicity. Retrieved from

http://www.cdc.gov/cancer/skin/statistics/race.htm

Centers for Disease Control and Prevention. (2015b, September 15). Indoor tanning

among adults in the united states. Retrieved from

http://www.cdc.gov/cancer/dcpc/research/articles/adult-indoor-tanning.htm

Centers for Disease Control and Prevention. (2016a, March 7). Fact sheets – excessive

alcohol use and risks to women's health. Retreived from

https://www.cdc.gov/alcohol/fact-sheets/womens-health.htm

Centers for Disease Control and Prevention. (2016b, October 17). Fact sheets –

preventing excessive alcohol use. Retrieved from

https://www.cdc.gov/alcohol/fact-sheets/prevention.htm

Cialdini, R. B., Reno, R. R., & Kallgren, C. A. (1990). A focus theory of normative

conduct: Recycling the concept of norms to reduce littering in public places. *Journal of Personality and Social Psychology, 58,* 1015-1026.

Colantonio, S., Bracken, M. B., & Beecker, J. (2014). The association of indoor tanning and melanoma in adults: Systematic review and meta-analysis. *Journal of the American Academy of Dermatology, 70*(5), 847-857.

Coupland, J. (2003). Ageist ideology and discourses of control in skincare product marketing. In J. Coupland & R. Gwyn (Eds.), *Discourse, the body, and identity* (pp. 127-150). New York, NY: Palgrave Macmillin.

Crutzen, R., Viechtbauer, W., Spigt, M., & Kotz, D. (2015). Differential attrition in health behaviour change trials: A systematic review and meta-analysis. *Psychology and Health, 30,* 122-135.

Davidson, T. M. & Wolfe, D. P. (1986). Sunscreens, skin cancer, and your patient. *The Physician and Sportsmedicine, 14,* 65-72, 77-79.

Day, A. K., Wilson, C. J., Hutchinson, A. D., & Roberts, R. M. (2016). Australian young adults' tanning behaviour: The role of ideal skin tone and sociocultural norms. *Australian Journal of Psychology.* doi: 10.1111/ajpy.12121

Elek, E., Miller-Day, M., & Hecht, M. L. (2006). Influences of personal, injunctive, and descriptive norms on early adolescent substance use. *Journal of Drug Issues, 36,* 147-172.

Ellickson, P. L., Bird, C. E., Orlando, M., Klein, D. J., & McCaffrey, D. F. (2003). Social

context and adolescent health behavior: Does school-level smoking prevalence affect students' subsequent smoking behavior? *Journal of Health and Social Behavior, 44,* 525-535.

Elliott, M. A. & Ainsworth, K. (2012). Predicting university undergraduates' binge-drinking behavior: A comparative test of the one- and two-component theories of planned behavior. *Addictive Behaviors, 37,* 92-101.

Faul, F., Erdfelder, E., Buchner, A., & Lang, A-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods, 41*, 1149-1160.

Feldstein, J., & Washburn, D. (1980). Shifts toward risk in adults at three age levels. *Experimental Aging Research, 6,* 149-157.

Festinger, L. (1954). A theory of social comparison processes. *Human relations, 7*, 117-140.

Field, A. (2009). *Discovering statistics using SPSS* (3rd ed.). Thousand Oaks, CA: SAGE.

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research.* Reading, MA: Addison-Wesley.

Fishbein, M., & Ajzen, I. (2010). *Predicting and changing behavior: The reasoned action approach.* New York, NY: Taylor & Francis.

French, D. P., Sutton, S. R., Marteau, T. M., & Kinmonth, A. L. (2004). The impact of personal and social comparison information about health risk. *British Journal of Health Psychology, 9,* 187-200.

Gardner, M., & Steinberg, L. (2005). Peer influence on risk taking, risk preference, and

risky decision making in adolescence and adulthood: An experimental study. *Developmental Psychology, 41,* 625-635.

Guy, G. P., Jr., Berkowitz, Z., Watson, M., Holman, D. M., & Richardson, L. C. (2013). Indoor tanning among young non-hispanic white females. *JAMA Internal Medicine, 173,* 1920-1922.

Hansen, M. R., & Bentzen, J. (2014). High-risk sun-tanning behaviour: A quantitative study in Denmark, 2008-2011. *Public Health, 128,* 777-783.

Hashizume, H. (2004). Skin aging and dry skin. *The Journal of Dermatology, 31,* 603-609.

Hemrich, A., Pawlow, L., Pomerantz, A., & Segrist, D. (2014). Current versus ideal skin tones and tanning behaviors in Caucasian college women. *Journal of American College Health, 62,* 588-591.

Hillhouse, J. J., & Turrisi, R. (2002). Examination of the efficacy of an appearance-focused intervention to reduce UV exposure. *Journal of Behavioral Medicine, 25*(4), 395-409.

Hillhouse, J. J., Turrisi, R., & Kastner, M. (2000). Modeling tanning salon behavioral tendencies using appearance motivation, self-monitoring and the theory of planned behavior. *Health Education Research, 15*(4), 405-414.

Kanny, D., Liu, Y., Brewer, R. D., & Lu, H. (2013). Binge drinking – United States, 2011. *Morbidity and Mortality Weekly Report (MMWR) Supplement, 62*(3), 77-80.

Kreuter, M. W., Bull, F. C., Clark, E. M., & Oswald, D. L. (1999). Understanding how

people process health information: A comparison of tailored and nontailored weight-loss materials. *Health Psychology, 18*(5), 487-494.

Kreuter, M. W., & Wray, R. J. (2003). Tailored and targeted health communication: Strategies for enhancing information relevance. *American Journal of Health Behavior, 27,* S227-S232.

Lane, D. J., Gibbons, F. X., O'Hara, R. E., & Gerrard, M. (2011). Standing out from the crowd: How comparison to prototypes can decrease health-risk behavior in young adults. *Basic and Applied Social Psychology, 33,* 228-238.

Leary, M. R., & Jones, J. L. (1993). The social psychology of tanning and sunscreen use: Self-presentational motives as a predictor of health risk. *Journal of Applied Social Psychology, 23*(17), 1390-1406.

Lipsey, M. W., & Hurley, S. M. (2009). Design sensitivity: Statistical power for applied experimental research. In *SAGE handbook of applied social research methods* (pp. 44-76). Thousand Oaks, CA: SAGE.

Mahler, H. I. M., Kulik, J. A., Butler, H. A., Gerrard, M., & Gibbons, F. X. (2008). Social norms information enhances the efficacy of an appearance-based sun protection intervention. *Social Science & Medicine, 67,* 321-329.

Mertler, C. A., & Vannatta, R. A. (2010). *Advanced and multivariate statistical methods* (4th ed.). Glendale, CA: Pyrczak.

Mollen, S., Rimal, R. N., Ruiter, R. A. C., Jang, S. A., & Kok, G. (2013). Intervening or

interfering? The influence of injunctive and descriptive norms on intervention

behaviours in alcohol consumption contexts. *Psychology & Health, 28*(5), 561-

578.

Mueller, A. S., Pearson, J., Muller, C., Frank, K., & Turner, A. (2010). Sizing up peers:

Adolescent girls' weight control and social comparison in the school context.

Journal of Health and Social Behavior, 51, 64-78.

Mumenthaler, M. S., Taylor, J. L., O'Hara, R., & Yesavage, J. A. (1999). Gender

differences in moderate drinking effects. *Alcohol Research & Health, 23,* 55-64.

National Institute of Alcohol Abuse and Alcoholism. (2004). NIAAA council approves

definition of binge drinking. *NIAAA Newsletter, 3, 3*. Retrieved from

http://pubs.niaaa.nih.gov/publications/Newsletter/winter2004/Newsletter_Number

3.htm

Page, R. M., Scanlan, A., & Gilbert, L. (1999). Relationship of the estimation of binge-

drinking among college students and personal participation in binge drinking:

Implications for health education and promotion. *Health Education, 30,* 98-103.

Parker, D., Manstead, A. S. R., Stradling, S. G., Reason, J. T., & Baxter, J. S. (1992).

Intention to commit driving violations: An application of the theory of planned

behavior. *Journal of Applied Psychology, 77,* 94-101.

Powers, J. R., Anderson, A. E., Byles, J. E., Mishra, G., & Loxton, D. J. (2015). Do

women grow out of risky drinking? A prospective study of three cohorts of

Australian women. *Drug & Alcohol Review, 34,* 278-288.

Ravert, R. D., Schwartz, S. J., Zamboanga, B. L., Kim, S. Y., Weisskirch, R. S., &

Bersamin, M. (2009). Sensation seeking and danger invulnerability: Paths to college-student risk taking. *Personality & Individual Differences, 47,* 763-768.

Reid, A. E. & Aiken, L. S. (2013). Correcting injunctive norm misperceptions motivates behavior change: A randomized controlled sun protection intervention. *Health Psychology, 32,* 551-560.

Robinson, J. K. (1990). Behavior modification obtained by sun protection education coupled with removal of a skin cancer. *Archives of Dermatology, 126*(4), 477-481.

Rolison, J. J., Hanoch, Y., Wood, S., & Liu, P. (2014). Risk-taking differences across the adult life span: A question of age and domain. *Journals of Gerontology Series B: Psychological Sciences & Social Sciences, 69,* 870-880.

Schmiege, S. J., Klein, W. M. P., & Bryan, A. D. (2010). The effect of peer comparison information in the context of expert recommendations on risk perceptions and subsequent behavior. *European Journal of Social Psychology, 40,* 746-759.

Scholly, K., Katz, A. R., Gascoigne, J., & Holck, P. S. (2005). Using social norms theory to explain perceptions and sexual health behaviors of undergraduate college students: An exploratory study. *Journal of American College Health, 53,* 159-166.

Scott, K. A., Mason, M. J., & Mason, J. D. (2015). I'm not a smoker: Constructing protected prototypes for risk behavior. *Journal of Business Research, 68,* 2198-2206.

Sheeran, P. (2002). Intention – behavior relations: A conceptual and empirical review. *European Review of Social Psychology, 12,* 1-36.

Sheeran, P., Abrams, D., & Orbell, S. (1995). Unemployment, self-esteem, and

    depression: A social comparison theory approach. *Basic and Applied Social*

    Psychology, 17, 65-82.

Sheeran, P., Maki, A., Montanaro, E., Avishai-Yitshak, A., Bryan, A., Klein, W. M., …

    Rothman, A. J. (2016). The impact of changing attitudes, norms, and self-efficacy

    on health-related intentions and behavior: A meta-analysis. *Health Psychology,*

    35(11), 1178-1188.

Smith-McLallen, A., & Fishbein, M. (2008). Predictors of intentions to perform six

    cancer-related behaviours: Roles for injunctive and descriptive norms.

    Psychology, Health & Medicine, 13, 389-401.

Stellefson, M., & Chaney, J. D. (2006). Determinants of indoor tanning behavior among

    adolescent females: A systematic review of the literature. *Health Educator, 38,*

    15-21.

Substance Abuse and Mental Health Services Administration. (2013). *Results from the*

    2012 national survey on drug use and health: Summary of national findings

    (NSDUH Series H-46, HHS Publication No. SMA 13-4795). Rockville, MD:

    Center for Behavioral Health Statistics and Quality.

Suls, J., & Wheeler, L. (2000). *Handbook of Social Comparison*. New York: Klewer

    Academic/Plenum.

Talbott, L. L., Wilkinson, L. L., Moore, C. G., & Usdan, S. L. (2014). The role of

    injunctive norms and alcohol use during the first-semester of college. *Journal of*

    Alcohol and Drug Education, 58, 60-81.

United States Census Bureau. (2015, March 11). Regions and divisions. Retrieved from

    https://www.census.gov/econ/census/help/geography/regions_and_divisions.html

Wehner, M. R., Chren, M. M., Nameth, D., Choudhry, A., Gaskins, M., Nead, K. T., …

    Linos, E. (2014). International prevalence of indoor tanning: A systematic review

    and meta-analysis. *JAMA Dermatology, 150*(4), 390-400.

Weinstein, N. D. (1982). Unrealistic optimism about susceptibility to health problems.

    Journal of Behavioral Medicine, 5, 441-460.

Weinstein, N. D. (1983). Reducing unrealistic optimism about illness susceptibility.

    Health Psychology, 2, 11-20.

Weinstein, N. D. (1988). The precaution adoption process. *Health Psychology, 7*, 355-

    386.

Wilsnack, R. W., Wilsnack, S. C., Kristjanson, A. F., Vogeltanz-Holm, N. D., & Gmel,

    G. (2009). Gender and alcohol consumption: patterns from the multinational

    GENACIS project. *Addiction, 104,* 1487-1500.

Zaleski, A. C., & Aloise-Young, P. A. (2013). Using peer injunctive norms to predict

    early adolescent cigarette smoking intentions. *Journal of Applied Social*

    Psychology, 43, E124-E131.