

PSYCHOSOCIAL PREDICTORS OF HIGH SCHOOL ADOLESCENTS'
SUN-TANNING AND SUN-PROTECTIVE BEHAVIORS

by

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The incidence of skin cancer among adolescents and young adults is increasing in the United States. Ultraviolet radiation (UVR) exposure via sun-tanning is considered an important risk factor for development of melanoma. Sun-induced skin damage and sun-tanning habits are initiated in early life and promoted through later sun exposure patterns. Assessing the predictors of adolescents' sun-tanning and sun-protective attitudes and behaviors has the potential to aid in developing age-appropriate strategies to prevent the adoption of sun-tanning habits and reinforce sun-protective behaviors. The current study focuses on the attitudes, motivations, and behaviors regarding sun-tanning and sun-protective practices of high school adolescents in rural Southern Illinois. A cross-sectional research design will be utilized. Students will participate in a self-administered survey in the Spring of 2014. Social norms, appearance attitudes, and perceptions of fitness and health attributed to sun-tanned skin and tanning bed usage have been established. Innovative alternatives are needed however, to counteract high rates of indoor tanning bed use and intentional UVR exposure. This study hypothesizes that both sun-tanning and sun-protective behaviors are influenced by peer group norms, situational context, environmental reinforcements, self-efficacy, and values placed on specific behavioral choices. The primary aim of this study is to investigate high school adolescents' sun-tanning and sun-protective behaviors through a theoretical framework of psychosocial constructs.

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CHAPTER 1 INTRODUCTION

Background

Many factors influence individual and population health status. These factors, called determinants of health, cover a wide range of personal, social, economic, and environmental topics (United States Department of Health and Human Services [HHS], *Healthy People 2020*, 2011). Determinants of health can include biologic characteristics such as gender and family genetics, the geographic location where one lives, income and educational levels, poverty, and the availability and accessibility of quality health care services. While all these factors can affect health, the majority of leading causes of death and premature morbidity are most influenced by lifestyles choices. These choices are otherwise known as behavioral risk factors. Reducing behavioral risk factors such as tobacco use, poor nutrition, physical inactivity and ultraviolet radiation (UVR) exposure may help to decrease preventable diseases such as heart disease, diabetes, and cancer. Cancer is one of the leading causes of death in the U.S., second only to heart disease (Heron et al., 2009). Non-melanoma skin cancer is now the most common of all types of cancer, affecting 2.2 million people in the United States annually (American Cancer Society, 2013).

The national health agenda for the United States, HHS *Healthy People 2020* (2011), identifies priority health topics and sets ten year targets for improvement. Among the goals for HHS *Healthy People 2020* (2011), are a reduction in the number of new cases of cancer and a reduction in illness, disability and deaths caused by cancer. Trends over the last decade show an increase in the incidence of skin cancer for both non-melanoma (basal and squamous cell

carcinomas) and malignant melanoma (ACS, 2014). Incidence rates for basal and squamous cell carcinomas are difficult to estimate because they are not required to be reported to cancer registries (ACS, 2014). One study in 2006 estimated the incidence of non-melanoma skin cancers in the U.S. to be around 3.5 million cases (ACS, 2014). Malignant melanoma accounts for around 2% of total skin cancer cases in the U.S. but is responsible for a majority of skin cancers deaths (ACS, 2014). Incidence rates for malignant melanoma have been increasing for at least 30 years, increasing almost 3% per year consistently from 1981-2008 (Little & Eide, 2012). A higher 6.1% annual increase has been seen in white women younger than 44 years old. The American Cancer Society (2014) estimates about 81,220 more people will be newly diagnosed with melanoma and other non-epithelial skin cancer in the United States in 2014. Approximately 12,980 skin cancer deaths are anticipated in 2014, with 9,710 of those attributed to malignant melanoma (ACS, 2014). The annual direct costs of treating skin cancer are estimated at \$2.36 billion to \$2.9 billion (National Cancer Institute, 2011; Jemal et al., 2009).

Conceptual Framework

Intentional ultraviolet radiation exposure via sunbathing and artificial UV light sources increases risk for developing melanoma (Reed et al., 2012). The “reduction of sun exposure through behavioral intervention has been proposed as the most effective way to reduce skin cancer rates” (James, Tripp, Sweeney, & Gritz, 2002, p. 306). In order to develop better interventions, health educators need an understanding of motivations for sun-tanning and sun-protective behaviors. Developing, implementing and sustaining practices aimed at reducing UVR exposure, such as occurs through intentional sun-tanning among adolescents, may contribute to a reduction in skin cancer rates. “In particular, an analysis of melanoma among

the young adult population may provide insight into the current and future burden of melanoma in the US population and serve as a critical first step toward describing, monitoring, and eventually eliminating this cancer” (Weir et al., 2011, p. S38.e11). Addressing UVR exposure during adolescence is consistent with behavioral theory. Hill and Dixon (1999) suggest that acquiring sun-safe habits during the school years is much easier than trying to undo harmful habits later. Health behavior is inherently complex, thus considering the multiple pathways of influence on adolescent behaviors can inform intervention efforts (Schumacker & Lomax, 2010). Psychosocial (sometimes also called social-psychological) theories, although not originally developed for understanding adolescent health risk behaviors, have “proven quite useful in predicting and explaining many different types of health-relevant behaviors” (Gibbons, Kingsbury, & Gerrard, 2012, p. 170). Gibbons et al. (2012) assert that increasing interest in psychosocial theories and adolescent behavior is a result of greater appreciation of dual-processing principles – or simply put, adolescent decision making is not always planned or thought through in advance and often involves a personal heuristic and analysis (Gibbons et al., 2012). Utilizing behavior change theory to identify and leverage factors such as multiple social and environmental influences may be useful in shaping this heuristic development in health enhancing ways.

Understanding the role and interaction of psychosocial factors enables public health professionals to better identify susceptible individuals and populations at particular risk of developing melanoma. In addition, “understanding the burden and relative risk of melanoma among adolescents and young adults is important to developing effective and targeted approaches to reducing incidence and deaths” (Weir et al., 2011, p. S38.e10). While research

has been done investigating influential factors for sun-tanning behavior, far less has been done to assess the role of predictors on sun-protective behaviors, and even less on sunless tanning as an alternative approach.

Several different approaches to shifting health behaviors exist. One approach is to study social norms, the influential, often unspoken, preferences of a group that shape attitudes and behaviors. Berkowitz (2004) says that behaviors are influenced by perceptions about how social peer group members think and act. For example, perceptions (although often incorrect) about the permissive attitudes of peers toward alcohol or drug use, smoking, and sexual behaviors are overestimated and engagement in healthy behaviors is underestimated (Berkowitz, 2004). Interventions that target peer influences on behavior, may have a greater impact on individual behavior than other determinants of health (i.e., genetics, personality, family, religion, etc. (Berkowitz & Perkins, 1986a; Bosari & Carey, 2001; Kandel, 1985; and Perkins, 2002). The importance of peer influences and normative beliefs regarding health behaviors of youth is well documented (Berkowitz, 2004). The direct and indirect effects of attitudes, motivations, and peer norms of adolescents and the complexity of their reciprocal interaction on sun-tanning and sun-protection should be better understood. Researchers examining the psychology of sun exposure and intentional sun-tanning found that attitudes, rather than lack of knowledge about the risks of ultraviolet (UV) exposure, are related to tanning behavior (Dennis, Lowe, & Snetselaar, 2009). For example, in a study of psychosocial predictors of sun safety among middle school youth it was found that adolescent females had higher sun-safety knowledge but were also more likely to have higher intentional UVR exposure (Andreeva, Reynolds, Buller, Chou, & Yaroch, 2008).

Evidence linking indoor tanning with melanoma and other skin cancers combined with the increased popularity of the practice among adolescents creates potential threat to public health. Frequent indoor sun-tanners are estimated to receive as much as 12 times the annual UVA dose compared to traditional sun exposure (HHS, 2011). Since it is well documented that the vast majority of mutations found in melanoma are caused by ultraviolet radiation, it follows that reducing intentional UVR exposure reduces risks of melanoma (Riker, Zea, & Trinh, 2010). Indoor tanning significantly increases the risk of developing skin cancer thus raising the need to shift adolescents' sun-tanning behaviors toward more healthful options. Psychosocial correlates of intentional outdoor sun-tanning and indoor tanning bed or booth usage have been studied to better inform interventions designed to reduce sun-tanning behaviors. Another approach to reducing less desirable health behaviors is through the use of harm-reduction strategies. Researchers are just beginning to explore sunless tanning product usage as it correlates to other sun-tanning and sun-protective behaviors. Sunless tanning product usage as a harm-reduced alternative for those who want to maintain the appearance of sun-tanned skin and as an intervention to encourage sun safety may be beneficial (Paul, Paras, Harper, & Coppa, 2011; Cokkinides, Bandi, Weinstock, & Ward, 2010; Pagoto et al., 2010; Brooks et al., 2006; Sahn, McIlwain, Magee, Veledar, & Chen, 2012; Fu, Dusza, & Halpern, 2004; Sheehan & Leshner, 2005; Girgis et al., 2003; Russo & VanAcker, 2012). Primary prevention of skin cancer through modifying behaviors such as reducing intentional exposure to ultraviolet radiation represents an important opportunity to improve health education efforts.

Need for the Study

Intentional UVR exposure through sun-tanning is a modifiable health risk behavior that can contribute to preventable disease, disability, injury and premature death (Centers for Disease Control and Prevention [CDC], 2010). Richards, Tucker, Brozyna, Ferdinand, and Shapiro (2009) recommend research that identifies the modifiable factors in preventative health care behaviors of adolescents. If lack of knowledge about the causes of skin cancer and the risks of sun-tanning are not the case, what does contribute to the continued behavior should be determined (Dennis et al., 2009; Andreeva et al., 2009). This study will examine sun-tanning and sun-protective attitudes and behaviors using constructs grounded primarily in social cognitive theory and select constructs derived from literature related to theories of health behavior. It is hypothesized that psychosocial influences predict both sun-tanning and sun-protective behaviors in adolescents and young adults. With the goal of reducing intentional UVR exposure in specific groups, this study seeks to understand current behaviors, motivations, and perceptions related to sun-tanning and sun-protection behaviors in adolescents.

The factors predictive of sun-tanning and sun-protective behaviors are complex. Investigating contributing factors through a theoretical framework can help to inform health education practice. Several psychosocial variables have been identified as potential determinants. Baranowski, Perry and Parcel (2002) established that behavior change constructs such as attitude/expectancy and perceived norms are often found to be related to health risk and health protective factors. Bandura's (1986) Social Cognitive Theory (SCT) draws attention to contextual factors such as social norms and the interaction of the individual with their environment, making it an appropriate framework through which to examine factors directly and indirectly affecting both sun-tanning and sun-protective behaviors.

Sun-induced skin damage, which increases skin cancer risk, is initiated in early life and promoted through later sun exposure patterns (Andreeva et al., 2008; Godar, Urbach, Gasparro, & van der Leun, 2003; Houghton & Viola, 1981). The incidence of melanoma among adolescents and young adults is increasing in the United States (Purdue, Freeman, Anderson, & Tucker, 2008; Jemal, Devesa, Hartge, & Tucker, 2001, Jemel et al., 2009; Weir et al., 2011). “Cutaneous melanoma ... is the second most commonly diagnosed cancer (after lymphomas) and the most lethal form of skin cancer among adolescents and young adults under the age of 30 years in the United States” (Weir et al., 2011, p. S38.e2) The 2009 Youth Risk Behavior Survey (YRBS) found wide variance in the prevalence of sun-protection behaviors across race/ethnicity, grade level in school and gender (CDC, 2010). Sun protection practices in children and adolescents fall well below national recommendations (Coogan, Geller, Adams, Benjes, & Koh, 2001; CDC, 2010). The Centers for Disease Control and Prevention (2013) has the following recommendations to reduce skin cancer risk:

- 1 Seek shade, especially during midday hours.
- 2 Wear clothing to protect exposed skin.
- 3 Wear a hat with a wide brim to shade the face, head, ears, and neck.
- 4 Wear sunglasses that wrap around and block as close to 100% of both UVA and UVB rays as possible.
- 5 Use sunscreen with sun protective factor (SPF) 15 or higher (with both UVA and UVB protection).
- 6 Avoid indoor tanning.

Despite sunscreen use being the most frequent method of sun protection only 17% of white adolescents report that they use sunscreen always or most of the time (Jones & Saraiya, 2006). A recent study conducted by Weir et al. (2011) found that “up to 37% of non-Hispanic

White (NHW) female adolescents and 11% of NHW male adolescents have used tanning booths at least once in their lifetimes and approximately 11% of adolescents report using a tanning bed in the past year” (Weir et al., 2011, p. S38.e10). In 2005, the World Health Organization designated ultra-violet tanning equipment to be carcinogenic (International Agency for Research on Cancer [IARC] Working Group, World Health Organization, 2005). The rising popularity of tanning salons and tanning beds, however, persists. Out of the millions of newly diagnosed skin cancers, many could be prevented by reducing excessive intermittent exposure to the sun and to artificial light from tanning beds, tanning booths, and sun lamps (ACS, 2013; NCI, 2012). The National Cancer Institute’s *Cancer Trends Progress Report – Update 2011/2012* states that key behaviors for reducing the odds of developing melanoma skin cancer include: avoiding sunburns and intermittent high intensity exposure to UVR (NCI, 2012).

Differences in incidence rates by site on the body, stage of cancer at the time of diagnosis, and the relatively early age of onset of skin cancers in adolescents and young adults age 15-39 years is indicative of “excessive, intermittent UVR exposure” rather than late-onset melanomas which may be more reflective of intermittent lifelong sun exposures (Weir et al., 2011, p. S38.e8). This suggests that early life factors are important in the etiology and prevention of cancer (Weir et al., 2011). Shoveller, Lovato, Young and Moffat (2003) found that preventing sunburns early in life, during childhood and adolescence, is an important risk factor to address in reducing future melanoma and basal carcinomas. The annual incidence rate of melanoma among young women increased by 50%, from 9.4 cases to 13.9 cases per 100,000 women between 1980 and 2004 (Purdue et al., 2008). In the last 30 years, the number of women under age 50 diagnosed with basal cell carcinoma has more than doubled; and the

incidence of squamous cell carcinoma among women under age 40 has increased almost 700% (Christenson et al., 2005).

The incidence of cutaneous melanoma is increasing internationally in light-skinned populations (Weir et al., 2011). Risk factors for melanoma include a family history of the disease, physical characteristics of the individual – particularly fair skin, nevi, moles, and excessive exposure to ultraviolet radiation (Pawlak et al., 2012). The association between socioeconomic status and skin cancer is also well-documented (Van Hattem et al., 2009). In addition to environment and genetic factors, several studies have concluded the association of socio-economic status and skin cancer. Aase and Benthem (1996) identified “the most striking feature of the epidemic of malignant melanoma is its association with changing behavior and socio-economic conditions” (Aase & Benthem, 1996, p. 1621). Kerkpatrick, Lee and White (1990) found that risks are elevated for people with higher socio-economic status. Lee et al. (1992) found that risks were also elevated for those with higher educational levels. Gallagher et al. (1987) in a study of 261 male melanoma patients, found a strong positive univariate association between socioeconomic status and risk of melanoma. Lee and Strickland (1980) found the incidence and mortality from skin cancer in whites to be strongly influenced by socio-economic conditions, even when analysis controlled for outdoor versus indoor work setting.

Purpose of the Study

The primary purpose of this study is to investigate high school adolescents’ sun-tanning and sun-protective behaviors through a theoretical framework of psychosocial constructs to include (a) situation, (b) outcome expectations, (c) outcome values, (d) reinforcements, (e) self-efficacy, and (f) reciprocal determinism. The second purpose is to identify which of these

constructs predict sun-tanning and sun-protective behaviors among high school adolescents. The third purpose is to determine if differences in predictors of sun-related behaviors exist among high school adolescents' based on the demographic variables (a) gender, (b) age, (c) race/ethnicity, (d) skin phenotype, and (e) socio-economic status. Measurement of self-reported sun-tanning attitudes and behaviors and determining which factors influence sun-tanning behavior the most will allow the researcher to identify key linkages between and among factors contributing to risk and protective behaviors. Findings should broaden knowledge about influences to adolescent sun-related risk behaviors and may enlighten future intervention research in areas such as harm reduction, social norms, and self-efficacy/skill building for sun-protective behaviors.

Research Design

This research study will utilize a cross-sectional, descriptive research design. Demographic variables include (a) gender, (b) age, (c) race/ethnicity, (d) skin phenotype, and (e) socio-economic status. Independent variables include (a) situation, (b) outcome expectations, (c) outcome values, (d) reinforcements, (e) self-efficacy, and (f) reciprocal determinism. A social desirability scale will also be used as a covariate for analysis to help control for potential respondents' bias in self-reporting behaviors in a way thought to be more favored by others (Nolte, Elsworth, & Osborne, 2013; Haghghat, 2007; Johnson & Fendrich, 2002). Social desirability bias may attenuate the predictive validity of self-reported questionnaire responses and such use of measures to control social desirability bias is now standard practice (Paulhus, 1981; Nolte et al., 2013; Haghghat, 2007; Johnson & Fendrich, 2002). The dependent variables include use frequency for (a) artificial/sunless tanning lotion, creams or gels, (b)

artificial/sunless spray tanning, (c) sun-tanning beds or lamps, and (d) outdoor sun-tanning. Two dependent variables represent health risk behaviors associated with an increase in incidence of melanoma. Two other dependent variables represent harm-reduced behaviors that may offer promise as an alternative option for those seeking the appearance of tan but also offering a reduction in behaviors known to be associated with melanoma.

Research Questions

1. What are adolescents' sun-tanning and sun-protective behaviors?
2. Which factors predict sun-tanning behaviors among high school adolescents?
3. Which factors predict sun-protective behaviors among high school adolescents?
4. Do differences in sun-related behaviors exist among groups with different demographic characteristics?

Method

Sample. A convenience sample of high school students from Jackson County in Illinois will be invited to participate in the study. An invitation letter introducing the study and a parent/guardian consent form will be sent home with students one week prior to the planned administration date. Students returning a signed parent/guardian consent form by a designated date authorizing participation, and who are present on the scheduled data collection date, will be allowed to participate in the study.

Data Collection. A self-report paper and pencil survey consisting of 56 ordinal (Likert-type) scaled items, five demographic variables, and a four question validated social desirability scale will be administered according to procedures approved by the Office of Sponsored

Projects Administration, an institutional review board at Southern Illinois University Carbondale.

Data Analysis. Participant responses will be analyzed to identify sun-tanning and sun-protective behaviors, to determine which independent variables are the strongest predictors of participants' sun-tanning and sun-protective behaviors, and to determine if differences in predictors exist among adolescents' sun-tanning and sun-protective behaviors based on age, gender, and race/ethnicity, skin phenotype, and socio-economic status variables. Descriptive statistics will be compiled to characterize the participant sample. The Statistical Package for the Social Sciences (PASW/SPSS 19.0) will be used to conduct factor analysis. An alpha level of .05 will be used to assess the statistical significance of findings.

Assumptions

For this study, the following assumptions are made: (a) the survey instrument is valid and reliable for this participant sample, (b) participants understand the survey instructions and items, (c) participants answer survey items honestly, and (d) participants answer survey items accurately.

Limitations

For this study, the following limitations are acknowledged: (a) participants may have limited recall or recall bias; (b) participants were recruited in a specific geographic area so results may not be generalizable for all other geographic regions and students throughout the United States; (c) the time of year that the study is conducted may affect self-perceptions of sun-tanning behavior.

Delimitations

For this study, the following delimitations are controlled by the researcher: (a) high school students are invited to participate in the study, (b) the study utilizes self-reported perceptions and behaviors, (c) pre-existing scales and instrument items are adapted for measuring the variables of interest.

Definition of Terms

Actinic keratosis. A scaly or crusty growth (lesion), most often appearing on areas of the body frequently exposed to the sun such as bald scalp, face, ears, lips, backs of the hands, forearms, shoulders, and neck. (Skin Cancer Foundation, 2014, www.skincancer.org).

Adolescent. Persons 12-19 years old are classified as adolescents (National Health and Nutrition Education Survey, 2007).

Basal cell carcinoma. Skin cancer that forms in the lower part of the epidermis (the outer layer of the skin) is called basal cell carcinoma (NCI, 2012). The most common form of skin cancer, usually found on the face, neck, and hands, considered highly treatable and rarely spreads to other places on the body (NCI, 2012).

Benign. A mass of cells that is harmless, non-cancerous.

Carcinogenic. A substance or agent that produces a cancer.

Carcinoma. A malignant tumor that forms in epithelial cells which line internal and external surfaces of the human body.

Cancer. A term used for diseases in which abnormal cells divide without control and are able to invade other tissues (NCI, 2012).

Cutaneous. Of or relating to the skin.

Dermis – the middle of three layers of the skin.

Dihydroxyacetone (DHA). A color additive that reacts with amino acids in the skin's surface to produce a darkened appearance (U.S. Food and Drug Administration, 2006). The color additive is listed in the Federal Food, Drug, and Cosmetic Act as external application only for imparting color to the human body (FD&C Act, Section 721, year).

Dysplastic nevus mole - Atypical moles which are usually benign but may resemble melanoma. Presence of these moles indicates increased risk of developing melanoma (Skin Cancer Foundation, 2014, www.skincancer.org).

Epidermis - the top layer of skin, comprised of flat cells (NCI, 2010).

Harm-reduction – an approach to behavior change intervention which includes practical strategies and ideas aimed at reducing negative consequences associated with specific behaviors.

In situ. Cells stay in place and do not spread (NCI, 2010).

Lymphomas. A type of cancer that begins in the lymphocyte cells of the immune system; also called non-melanoma cancer.

Malignant. Cancerous; tumor that is dangerous, invasive and can spread to other parts of the body.

Melanocytes – Skin cells that make pigment (NCI, 2012).

Melanoma. Skin cancer that forms in melanocytes (skin cells that make pigment) (NCI, 2012). Most dangerous form of skin cancer, can develop anywhere on the body (the legs, arms and trunk are most common sites); highly treatable if detected early but spreads rapidly to other organs (most commonly lungs and liver).

Metastasis - Tumor that has spread from the place where it first started to another place in the body.

Phenotype - The observable expression of specific traits, such as hair or eye color, and skin pigmentation based on genetic and environmental influences.

Psychosocial. The interaction of one's psychological development and social environment

Reciprocal determinism. Referring to the mutual influence among personal factors such as thoughts, attitude and behaviors with the physical and social environment.

Risk factors. Behaviors or conditions that are known correlates with an increased chance of developing a disease or infection.

Skin Cancer. Cancer that forms in the tissues of the skin (NCI, 2012).

Social Norms. Lewis, DeVellis, and Sleath (2002) describe social norms in two different categories. Descriptive social norms refer to the way most people act or the usual and customary ways of behaving. Injunctive social norms are normative values and beliefs that indicate what types of behavior others approve or disapprove of in a given situation.

Squamous cell carcinoma. Skin cancer that forms in squamous cells (flat cells that form the surface of the skin) is called squamous cell carcinoma. (NCI, 2012). The second most common type of skin cancer; usually develops in places on the body exposed to the sun (ears, face, and mouth), if untreated can spread quickly to other areas such as the lymphatic system, bloodstream and nerve routes (NCI, 2012).

Sun lamp, tanning booth, and tanning beds. Devices that emit ultraviolet radiation to produce a cosmetic tan. Use fluorescent lights with phosphor blends that produce light in a spectrum similar to the sun.

Sunless tanner. Products that provide a suntanned appearance without exposure to ultraviolet radiation; usually through use of the color additive ingredient Dihydroxyacetone (DHA). Neither the U.S. Food and Drug Administration or laws enforced by the FDA define the term sunless tanner explicitly (U.S. Food and Drug Administration, 2006).

UVA. An abbreviation for ultraviolet A (long-wave light rays). UVA contributes to premature skin aging (wrinkling), eye damage and skin cancer by damaging keratinocytes in both the squamous and basal skin layers. Approximately 95% of the UVR reaching the earth's surface are UVA (Skin Cancer Foundation, 2014).

UVB. An abbreviation for ultraviolet B (short-wave light rays). UVB is responsible for damage such as tanning, redness and sunburn in the epidermal (more superficial) skin layers, contributing to skin cancer and premature skin aging. The intensity of UVB rays are stronger between the hours of 10 AM and 4 PM in the U.S. (Skin Cancer Foundation, 2014).

UVR. An abbreviation for ultraviolet radiation. UVR is the part of the electromagnetic spectrum (light) that reaches earth from the sun. It is invisible to the naked eye (Skin Cancer Foundation, 2014). UVR damages cells, producing genetic mutations that contribute to melanoma, the deadliest form of skin cancer (Skin Cancer Foundation, 2014).

Summary

Chapter 1 provided background information about the purpose and scope of this study, and provided background regarding trends of skin cancer and intentional UVR exposure in

adolescents. Rationale was provided for further investigation into adolescents' sun-tanning and sun-protective attitudes and behaviors. A cross-sectional descriptive research design was proposed to collect self-reported health behavior data related to sun-tanning and sun-protective influences.

CHAPTER 2 REVIEW OF LITERATURE

Background

Chapter 2 provides a brief clinical background about skin cancer and a review of literature pertinent to adolescents' sun-tanning and sun-protective behaviors.

Recommendations for sun-protective practices are identified, correlates of sun-tanning activity are described, and supporting research furthering health promotion and harm-reduction strategies is provided. This chapter also presents the theoretical framework from which psychosocial constructs (study predictors) were derived.

Purpose of the Study

The primary purpose of this study is to investigate high school adolescents' sun-tanning and sun-protective behaviors through a theoretical framework of psychosocial constructs. The second purpose of this study is to identify which psychosocial constructs predict sun-tanning and sun-protective behaviors among high school adolescents. The third purpose is to determine if differences in sun-related behaviors exist among high school adolescents with different demographic characteristics.

Clinical Background

Skin cancer is the most common of all cancer types in the United States. The National Cancer Institute (2010) identifies the three most common types of skin cancer as melanoma, basal cell carcinoma, and squamous cell carcinoma. Basal cell carcinoma is the most common, squamous cell carcinoma is the second most common, and melanoma is the most deadly form

of skin cancer in the U.S. (Skin Cancer Foundation, 2013). The type of cancer is usually named for the type of cell it originates in.

Anatomy of the Skin

Skin is the largest organ of the body, offering protection from injury and infection, regulating body temperature through water and fat storage, and protecting the body from damage caused by ultraviolet radiation (NCI, 2010). Skin also makes vitamin D when exposed to sunlight. The body then converts vitamin D into a hormone called “activated vitamin D” or “calcitriol” which aids the absorption and metabolism of calcium and phosphorus in the body. The skin has two main layers. The epidermis, the top layer, is comprised of flat cells called squamous cells. Deeper into the epidermis, below the squamous cell layer, are round cells called basal cells (NCI, 2010). Scattered among the basal cells, still within the epidermis layer are additional cells called melanocytes. Melanocytes are responsible for making pigment or color called melanin in the skin (Marieb, 1992). When skin is exposed to ultraviolet radiation, melanocytes are stimulated to make more melanin causing the skin to darken (Marieb, 1992). The second main layer of the skin lies beneath the epidermis and is called the dermis. The dermis layer contains blood and lymph vessels, and glands such as sweat and sebum which help regulate (cool) body temperature and keep skin from drying out. Both sebum and sweat glands secretions reach the surface of the skin through pores (NCI, 2010).

Etiology of Skin Cancer

Cancer begins in cells, the building blocks of body tissue (NCI, 2010). Normal cells grow and divide as the body needs them to replace old or damaged skin cells. Cancer is a class of diseases characterized by abnormal or out of control cell growth and division (ACS, 2013). For

example, when more new cells than the body needs are formed or old and damaged cells don't die, cells build up and form a mass of tissue called a tumor. Tissue growths on the skin can be non-cancerous (benign) such as moles or malignant (cancerous) such as melanoma, basal cell cancer, or squamous cell cancer (NCI, 2010). Skin cancer can invade normal cells nearby and can spread to other areas of the body. The spread of cancer cells is called metastasis. When the cells stay in place, it is called in situ (ACS, 2013).

Types of Skin Cancer

Melanoma. Melanoma begins in the melanocytes (pigment cells) and can occur on any skin surface. In men, it is most often found on the head and neck, between the shoulder blades, and on the trunk area (between the shoulders and the top of the hips). This type of cancer is rare in people with darker skin. Melanoma is more likely than other skin cancers to spread to other areas of the body.

Basal cell. Basal cell cancer begins in the basal cell layer of the epidermis. This type of cancer is most often found on the face and is the most common type of skin cancer in people with fair skin (NCI, 2010). Basal cell skin cancer rarely spreads to other areas of the body.

Squamous cell. Squamous cell skin cancer begins in the squamous cells, located in the very top layer of the epidermis. In people with dark pigmented skin, squamous cell skin cancer is the most common type and is most often found on the body in places that are not exposed to the sun. In people with fair pigmented skin, squamous cell skin cancer most often occurs on parts of the skin with the most exposure to the sun such as the head, face, ears, and neck.

Risk Factors

Risk factors are characteristics or behaviors that increase the chance of getting a disease. Risk factors for melanoma include a family history of the disease; physical characteristics of the individual such as particularly fair skin, nevi, moles; and excessive exposure to ultraviolet radiation (Pawlak et al., 2012). The NCI (2010) identifies risk factors for the three most common types of skin cancer. The primary risk factor for skin cancer is exposure to ultraviolet radiation through sunlight. Exposure factors contributing to risk include the number and severity of sunburns, lifetime sun exposure, sun-tanning (both natural sunlight and artificial UV radiation from sunlamps/tanning booths) and excessive exposure to UVR causing skin damage that can lead to cancer (Pawlak et al., 2012, NCI, 2010). Personal and family history of skin cancer and certain physical characteristics of the individual increase risk of developing skin cancer. Pale or fair skin that burns easily, blue or gray eyes, red or blond hair, and having freckles all increase the risk for developing skin cancer. Finally, certain medical conditions or medications may increase the risk of skin cancer by making skin more sensitive to ultraviolet radiation. This photosensitivity, or abnormal response of the skin to sunlight and artificial UVR sources, has been observed in people with certain medical disorders or those taking particular medications. For example, organ transplant patients and others on immune-suppressing therapies may be more at risk for developing skin cancer (Karagas, 2010). Patients with chronic conditions such as arthritis and systemic lupus erythematosus may be more sensitive to UVR. Sarnoff, Saini, and Handel (2014) identify oral medications such as antiarrhythmics, antibiotics, antifungals, NSAIDS, diuretics, herbal anti-depressants such as St.

John's Wort, and topical medications such as retinoids, antineoplastics, and furocomarins as photosensitivity triggers thus increasing skin cancer risk.

Risk factors vary slightly by specific types of skin cancer. Risks for melanoma include having more than fifty common moles, or presence of a dysplastic nevus mole in which the color, surface and border vary from a common mole. For example, a dysplastic nevus mole is larger than a common mole, may have a mixture of colors, irregular edges, and have a slightly scaly or pebbly surface. Risk factors specific to both basal and squamous cell skin cancers include presence of scars, burns, ulcers or other areas of inflammation on the surface of the skin, exposure to arsenic, and radiation therapy. Two additional risk factors for squamous cell cancer include actinic keratosis, a scaly growth on the skin which may appear as a pink, red or brown patch especially on the face or back of the hands; and certain types of human papillomavirus (HPV). These HPV's are different from the HPV types that cause cervical and other female and male genital cancers (NCI, 2010). Karagas (2010) conducted a study of 1561 people observing that people with squamous cell carcinomas tended to have been infected with more cutaneous HPV types than those who did not have skin cancer. There is also evidence that people on long-term steroid medications for chronic conditions such as rheumatoid arthritis and asthma may be at higher risk for HPV-associated skin cancer (Karagas, 2010).

Non-modifiable risk factors increase relative risks for melanoma from 1.4 to 11.0 times, and behavioral risk factors such as intentional exposure to UV light through outdoor sun-tanning and indoor tanning bed use, increase relative risk of melanoma by 1.8 times (Pawlak et al., 2012; Newton & Bishop, 2008). Boniol, Autier, Boyle and Gandini (2012) conducted a meta-

analysis to determine the relative risk for skin cancer attributable to sunbed use specifically. They confirmed the risk of melanoma is doubled when initial sunbed use occurs before age 35, and there is a dose-response relationship for tanning bed use which showed a 1.8% increase in the risk of melanoma for every one additional tanning bed session per year (Boniol et al., 2012). Indoor tanning is also associated with non-melanoma skin cancers. Wehner, Shive, Chren, Quershi, and Linos (2012) determined that people who reported having ever used a tanning bed had at 67% higher risk of squamous cell carcinoma and a 29% higher risk of basal cell carcinoma than those who had never used an indoor tanning bed.

Public Health Concerns

The American Cancer Society (2014) indicates that an estimated 76,100 new cases of malignant melanoma are expected to be diagnosed in 2014. While survival rates with melanoma have increased, from 49% in 1950 – 1954 to 92% in 1996-2003 respectively, the incidence rate continues to rise faster than many of the most common cancers (Ries et al., 2010). It is estimated that nearly 9,710 of the newly diagnosed melanomas will result in death and many more in lost quality of life and health (ACS, 2014). The annual estimated direct cost of melanoma treatment in the United States is \$2.36 billion to \$2.9 billion (NCI, 2011; Jemal et al., 2009).

Healthy People 2020

The HHS *Healthy People 2020* (2011) is a framework of goals and objectives for improving the Nation's health. It is a compilation of 10-year goals and objectives for health promotion and disease prevention designed to focus national efforts and actions toward common public health prevention priorities (HHS, 2011). The newest framework includes four

overarching goals (a) attain high-quality, longer lives free of preventable disease, disability, injury, and premature death; (b) achieve health equity, eliminate disparities, and improve the health of all groups; (c) create social and physical environments that promote good health for all; and (d) promote quality of life, healthy development, and healthy behaviors across all life stages (HHS, 2011). To measure progress toward desired goals, four general metrics corresponding to these areas have been developed. These include (a) measures of general health status, (b) health-related quality of life and well-being; (c) determinants of health and (d) disparities.

Under each of these general metrics, disease specific targets have also been established. Cancer is one of the specific topics addressed in HHS *Healthy People 2020* (2011). The 10-year goal is to reduce the number of new cancer cases, as well as related illness, disability and death caused by cancer. Specifically the skin cancer target is to decrease by 10% from 2.7 to 2.4 the number of melanoma cancer deaths per 100,000 population by the year 2020 (2007 rates age adjusted to the year 2000 standard population). Table 1 below identifies additional HHS *Healthy People 2020* (2011) objectives specifically related to skin cancer.

Table 1

Healthy People 2020 Objectives Related to Skin Cancer

Objectives	Description
C-20	Increase the proportion of persons who participate in behaviors that reduce their exposure to harmful ultraviolet (UV) irradiation and avoid sunburn
C-20.1	(Developmental) Reduce the proportion of adolescents in grades 9 through 12 who report sunburn
C-20.2	Reduce the proportion of adults aged 18 years and older who report sunburn
C-20.3	Reduce the proportion of adolescents in grades 9 through 12 who report using artificial sources of ultraviolet light for tanning
C-20.4	Reduce the proportion of adults aged 18 and older who report using artificial sources of ultraviolet light for tanning
C-20.5	Increase the proportion of adolescents in grades 9 through 12 who follow protective measures that may reduce the risk of skin cancer
C-20.6	Increase the proportion of adults aged 18 years and older who follow protective measures that may reduce the risk of skin cancer

Note. Adapted from U.S. Department of Health and Human Services. Healthy People 2020 (2011, June 29). *Topics and objectives*. Retrieved from <http://healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicid=1>.

Prevention

The best way to prevent skin cancer is to protect skin from ultraviolet radiation (NCI, 2012; Riker et al., 2010). Out of the 3.5 million cases of non-melanoma skin cancer and nearly 77,000 cases of melanoma diagnosed in the U.S. each year, many could be prevented by reducing excessive intermittent exposure to the sun and to artificial light from tanning beds, tanning booths, and sun lamps (ACS, 2014; NCI, 2010). The National Cancer Institute's *Cancer Trends Progress Report – Update 2011/2012* states that “avoiding sunburns, intermittent high intensity exposure, and other damage from these sources...reduces the chances of getting melanoma skin cancer” (NCI, 2012, prevention section, para.4).

Recommendations for Sun Protection

The Centers for Disease Control and Prevention (2013) has issued recommendations for protection from UV radiation. The six general CDC recommendations, shown in Table 2, include UVR avoidance, use of protective clothing and broad spectrum sunscreen use.

Table 2

CDC Recommendations for Sun Protection

Category	Recommendation
UVR Avoidance	seek shade during midday hours (between 10 a.m. and 4 p.m. daylight savings time or 9 a.m. to 3 p.m. standard time in the continental U.S.
UVR Avoidance	avoid indoor tanning
Protective Clothing	wear clothing to protect exposed skin
Protective Clothing	wear a hat with a wide brim that shades the face, head, ears, and neck
Protective Clothing	wear sunglasses that wrap around and block as close to 100% of both UVA and UVB rays as possible
Sunscreen	use sunscreen with sun protective factor (SPF) 15 or higher, and both UVA and UVB protection

Note. Adapted from Centers for Disease Control and Prevention. *Skin Cancer: Prevention.* (2013, July 26). Division of Cancer Prevention and Control, National Center for Chronic Disease Prevention and Health Promotion. Retrieved from http://www.cdc.gov/cancer/skin/basic_info/prevention.htm.

Prevalence

Sun-tanning Practices

Approximately 90% of non-melanoma skin cancers are associated with ultraviolet radiation (UVR) exposure from the sun (Pleasant et al., 2010; Koh, Geller, Miker, Grossbat, & Lew, 1996). About 65% of melanoma cases can also be attributed to ultraviolet radiation from the sun (NCI, 2012). Indoor UVR delivered by tanning beds and sun lamps is even more damaging. Some estimates are that ten minutes in a sun-tanning bed or booth is equivalent to the same amount of time and cancer-causing effects of the Mediterranean summer sun (World Health Organization, 2010).

Ultraviolet radiation, delivered by tanning equipment, is known to cause cancer in humans (IARC, 2005). In 2009, the International Agency for Research on Cancer, an affiliate of the World Health Organization, included UV tanning devices in the list of Group 1 carcinogens, the most dangerous cancer-causing substances (IARC Working Group, World Health Organization, 2009). Group 1 carcinogens also include agents such as plutonium, cigarettes, and solar UV radiation. The rising popularity of tanning salons however, persists. Those people who begin using a tanning bed younger than age 35 have a 75% higher risk of melanoma (IARC Working Group, World Health Organization, 2007).

Despite increased public awareness (Fu et al., 2004) of the harms of intentional UVR exposure, the frequency of sunburns, tanning bed usage and high-risk sun-related practices are common among children and adolescents. The indoor tanning industry is estimated to be a \$5 billion enterprise with an estimated 28 million Americans having used these facilities. About one million visits to indoor tanning facilities occur each day in the U.S. (Lazovich et al., 2008). According to the 2011 Youth Risk Behavior Surveillance System, the proportion of self-reported indoor tanning is 13% for all high school students, 29% of white high school girls, and 32% of girls in the 12th grade of high school (CDC, 2012). Robinson, Kim, Rosenbaum, and Ortiz (2008) report the use of indoor tanning beds increased substantially in the United States from around 1% in 1988 to 26% in 1994, and 27% in 2007 respectively. Among 9th through 12th grade students nationwide, the prevalence of indoor tanning did not change significantly from 15.6% in 2009 to 13.3% in 2011 (CDC, 2012).

Sun-protective Practices

The National Health Interview Survey and the Behavioral Risk Factor Surveillance System data continue to show that sun-protective behaviors are less prevalent than sunburn and intentional sun exposure (Hall et al., 2003; Saraiya, Hall, & Uhler, 2002; CDC, MMWR, 2012). Only about one-third of those surveyed were very likely to use sunscreen, wear protective clothing or to use shade. These rates have remained consistent since the early 1990s (Glanz et al., 2008). The CDC and the National Cancer Institute analyzed data from the NHIS for the timeframe from 2000-2010. Their findings showed an increase in sunscreen use, shade use, and use of protective clothing among 18-29 year olds but no decrease in the proportion of people who reported having had a sunburn in the past 12 months (CDC, 2012). The percentage of all adults who reported having had at least one sunburn in the past 12 months was 50.1%, with whites reporting 65.6% (CDC, 2012).

In a 2011 study reviewing national surveys and case studies in three different states in the U.S. to determine the prevalence of sunburn, sun protection and indoor tanning, Buller et al. (2011) reported that about three in ten adults reported routinely using sun-protection such as sunscreen, long-sleeved shirts and hats. Sixty-nine percent of adolescents reported sunburns in the previous summer and less than 40% reported practicing any type of sun protection. The 2011 Youth Risk Behavior Survey (YRBS) found wide variance in the prevalence of sun-protection behaviors across race/ethnicity, grade level in school and gender (CDC, 2012).

Sunless tanning products containing Dihydroxyacetone (DHA) are approved for external use by the U.S. Food and Drug Administration (U.S. Food and Drug Administration, 2014). DHA is a color additive that reacts with amino acids in the skin's surface to produce a darkened

appearance (U.S. Food and Drug Administration, 2014). The color additive is regulated as a cosmetic, similar to other types of makeup through the Federal Food, Drug, and Cosmetic Act (FD&C Act, Section 721, 2014). The additive produces a temporary effect and washes off over time. Currently, the FDA has only approved application of DHA to external parts of the body, not including lips, eyes or other body surface covered by mucous membranes. Safety data regarding DHA from other exposure routes such as misting or spray tanning has not been provided to the FDA for review and evaluation and is thus not currently approved by the FDA (U.S. FDA, 2014). Users of spray tanning should avoid exposure in a manner for which DHA is not approved. This includes ensuring protection from internal exposure via inhalation, ingestion, or contact with mucous membranes (U.S. FDA, 2014).

In 2005, the Health Information National Trends Survey (HINTS) study found that 11% of adults used sunless tanning products (a non-UV alternative to sun-tanning) in the past year and one-quarter of them used sunless tanning products more than ten times (Buller et al., 2011; NCI, 2007). Sun-related studies with adolescents have collected information about sunburns, sunscreen and protective clothing use, but have not explored non-UV sunless-tanning to much extent. Findings from the few studies that have examined sunless tanning are mixed. Cokkinides et al. (2010) and Brooks et al. (2006) identified use of sunless tanning products to be associated with a higher frequency of sunburn and indoor tanning bed use, but not with routine use of sunscreen. In contrast, Stryker, Yaroch, Moser, Atienza and Glanz (2007) found higher sunscreen usage rates by those who also used sunless tanning products, suggesting sunless tanning is associated with other sun protective behaviors. Literature about the use of sunless tanning products as a harm-reduction strategy is limited but seems to support its potential.

Sheehan and Leshner (2005) explored the extent to which sunless tanning altered pre-existing sun-tanning habits. They found that 73% of people in the study who received a sunless spray tan reported a decrease in their UVR tanning since adopting sunless tanning (7% reported having increased tanning booth use). Pagoto et al. also determined an intervention promoting sunless tanning as an alternative to UVR tanning “had a short-term effect on sunbathing, sunburns, and use of protective clothing and a longer-term effect on sunbathing and sunless tanning” (Pagoto et al., 2010, p.979).

Demographics

The American Academy of Dermatology has researched correlates of sun-tanning behavior and determined demographic factors may influence both sun-tanning and sun-protective behaviors (Heckman & Coups, 2011). The Centers for Disease Control and Prevention evaluated trends in sunburn and sun-protective behaviors among person age 18-29 via data collected through National Health Interview Survey (CDC, 2012). The 2010 NHIS results indicated numerous demographic factors such as age, race/ethnicity, gender and socio-economic status may relate to incidence rates of skin cancer. Assessing sun-related behaviors and measuring progress toward the HHS *Healthy People 2020* (2011) goals may be enhanced by considering demographic information about persons who participate in behaviors that increase or decrease exposure to UVR (CDC, 2012).

Age. According the 2011 Youth Risk Behavior Surveillance System (YRBS), 13% of all high school students reported indoor tanning in the previous twelve months. Weir et al. (2011) reported that approximately 11% of adolescents reported using a tanning bed in the past year (Weir et al., 2011). For women who used indoor tanning beds, the average use was 20.3

sessions per year. The number of sessions was higher among young women between 18 and 21 year old at an average of 27.6 sessions per year (CDC, 2012). Age also seems to be a factor in sunless tanning product use. Cokkinides et al. (2010) surveyed 1,600 adolescents between the ages of 11 and 18 regarding their use of sunless tanning products within the last year. Of the adolescents surveyed, 10.8% reported using sunless tanning products in the past year. Those who reported use of sunless tanning products tended to be older and female (Cokkinides et al., 2010). Cokkinides et al. (2010) also found that use of sunless tanning products by adolescents was independently correlated with risky UVR exposure behaviors.

Gender. According to the 2011 YRBS, 21% of high school girls reported indoor tanning in the previous twelve months (CDC, 2012). The 2010 National Health Interview Survey (NHIS) indicated that among non-Hispanic white adults who used indoor tanning devices in the past year 50% of women and 40% of men reported 10 or more sessions in the past year (CDC, 2012). The most common sun-protective behaviors among women responding to the 2010 NHIS were using sunscreen and staying in the shade; least common were wearing a wide-brimmed hat and wearing a long-sleeved shirt (CDC, MMWR, 2012). Among men, the most common protection from the sun was wearing long clothing (to the ankles) and seeking shade (CDC, MMWR, 2012). There have been no significant changes observed in use of sunscreen, wearing a long-sleeved shirt or wearing a wide-brimmed hat by men between 2000 to 2010 (CDC, MMWR, 2012). There were also no significant difference in prevalence of sunburn between adult men and women with about half of both groups reporting having had a sunburn within the prior twelve month period (CDC, MMWR, 2012). Weir et al. (2011) found that “up to 37% of non-Hispanic

White (NHW) female adolescents who used tanning booths at least once in their lifetime was 37% compared to 11% of NHW male adolescents.

Race/ethnicity. According to the NHIS, roughly one-third of non-Hispanic white women between the age of 18 and 21 reported indoor tanning device use in the past year (CDC, 2012). These rates were higher still for non-Hispanic white women residing in the Midwest with 44% reporting indoor tanning device use in the past year (Cokkinides et al., 2006). Of the non-Hispanic white women who reported indoor tanning device use in the past year, an average of 28 sessions were reported.

Data from the 2010 NHIS regarding sun-protective behaviors indicated white women were less likely to report shade use and black women were less likely to report using sunscreen than persons of other races or Hispanic ethnicity (CDC, MMWR, 2012). Among adult men, no significant differences in protective behaviors were observed across racial or ethnic groups (CDC, MMWR, 2012). Sunburn prevalence was observed to be highest among white adults at about 66% (CDC, MMWR, 2012). Sunscreen is the most frequent method of sun protection by white adolescents with 17% reporting that they use sunscreen always or most of the time (Jones & Saraiya, 2006).

Skin Phenotype. Phenotype is the expression of specific genetic traits, for example skin and hair color. People with more highly pigmented (darker) skin have a lower incidence of skin cancers than people with light pigmented skin. The association between the prevalence of skin cancer and certain phenotypes has been established. Pale or fair skin that burns easily, blue or gray eyes, red or blond hair, and freckles are risk factors for skin cancer. The Fitzpatrick Scale (1988) is a quantitative classification schema for the color of skin as a way to classify and study

the response of different types of skin to UVR. It remains a recognized tool for classification in dermatologic research. Fitzpatrick skin type I or II are shown to have increased risk of skin cancer (Gon & Minelli, 2011).

Table 3

Fitzpatrick skin types

Skin Type	Skin Color	Characteristics
I	White, very fair, red or blond hair; blue eyes; freckles	Always burns, never tans
II	White, fair, red or blond hair; blue, hazel or green eyes	Usually burns, tans with difficulty
III	Cream white; fair with any eye or hair color (common)	Sometimes mild burn, gradually tans
IV	Brown; typical Mediterranean Caucasian skin	Rarely burns, tans with ease
V	Dark Brown; mid-eastern skin types	Very rarely burns, tans easily
VI	Black	Never burns, tans very easily

Note. Adapted from Fitzpatrick, T.B. (1988). The validity and practicality of sun reactive skin types I through IV. *Archives of Dermatology*. 124; 869-871.

Socio-economic status. The association between socioeconomic status (SES) is well-documented for malignant melanoma (Van Hattem et al., 2009). Higher SES is associated with the development of skin cancers, specifically malignant melanoma (Aase & Bentham, 1996; Braaten, Weiderpass, Kumle, & Lund, 2005; Lee & Strickland, 1980; Gallagher et al., 1987; Kogevinas, 1997; Hausauer, Swetter, Cockburn, & Clarke, 2011). Risks are also elevated for people with more education (Lee & Strickland, 1980) and high socio-economic status (Kirkpatrick, 1990). Lee and Strickland (1980) determined that the incidence and mortality from malignant melanoma in whites is strongly influenced by socio-economic conditions without any notable increase in outdoor workers when compared with indoor workers from similar SES

groups. Van Hattem et al. (2009) found that high SES was also associated with increased incidence of basal cell carcinoma among men. Although basal cell carcinoma associated mortality is extremely rare, it often causes “considerable functional and cosmetic morbidity and costs because of the high prevalence” (Van Hattem et al., 2009, p. 840). Hausauer et al. (2011) assessed the relationship between melanoma incidence and SES in a longitudinal study including 3800 female participants aged 15-39 years. The researchers observed that women and girls “living in higher SES neighborhoods were diagnosed with melanoma 70% more often than those living in lower SES neighborhoods” even when residence-based exposures such as ambient UVR were considered (Hausauer et al., 2011, p.786). They determined that affluence was strongly linked to melanoma. The researchers suggested possible reasons including greater access to recreational and leisure time activities wealthier groups. For example, higher SES groups may be more likely to pursue activities involving intermittent, intense UV exposure such as sunny vacations, or high-altitude destinations in which UV exposure would be more intense. Minimal financial barriers to indoor tanning were also suggested as a possible reason for the findings. It follows that if parental educational level and income are associated with sun-tanning, an adolescent’s socioeconomic status may also influence his or her engagement in sun-related behaviors.

Adolescents. Adolescence has long been understood to be a period of transition during which multiple areas of social and biological growth and change are intertwined (Jackson-Newsome & Shelton, 2010). Steinberg (2007) notes adolescent biological development is embedded in the social world. Neural development in combination with environment creates a window of opportunity for a range of behaviors mediated by normative beliefs and life skills

(Calkins, 2009; Steinberg, 2007; Casey, Getz, & Galvan, 2008). Jackson-Newsome and Shelton (2010) suggest research to better understand the complexity of the normative processes occurring during adolescence. Understanding these key points of vulnerability holds promise for furthering prevention of adolescent risk behaviors.

Several studies identify adolescence to be a critical time in the development of sunbathing habits, normative beliefs and values about suntanned body images (Shoveller et al., 2003; George, Kuskowski & Schmidt, 1996; Newman, Argo, Woodruff, & Mayer, 1996; Oliphant, Forster, & McBride, 1994). Shoveller et al. (2003) conducted a grounded theory study with forty adolescents aged 12 to 16 years old to describe decision making related to sun-tanning. Shoveller et al. (2003) concluded that adolescence is an important time in the development of sun-related habits and norms about sun-tanning and body image. The prevalence of sunburns, particularly those experienced during childhood and early adulthood, is correlated with an increased risk of melanoma (Shoveller et al., 2003). Exposure to UV Radiation (UVR) is the most common avoidable cause of skin cancer (IARC, 2007). It follows then, that preventing excess UVR exposure through protective practices, especially during childhood and adolescence, is important in reducing the risk of developing skin cancer later in life (Shoveller et al., 2003; Gallagher et al., 1990; Rosso et al., 1996). More frequent sunburn and positive attitudes towards tanning and tanned skin, as well as having a social network who tans have been established in studies of European and U.S. adolescents and adults (Branstrom et al., 2010; Branstrom, Ullen, & Brandberg, 2004; Geller et al., 2002; Hall et al., 2003; Shoveller et al., 2003).

Intentional sun-tanning and indoor tanning behaviors continue to be prevalent among many young white adults and adolescents despite study participants' awareness that UVR exposure is a known risk factor for skin cancer (Geller et al., 2002; Lazovich et al., 2004; Cokkinides et al., 2006; Cokkinides et al., 2010). Heckman et al. (2012) studied adolescents' self-efficacy for sun-protective behaviors. They found low perceived control over skin protection practices. For example, participants reported they felt limited control over their skin protection despite being aware of their susceptibility to skin cancer and attempting to use sunscreens. Heckman et al. (2012) also reported that participants were not less likely to suntan than others despite heightened awareness about their susceptibility to skin cancer.

Studies exploring the use of sunless tanning products as an alternative for modification of risky UVR exposure behaviors have mixed findings. In 2004, Cokkinides et al. (2010) surveyed a nationally representative sample of 1600 adolescents aged 11 to 18 years old and their caregivers through random-digit telephone dialing, about their use of sunless tanning products. The self-reported prevalence of sunless tanning product use within the past year was 10.8%. Cokkinides et al. (2010) reported adolescent users of sunless tanning products were more likely to be older and female, to perceive a tanned appearance as desirable, to have a parent or caregiver who used sunless tanning products, and to hold positive beliefs or attitudes about the products. Cokkinides et al. (2010) also found however, that sunless tanning product use was not associated with the use of sunscreen, and was independently associated with risky UV radiation exposure-related behaviors such as indoor tanning and higher frequency of sunburns. People who use sunless tanning products were 2.61 times more likely to indoor tan. In contrast, Pagoto et al. (2010) found that an intervention promoting sunless tanning as an

alternative to UVR tanning “had a short-term effect on sunbathing, sunburns, and use of protective clothing and a longer-term effect on sunbathing and sunless tanning” (Pagoto et al., 2010, p.979). There remains opportunity to educate adolescents about the importance of avoiding indoor tanning, practicing sun-protective behaviors, and about sunless tanning products (Cokkinides et al., 2010).

Conceptual Framework

Interpersonal Models

Using an explicit theoretical foundation to explore health behavior is supported by a growing body of evidence (Glanz, Rimer, & Lewis, 2002). Using such a framework helps define parameters and methods of study, more effectively tailor interventions, and evaluate outcomes. A key feature of interpersonal models is the assumption that individuals’ interaction with their environments is a determinant of their health behaviors and ultimately their health outcomes. Many sources of influence act upon and interact with individuals as they navigate through their environments to gain information, skills, self-confidence, competency and coping skills (Lewis et al., 2002). Biopsychosocial models and Social Cognitive Theory share essential features making them complimentary in studying adolescent health behavior. Both examine how person (including biology, personality and social desirability), behavior and environment (including peer influence) work together to result in a health behavior.

Biopsychosocial Models

Biopsychosocial models in general are conceptual models relevant to the study of health behaviors. Engel, who originally posited the paradigm in 1977, said that biological,

psychological and social factors all make significant contributions to human functioning as related to health or illness. Similar to Bandura's (1986) concept of reciprocal determinism, the model emphasizes the integration of factors and the need to account for their interaction. Originally, the concept was presented as an alternative to the prevailing biomedical model in which health was thought largely a biologic condition. Engel (1977) proposed the model as a more inclusive perspective in which psychological and social factors were also considered. The concept is applicable to many fields of study as a philosophical paradigm for whole-person wellness or mind-body connection concepts, as well as in the consideration of social-determinants of health such as poverty on observed health outcomes. Although McLaren (2002) argues there is no published single definitive, irreducible model, a figure of the widely accepted components is shown below.

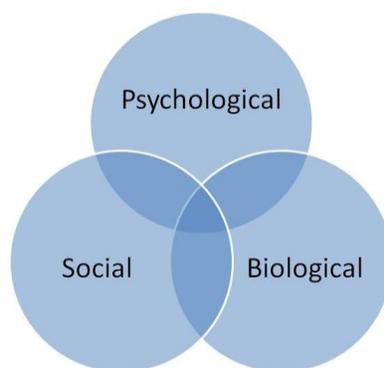


Figure 1. General Biopsychosocial Model

According to Irwin and Millstein (1986), the biopsychosocial model can be useful in conceptualizing adolescent health behaviors and risk taking and is applicable to intervention design. Irwin and Millstein (1986) examined how adolescents' psychosocial and biological development correlated with risk taking behaviors. "The opportunities, pressures, and resources adolescents confront are influenced by key social, structural, and economic variables

related to ethnicity, minority status, gender and poverty level” (Crocket & Peterson, 1993, p.21). Although accidents are the leading cause of mortality during adolescence, many of the primary risk factors for future morbidity and mortality develop during this period (Irwin & Millstein, 1992). Adolescence is a transitional period between childhood and adulthood in which young people develop social and intellectual skills, and reach physical and sexual maturity. During this time adolescents have increased autonomy for decision making for health-enhancing or health compromising lifestyles (Crocket & Peterson, 1993).

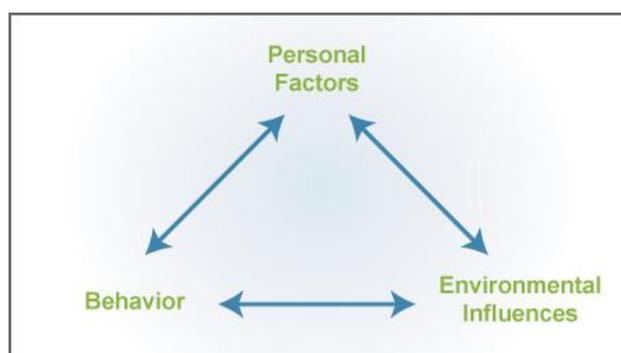
This period of cognitive development can facilitate health promotion efforts as adolescents become more attune to symbolic rewards and can discern health compromising messages. For example, Steinberg (1991) determined that adolescents are responsive to health messages requiring longer-term perspectives but are also more susceptible to advertisements for products such as cigarettes and alcohol that associate the products with attractiveness, peer acceptance, and adult status. Adolescents are increasingly capable of considering extended time perspectives (Millstein, Petersen, & Nightingale, 1993) such as would be needed to accurately assess risk of adverse health outcomes such as skin cancer. Regarding increased autonomy during adolescence, Crockett and Peterson (1993) cite the importance of providing adolescents with “opportunities to develop and exercise their autonomy while minimizing the risk of negative consequences” (p. 21). This concept is similar to a harm-reduction approach in health behavior. “From a developmental perspective adolescence marks a period of biobehavioral transformation, with biological, psychological and social changes jointly contributing to both opportunities for adaptive growth and risk for maladaptive outcomes” (Calkins, 2009, p.213). Steinberg (2007) also makes the case that adolescent development is

embedded in the social world. Steinberg (2007) writes about adolescent adjustment and risk taking, noting three related constructs: 1) sensation seeking (especially with the context of peer influences), 2) harm-reduction strategies, and 3) higher-order cognitive controls (which are later emerging).

Social Cognitive Theory (SCT)

Albert Bandura's (1986) Social Cognitive Theory (SCT) provides a social, environmental and behavioral framework to explore how both psychological factors and social environments interact to influence health behaviors. Bandura's Social Learning Theory, first published in the 1960's and formalized in 1977, theorized that individual factors such as personal history and previous experiences, subjective cognitions, and environmental conditions affect behaviors. Bandura (1978) named this concept reciprocal determinism.

Figure 2. Social Cognitive Factors



Source: Bandura, A. (1986). *Social Foundations of Thought & Action: A Social Cognitive Theory*, 1st edition. Electronically reproduced (pending permission of Pearson Education, Inc., Upper Saddle River, New Jersey).

In this theory, the three components of person, behavior, and environments constantly interact and influence each other. Bandura (1986) renamed the Social Learning Theory as Social Cognitive Theory and presented SCT as a more comprehensive framework for understanding human social behavior (Baranowski et al., 2002). He also theorized that people's

behaviors are motivated by their expectancies and values placed on outcomes of behaviors, in general motivated to seek out positive rather than unpleasant reinforcement. Bandura (1997) further refined the model and proposed self-efficacy as a latent construct contributing to many aspects of social change.

Baranowski et al. (2002) explain that Social Cognitive Theory is especially applicable to the study of health education and health behavior because (a) it brings previously separate cognitive, emotional, and behavioral approaches to understanding health behavior, (b) allows the ideas developed through other disciplines such as psychology to inform approaches to changing health behaviors, and (c) the theory's constructs provide many potential avenues for research, intervention development and evaluation. The proposed study focuses on five constructs thought to influence sun-related behaviors as they may facilitate or hinder the likelihood of behavior change. Understanding the relationship between individual biological and psychological factors and social contexts is important to health educators' understanding in order to develop tailored interventions. Table 4 identifies each of the constructs with a brief definition.

Table 4

Social Cognitive Theory Constructs

Construct	Definition
Situation	Person's perception of the environment
Outcome expectation	Anticipatory outcomes of a behavior
Outcome values	The value that the person places on a specific outcome; incentives
Reinforcements	Responses to a person's behavior that increase or decrease the likelihood of reoccurrence
Self-efficacy	The person's confidence in their ability to perform a particular behavior and overcoming barriers to that behavior.

Reciprocal determinism The dynamic interaction of the person, behavior, and the environment in which the behavior is performed.

Note. Adapted from Baranowski, T. P., Perry, C.L., & Parcel, G. S. (2002). How individual, environments, and health behavior interact. In Glanz, K., Rimer, B. K., & Lewis, F. M. (Eds.), *Health Behavior and Health Education: Theory, Research, and Practice* (3rd ed., pp. 169). San Francisco, CA: Jossey-Bass.

Constructs of SCT can provide a framework for investigating predictors of sunless tanning and other sun-protective behaviors such as sunscreen use, sun avoidance and use of protective clothing. Research through the lens of SCT specifically affords health educators higher levels of specificity in designing tailored interventions and theoretically inducts “higher levels of behavioral capability and self-efficacy” (Lewis et al., 2002, p. 266).

Opportunities to Address Behavior

Knowledge

Dennis, Lowe and Snetselaar (2009) determined that sun-tanning behaviors are related more to attitudes about sun-tanning than lack of knowledge about the associated risks. Beliefs about looking healthier and feeling better with a suntan strongly influence young people to tan (Dennis et al., 2009). Of the 163 students surveyed, accurate knowledge regarding sun exposure was positively correlated with increased importance of tanning. Participants indicated good knowledge about skin cancer prevention but continued to suntan. Among participants who felt a suntan was very or somewhat important, over 85% expressed belief that sunless tanning products were safer than outdoor sunbathing and indoor tanning bed use (Dennis et al., 2009). Dennis et al. (2009) recommend cancer prevention efforts address the continued desire for a sun-tanned appearance by encouraging use of sunless tanning products in lieu of UVR exposure.

Legislation

Legislation restricting or banning access to facilities is one way to protect adolescents from indoor tanning. Epidemiologic evidence has linked higher skin cancer risks with artificial UVR tanning. This risk increases when tanning starts at an early age. The World Health Organization, the American Academy of Pediatrics, and the American Academy of Dermatology all recommend legislation banning minors from indoor tanning. Indoor tanning bans are already in place for everyone in Brazil, Australia, and New South Wales (Balk, Fisher, & Geller, 2013). Thirty-three states in the U.S. have some kind of regulation restricting tanning salon use by teens (National Conference of State Legislatures, 2012). Regulations vary from bans for under 18 in California, under 17 in New York, and some states have placed bans at 14, 15 or 16 years of age. Other states allow indoor tanning but require a parent to accompany tanners younger than a certain age, require written parental consent or a physician order or prescription (National Conference of State Legislatures, 2012). Seventeen states have no regulations regarding minors' use of indoor tanning facilities (Balk et al., 2013). Balaraman, Biesbroeck, Lickerman, Cornelius and Jeffe (2013) examined these practices in Missouri, one of the states with no regulations pertaining to minor's use of tanning facilities, finding that more than two-thirds of tanning facility workers indicated they would allow children to tan without parental consent and 40% claimed there were no adverse health effects associated with sun-tanning. Even in states that have passed restrictive age bans, enforcement remains a challenge. Funding for states to mandate enforcement of the laws is non-existent. In states with tanning bans, low rates of citations and inspections contribute to noncompliance by tanning facilities. Marketing for discounts and unlimited tanning packages to minors (i.e., Prom, Homecoming,

etc.) are not monitored or restricted (Chen & Wang, 2012). In addition, some locations in which neighboring states have different restrictions allow minors to continue accessing indoor tanning facilities. Without federal oversight or a strong stance by the FDA, legislation varies by state, enforcement is tricky and not uniform, and many parents give consent anyway. Chen and Wang (2012) comment that “in the absence of a complete ban in the near future, other strategies to limit UV exposure to minors can be promoted” (Chen & Wang, 2012, p. 1072).

Social Norms

Given the resilience of the desire for a tan (Paul et al., 2011) it follows that additional prevention and intervention strategies should be explored. Paul et al. (2011) suggest relatively little is known about active suntan seekers. Despite ongoing public education campaigns and messaging regarding the need to reduce exposure to UV light the “perceived attractiveness of a tan remains high, particularly for young people, with many young women associating a tan with better appearance, greater physical fitness and an effective way of concealing acne” (Paul et al., 2011, p. 930). Dennis et al. (2009) identified the following attitudes corresponded with higher sun-tanning importance: feeling better with a suntan, a suntan is attractive, lack of a suntan is unattractive, suntanned skin looking healthier than untanned skin, and that friends and media support suntan attractiveness. Mahoney et al. (2012) suggest understanding these underlying attitudes may provide direction for effective interventions to reduce intentional UVR exposure for tan seeking. It is hypothesized that social influence and perceived norms can affect both sun-tanning and sun-protective behaviors. In fact, the majority of mainstream media portrays women as tanned and wearing little clothing in the outdoor environment (Dixon, Dobbison, Wakefield, Jameson, & McLeod, 2008). While participants in Paul et al. (2011) study reported

having observed information, public education and behavioral changes related to sun tanning and skin cancer risks that have occurred in recent decades, they had adopted self-exempting attitudes to information suggesting behavioral change was needed. Shoveller et al. (2003) findings support the view that a strong self-identify associated with a tanned appearance exists (Shoveller, 2003). Paul et al. (2011) also suggests age specific subjective norms which support tanning-related activities and a tanned appearance influence adolescents' attitudes and subsequently their behavior. No studies were identified that assessed potential differences in social influences for sunless tanning behaviors.

Harm-reduction strategies

Harm-reduction, as described by Leslie (2008), is a “strategy directed toward individuals or groups that aims to reduce the harms associated with certain behaviors” (Leslie, 2008, p.3). This public health strategy was developed initially for adults with substance abuse problems for whom abstinence was not feasible (Leslie, 2008). Leslie (2008) and others provide literature supporting the efficacy of harm-reduction strategies in both the prevention and intervention of behaviors with potential health risks (Leslie, 2008; Marlatt and Kitkewitz, 2002; Mastermann & Kelly, 2003; McBride, Farringdon, Midford, Meuleners & Phillips, 2004). In recent years, this approach has been used successfully in drug education (McBride et al., 2004), HIV needle exchange programs, and in lowering risky alcohol use (Mastermann & Kelly, 2003). Harm reduction approaches have successfully been applied in efforts to reduce both teen pregnancies and sexually transmitted diseases, including HIV (Leslie, 2008; Kirby, 2007). Leslie (2008) recommends those who work with or provide care to adolescents be aware of the potential of

harm-reduction strategies and aim to reduce risks associated with normative adolescent health behaviors (Leslie, 2008).

There are several possible harm-reduction approaches including discouraging the harmful behavior, encouraging individual to reduce the harmful behavior, or provide with information aimed at reducing the harmful consequences of the behavior when it does occur (Leslie, 2008).

High rates of indoor tanning bed use and intentional UVR exposure call for innovative alternatives (Mahoney et al., 2010). Paul et al. (2011) suggest it is reasonable to explore promoting non-UV tanning product use as a harm-reduction strategy if such product use would result in reduced UV exposure and reduce cancer risks. Sunless tanning products are a non-UV tanning alternatives available as over-the-counter lotions, creams and spray-on products to be applied in the home or in salons (Paul et al., 2011). Sunless tanning is a relatively risk-free alternative but has not been well studied in the context of skin cancer prevention (Pagoto et al., 2010).

Sunless tanning products have been investigated in only a few studies and limited comparable adolescent targeted sunless data is available. Pagoto et al. (2010) studied an intervention that promoted sunless tanning to Massachusetts beach-goers, as an alternative to UV tanning. Pagoto et al. (2010) found that the intervention had a short term impact on sunbathing, sunburns, and protective clothing, and a longer term impact on sunbathing and sunless tanning. Cokkinides et al. (2010) assessed the prevalence and correlates of the use of sunless tanning products among U.S. adolescents and their association with UV radiation exposure behaviors including indoor tanning, sunburn experiences, and use of sunscreen while

outdoors. Sunless tanning product use was found to be “high among those with strong tan preferences and was also associated with higher rates of indoor tanning and recent sunburns” (Mahoney et al., 2012, p. 124). Sheehan and Leshner (2005), however, found that 73% of sunless tanning product users either already had decreased or intended to decrease their indoor tanning bed usage. Previous work by Brooks et al. (2006) and Stryker et al. (2007) suggested use of sunless tanning products was associated with sunburn and tanning bed use, and independently with sunscreen use. Paul et al. (2011) used a focus group to gain contextual understanding about the perception and use of sunless tanning products by tanners and to explore the potential substitution of sunless tanning products for UV exposure in those wanting the appearance of tan. They found potential motivating factors for sunless tanning included tanning for social occasions, convenience due to not having time to obtain a tan outdoors, risk of skin cancer, and perceived negative appearance of skin for long term tanners (i.e., wrinkled or leathery skin). They found that “those with fair skin, a tendency to burn, or a perceived susceptibility to skin cancer indicated a propensity to reduce their sun exposure as a result of substitutional use of sunless tanning products” (Paul et al., p. 934). “Interventions for reducing skin cancer risk should focus not only on decreasing favorable attitudes toward tanning, but also on increasing favorable attitudes toward healthier alternative to tanning salon use” (Danoff-Burg & Mosher, 2006, p. 511). Paul et al. (2011) “found that, other than for those with sunburn-prone or fair skin, sunless tanning products are considered a tanning add-on or top-up rather than a substitute for exposure to UV light” (Paul et al., 2011, p. 935). “Given the limited amount of systematic investigations of these products and the mixed findings in the studies

that have been completed, their potential role in reducing UVR exposure in the population is still unclear” (Cokkinides et al., 2006, p. 988).

Summary

The review of literature presented in this chapter provided a brief clinical background for skin cancer, an overview of the known correlates and recommendations related to sun-tanning and sun-protective behaviors, and a review of the relevant literature pertaining to the use of behavioral theory as a framework for research. Exploring factors predictive of adolescents’ sun related behaviors is enhanced by using psychosocial theory such as Social Cognitive Theory and the Biopsychosocial Model as a framework. The investigative variables included in this study will help identify targets for reducing risk behaviors and inform future intervention to promote sun-protective behaviors and thus contribute to the prevention of skin cancer.

CHAPTER 3 METHOD

Background

Chapter 3 details the steps planned to conduct this study. Research questions, design, methods, sample selection, pilot study, instrumentation, data collection and data analysis plans are provided.

Purpose of the Study

The primary purpose of this study is to investigate high school adolescents' sun-tanning and sun-protective behaviors through a theoretical framework of psychosocial constructs. The secondary purpose of this study is to identify which psychosocial constructs predict sun-tanning and sun-protective behaviors among high school adolescents. The third purpose is to determine if differences in sun-related behaviors exist among high school adolescents with different demographic characteristics.

Research Questions

1. What are adolescents' sun-tanning and sun-protective behaviors?
2. Which factors predict sun-tanning behaviors among high school adolescents?
3. Which factors predict sun-protective behaviors among high school adolescents?
4. Do differences in sun-related behaviors exist among groups with different demographic characteristics?

Research Design

This research study proposes to utilize a cross-sectional, descriptive research design to investigate high school adolescents' sun-tanning and sun-protective behaviors through a

theoretical framework of psychosocial constructs. The theoretical constructs chosen to explore this topic are derived from Bandura's (1986) Social Cognitive Theory (SCT) and Irwin and Millstein's (1986) Biopsychosocial Model because of their suitability for exploring how individuals, their environments, and health behaviors interact (Baranowski et al., 2002; Bandura, 1986, 1997, 2004; Irwin & Millstein, 1986). The independent variables include (a) situation, (b) outcome expectations, (c) outcome values, (d) reinforcements, (e) self-efficacy, and (f) reciprocal determinism. Demographic variables include (a) gender, (b) age, (c) race/ethnicity, (d) skin phenotype, and (e) socio-economic status. The dependent variables include frequency for (a) use of artificial/sunless tanning lotion, creams or gels, (b) use of artificial/sunless spray tanning, (c) use of sun-tanning beds or lamps, and (d) use of outdoor sunbathing. Two dependent variables (c and d) represent health risk behaviors associated with an increase in incidence of skin cancer while two of the dependent variables (a and b) represent "harm-reduced" or sun-protective behaviors that may offer promise as an alternative option for those seeking the appearance of tan. A social desirability scale is included as part of the questionnaire to help control for respondents' potential bias in self-reporting behaviors in a way thought to be more favored by others (Nolte et al., 2013; Haghighat, 2007; Johnson & Fendrich, 2002). Social desirability bias may attenuate the predictive validity of self-reported questionnaire responses. As such, use of measures to control social desirability bias is now standard practice (Paulhus, 1981; Nolte et al., 2013; Haghighat, 2007; Johnson & Fendrich, 2002). Paulhus (1981) recommends incorporating covariate techniques to account for social desirability bias and maximize the predictive value of an instrument.

Table 5

Summary of Research Questions and Planned Analysis

Research Question	Questionnaire Item	Planned Test
1. What are adolescents' sun-tanning and sun-protective behaviors?	<p><u>Independent Variables</u> 25 Behavior Items (Sun-Protective Behavior questions 33-35, 38, 40-46, 49,50,56,57) (Sun Risk questions 36,37,39,47,48,51-55)</p>	Descriptive (Frequencies, Mean, Standard Deviation)
2. Which factors predict sun-tanning behaviors among high school adolescents?	<p><u>Independent Variables</u> 22 Attitude Items (questions 1 through 22) 10 Sun Risk Behavior Items (questions 36,37,39,47,48,51-55) 10 Self-efficacy (questions 23-32)</p> <p><u>Dependent Variables</u> "Sun RISK Behavior" total score (questions 39, 40 and 43)</p>	Multiple regression with all independent variables predicting the mean "Sun RISK Behavior" score
3. Which factors predict sun-protective behaviors among high school adolescents?	<p><u>Independent Variables</u> 22 Attitude Items (questions 1 through 22) 25 Sun-Protective Behavior Items (questions 33-35, 38, 40-46, 49,50,56,57) 10 Self-efficacy (questions 23-32)</p> <p><u>Dependent Variables</u> "Sun-Protective Behavior" total score (questions 41 and 42)</p>	Multiple regression with all independent variables predicting the mean "Sun-Protective Behavior" score
4. Do differences in sun-related behaviors exist among groups with different demographic characteristics?	<p><u>Independent Variables</u> 6 Demographic Items (questions 62-67)</p> <p><u>Dependent Variables</u> "Sun RISK Behavior" total score (questions 39, 40 and 43) "Sun-Protective Behavior" total score (items 41 and 42)</p>	ANOVA for total score a. "Sun RISK Behavior" mean score by age, gender, race/ethnicity, SES, and skin phenotype b. "Sun-Protective Behavior" mean score by age, gender, race/ethnicity, SES, and skin phenotype

Human Subjects

Prior to data collection, approval from Southern Illinois University Carbondale's Office of Sponsored Projects Administration will be obtained by the researcher. For a student to participate in the research study, an informed consent form will be signed by the adolescent's parent or guardian and returned to the student's physical education teacher, then to the researcher.

Theoretical Framework

The theoretical constructs chosen to address sun-tanning and sun-protective attitudes and behaviors are derived from Bandura's (1986) Social Cognitive Theory and Irwin and Millstein's (1986) Biopsychosocial Model. While many models of health behavior attempt to predict health behaviors, SCT offers an approach that incorporates both predictors and principles regarding how to change health behaviors through health enhancing behaviors, or reducing those behaviors which cause harm and impair health (Bandura, 2004). Irwin and Millstein (1986) having studied the biologic and psychosocial correlates of risk-taking behaviors during adolescence, also offer support for examining how individuals adopt behaviors in the context of their social environment and biologic and psychological development (Irwin & Millstein, 1986). Similar to Bandura's (1997) concept of reciprocal determinism, Irwin and Millstein's (1986) biopsychosocial model purports that factors affecting decision making and subsequent behaviors (i.e., cognitive scope, self-perceptions, perceptions of the social environments and personal values) are not independent. This study will use this theoretical framework to help understand the relationship between individual biological, psychological, and social contextual factors in sun-tanning risk behaviors versus sun-protective behaviors

(Bandura, 1986; Baranowski et al., 2002; Janz, Champion, & Strecher, 2002). Individual questionnaire items summed into construct subscales (derived using factor analysis) will be incorporated into an initial conceptual integrated model.

Research Method

All data will be collected through a self-administered survey, which is an efficient method of data collection among quantitative researchers (Dillman, Smyth, & Christian, 2009). In addition to surveys being a useful technique for gathering information, a primary advantage is the ability to generalize about a population through inferences on a smaller sample of participants (Rea & Parker, 1997). The survey instrument for the current study was developed through modification of pre-existing scales and survey questions designed to capture sun-related attitudes and behaviors and adapted for this study (Haghighat, 2007; Fitzpatrick, 1988; Glanz et al., 2008; James et al., 2002; Branstrom et al., 2004, 2010; Geller et al., 2002; Hall, McCarty, Elliott, & Glanz, 2009).

Sample

Convenience sampling of high school adolescents from Carbondale Community High School (CCHS) in Carbondale Illinois will be utilized to obtain response data. Carbondale is a town located within Jackson County. The population of Jackson County was approximately 60,000 at the 2010 census (United States Census Bureau, 2010). Carbondale was chosen due to proximity to the researcher and disparities in incidence of skin cancer in downstate Illinois compared to upstate (Garner, Shen, & Steward, 2013). Garner et al. (2013) analyzed 2009 Illinois State Cancer Registry data by site and geography. Significantly higher rates of melanoma

of the skin were seen in both downstate males and females when compared to upstate (Garner et al., 2013).

Table 6

Area Population Demographics

Geography Quick Facts	Illinois	Jackson County	Carbondale
Land area in square miles	55,518.93	584.08	17.09
Persons per square mile	231.1	103.1	1,516.1

Note. Adapted from United States Census Bureau. (2009). *State and County QuickFacts: Jackson County, IL*. Retrieved June 10, 2011, from <http://quickfacts.census.gov>.

Table 7

2010 Census Population Compared to 2000: Illinois Counties

Location	2000 Census ¹ Total Population	2010 Census Total Population	2000-2010 Change	2000-2010 % Change
Illinois	12,419,293	12,830,632	411,339	3.3
Jackson County	59,612	60,218	606	1.0
Carbondale	21,463	25,902	4439	20.68

Note. Adapted from U.S. Census Bureau. (2011). *2010 Census Redistricting Data (Public Law 94-171) Summary File, Tables P1 and H1*. Washington, DC: Government Printing Office. Retrieved from <http://www.census.gov/prod/cen2010/doc/pl94-171.pdf>

In Jackson County the primary race/ethnicity groups are 78.5% white, 14.7% Black, and 4.3% Hispanic non-white. The median household income is \$32,169 compared to Illinois at \$55,735 and the U.S. \$51,914. The percent of families below the poverty level is 28.5%, higher than both the state 12.6% and the U.S. 13.8% (U.S. Census Bureau, 2009). In the city of Carbondale, there is one public high school, one public middle school, and five public elementary schools (Illinois State Board of Education [ISBE], 2012). There are three private

schools in Carbondale (one pre-kindergarten through eight grade, one pre-kindergarten through twelfth grade, and one sixth through twelfth grade school).

Carbondale Community High School has 1,107 students enrolled in grades 9 – 12 (ISBE, 2012). Academically, the school's graduation rate is 82.9% (Illinois, 82.3%). ACT composite scores for CCHS were 22.5 (compared to state 20.9 and National at 21.1). Ninety-four percent of CCHS students are college-bound. Approximately 48% go to a 4 year college, 46% to a 2 year college, and 6% enter the military and workforce (ISBE, 2012). Approximately half the school population is categorized as low income (ISBE, 2012). A little over half of the students (57.9%) identify as white, 27.9% black, 7.1% Hispanic, .1% Asian, and 1.9% Multi-racial (ISBE, 2012).

For this study using ten independent variables (five demographic and five predictors), approximately 114 to 130 subjects will be needed to conduct a regression analysis with a sampling error of $\pm 5\%$, a confidence interval of 95%. Using Cohen's (1988) power analysis, the equation $L = 6.4 + 1.65m - .05m^2$ (where m is the number of predictors) results in $L = 17.9$. To determine the number of participants needed to detect a medium effect size, 17.9 was divided by .15, resulting in $N \geq 119$. Using Green's (1991) published "rule of thumb" table as a comparison, for a study with 8-10 predictors, and a desired medium effect size, a similar range of 109-119 subjects would be required to conduct a regression analysis (Green, 1991). Cross-referencing results from Cochran's (1977) sample size formula for continuous data and Hair, Anderson, Tatham, and Black's (1995) ratio considerations for sample size necessary for regression and factor analysis yielded similar recommendations for minimum sample size. Salkind (1997) as referenced in Bartlett, Kotrli, and Higgins (2001) recommends over-sampling by increasing sample size by 40-50% to account for potential non-response rates. To conduct

this study, an invitation letter with a parent/guardian consent form included will be distributed to approximately 240 students enrolled in a 5th hour physical education class. Every Tuesday, six sections of physical education classes from all grade levels meet in the gymnasium for silent sustained reading. Only those students returning a signed parent/guardian informed consent form by the designated date will be allowed to participate in the study.

Data Collection Procedures

The researcher will contact the principal of Carbondale Community High School and request permission to conduct the study with the students at the school. The principal and the researcher will discuss the purpose of the study, logistics for administration, and the requirements and process for obtaining parental/guardian informed consent. Prior to submission to the Southern Illinois University Carbondale's Office of Sponsored Projects Administration, the researcher will obtain a signed agreement from the principal signifying consent to proceed with the study.

Data collection will occur over a 10 day period early in the fall 2014 semester. Once the Southern Illinois University Carbondale's Office of Sponsored Projects Administration approves the research protocol, the researcher and the principal (or alternate designated school staff) will agree upon a date to send home the parent/guardian letter and informed consent forms following the agreed upon process. The researcher will deliver the parent/guardian letter and informed consent forms to the high school on a Monday. Stapled and collated packets containing parent/guardian letters and informed consent forms, an envelope, and an explanation letter will be placed into each physical education teacher's mailbox. Physical education teachers will be asked to send one packet home with each student on Tuesday.

Students will be asked to return the signed parent/guardian informed consent form to their physical education teacher by Friday, of that same week. As informed consent forms are returned, physical education teachers will collect and place forms in the envelope provided by the researcher. After their physical education class period meets on the Friday when consent forms are due, physical education teachers will return the envelope containing the consent forms to the office. Office staff will designate and label a collection spot in the office (i.e., a box labeled "Research Study Informed Consent Forms Here").

The researcher will return to the school to collect the returned study informed consent forms from the office and the end of the day Friday. The researcher will then type a list of the students who received parent/guardian informed consent forms for each physical education teacher. The following Monday, the researcher will then place teacher instructions and a list of students who received parent/guardian permission to participate, the appropriate number of surveys, and a return envelope in each physical education teacher's mailbox. The physical education teachers will be instructed to administer the surveys to the students on the study informed consent list who are present on Tuesday. The researcher and an assistant will be available at the school on the day of the survey to answer questions about the survey. Physical education teachers will then collect the completed surveys, place in the envelope provided by the researcher and return the envelope to the office at the end of the same day where the researcher will collect them. Any students not having parent/guardian informed consent to participate will continue with their normal class period assignments. All completed informed consent forms and surveys will be stored in a locked filing cabinet in the researcher's office. Only the researcher and the researcher's committee will have access to the information. Once

the research study is completed and all data for the surveys are entered into the data analysis tool, the informed consent forms will be destroyed. Only anonymous survey data will be retained.

To increase participation rates, a small cash incentive will be included. The researcher will offer \$5.00 cash prizes for 1 out of every 50 children. Students may be more likely to take the letter and informed consent form to the parent/guardian to ask for permission to participate due to an incentive being offered. Parents will check "Yes" or "No" on the informed consent forms to give or deny permission for their child to participate in the study. All students with a returned consent form, regardless of whether parental permission was given, will be eligible to win one of the prizes. The purpose of including all the students is to reward engagement (reading the letter) without coercing the parent to allow their child to participate. Once informed consent forms are collected, the researcher will tally the number received to determine how many \$5.00 cash prizes are to be awarded. All returned consent forms will be placed in a box and randomly drawn (without replacement) for the prizes. The name of the student and physical education teacher will be written on an envelope and a \$5.00 bill included. The envelopes will be sealed and placed in the physical education teacher's mailbox on a designated date. Physical education teachers will be requested to distribute prizes to the winners during class that same day. Any winner who is absent that day will receive the prize when he or she returns to school. Once data collection is completed and prizes distributed, the researcher will send the principal and designated staff "Thank you" cards for their assistance and for allowing the study to be conducted at their school.

Instrumentation

Surveys are a common and efficient tool for gathering information about people's opinions and behaviors (Dillman et al., 2009). For skin cancer prevention research, self-reported sun exposure and sun protection behaviors are often the primary outcome variables (Hillhouse, Turrisi, Jaccard, & Robinson et al., 2012). These types of measures are needed because skin cancer risk behavior does not have a gold standard biological marker currently (Hillhouse et al., 2012). While a majority of studies use verbal reports or self-reports to measure habitual sun exposure and solar protection behaviors, historically there has been a lack of consistency and standardization (Glanz & Mayer, 2005). This led the National Cancer Institute and the Emory Prevention Research Center to convene a workgroup whose aim was to devise a core set of measures for sun exposure, sun protection and indoor tanning behaviors. Glanz et al., 2008 recommend researchers use core items from the workgroup's instrument with minor adaptations to the questions based on a particular study's aims (Glanz et al., 2008).

Source of questions

Questions were identified from existing surveys and studies designed to assess sun-tanning and sun-protective attitudes and behaviors and modified to fit the purpose of this study. To assess behaviors, the survey instrument proposed for this study (Appendix A) is largely adapted from the National Cancer Institute and Emory Prevention Research Center workgroup's "Core Skin Cancer Prevention Items for adults (A), adults reporting for children 10 years or younger (B), and adolescents aged 11 to 17 years (C)" (Glanz et al., 2008). To assess attitudes, subjective norms, social desirability and demographic characteristics, this survey utilizes select questions from James et al. (2002); Bandi, Cokkinides, Weinstock, and Ward

(2010); Heckman et al. (2012); Jackson and Aiken (2000); Lazovich et al. (2008); Pagoto et al. (2010); Andreeva et al. (2008); and Mahoney et al. (2012). Additional questions were developed by the researcher based on knowledge of behavior change theory.

Demographic items. The survey will collect age and gender data. Age is captured as a continuous variable “What is your age? _____ years.” Gender is categorized as “male” or “female.”

Race/ethnicity. The survey will collect race/ethnicity data. The question is “What is your race/ethnicity?” Responses will be categorized as “Asian/Pacific Islander,” “Black/Non-Hispanic,” “White/Non-Hispanic,” “Hispanic/Latino,” “Native American,” “Other (please specify).”

Socioeconomic status. For this study, socio-economic status will be categorized as “low” or “not low” (McClary-King, 2008). Students’ self-reported eligibility for receiving the free or reduced-price lunch program will be used as a proxy for estimating socioeconomic status. The survey item is “Do you receive free or reduced-price lunch?” Response options are “yes” or “no.”

Skin Phenotype. Participants will be asked to indicate the color of their natural un-tanned skin and the natural color of their eyes to determine Fitzpatrick skin type (Fitzpatrick, 1988; Glanz et al., 2008). One question is “What is the color of your natural un-tanned skin?” Answer choices include “very fair”, “fair”, “medium light”, “medium (olive)”, “medium dark”, and “very dark.” Participants who indicate that they have very fair or fair skin will be categorized as “fair-skinned;” all others will be categorized as “not fair-skinned.” The second question is “What is the natural color of your eyes?” Answer choices include “pale or blue”, “green”, “hazel blue/green”, “hazel green/brown”, “light/medium brown”, “dark brown/very

dark”, and “other (please specify).” Cust, Pickles, Goumas, and Vu (2014) assessed the validity of self-reported nevus and skin pigmentation (phenotype). They found strong agreement between self-reported skin pigmentation and clinical measurement of eye color (Cust et al., 2014).

Behavioral assessment questions. Self-report sun exposure and protection behaviors have been found to be reliable and valid (Daniel, Heckman, Kloss, & Manne, 2009). Survey items to assess sun related behaviors were adapted from these prior studies: 1) NCI and Emory Prevention Institute’s recommendations for measurement of sunbathing in community and clinical research (Glanz et al., 2008); 2) a study measuring non-solar tanning behaviors (Lazovich et al., 2008); 3) a study promoting sunless tanning to beach-goers (Pagoto et al., 2010); 4) select questionnaire items related to attitudes and sun exposure variables (Mahoney et al., 2012); and 5) the American Academy of Dermatology’s *Suntelligence Survey* (AAD, n.d.).

UVR Exposure Behaviors. Ten questions address sun risk behaviors (UVR exposure). Participants will be asked to indicate on a scale of 1 to 5 (“1” being “Never”, “5” being “Always”) how often they use a tanning bed or sun lamp to look sun-tanned (Glanz et al., 2008), layout in the sun outdoors to get a suntan (Glanz et al., 2008), or suntan for special events such as weddings, dances, or social events (Mahoney et al., 2012). Answer choices include “never”, “rarely”, “sometimes”, “often”, or “always.”

Participants will be asked to indicate during the last twelve months (1 year) how many times did they use a tanning bed or sun lamp, during the last twelve months (1 year); and how many times did they suntan outdoors (AAD, n.d.). Participants will be asked to indicate a response on a scale of 1 to 6 (“1” being “not at all”, “6” being “more than once a week”).

Answer choices include “not at all”, “a few times during the year”, “about once a month”, “two to three times a month”, “about once a week”, “more than once a week”.

Participants will be asked to indicate on a scale of 0 to 5 (“0” being “does not apply/do not intentionally suntan”, “5” being “more than 20 minutes”) during the last twelve months (1 year) how many minutes was a typical indoor sun-tanning bed/sun lamp session; and during the last twelve months (1 year) how many minutes was a typical outdoor sun-tanning session (AAD, n.d.). Answer choices include “does not apply to me/do not intentionally suntan”, “less than 5 minutes”, “5 to 10 minutes”, “11 to 15 minutes”, “16 to 20 minutes”, or “more than 20 minutes.” Participants will be asked to indicate how many times during the last twelve months (1 year) they had a red or painful sunburn that lasted a day or more (Glanz et al., 2008).

Answer options include “does not apply to me (I have not gotten a sunburn in the last twelve months)”, “1”, “2”, “3”, “4”, “5 or more times.”

Participants will be asked about the number of hours spent outside during the summer. The questions are “In the summer, on average, how many hours are you outside per day between 10 am and 4 pm on weekdays (Monday-Friday)?” and “In the summer, on average, how many hours are you outside per day between 10 am and 4 pm on weekend days (Saturday and Sunday)?” (Glanz et al., 2008). Answer choices are on a scale from 0 to 6 (“0” being “30 minutes or less”, “6” being “6 hours or more”). Answer choices include “30 minutes or less”, “31 minutes to 1 hour”, “2 hours”, “3 hours”, “4 hours”, “5 hours”, “6 hours or more”. A mean Sun-risk score will be calculated.

Sun Protective Behaviors (SPB). Participants will be asked fifteen questions about individual sun-protective behaviors. Seven of the fifteen questions address sun avoidance,

sunscreen use and protective clothing use. Participants will be asked to indicate on a scale of 1 to 5 (“1” being “Never”, “5” being “Always”) how often they avoid intentional sun-tanning; use sunscreen when outdoors; purposely stay inside during peak sun hours (10 a.m. and after 4 p.m.) to avoid suntan; purposely stay inside during peak sun hours (10 a.m. and after 4 p.m.) to avoid sunburn (Glanz et al., 2008); when they go outside on a warm sunny day for more than an hour, how often do they seek out shade, wear protective clothing, or use sunscreen with and SPF of 15 or greater (James et al., 2002; Glanz et al., 2008). Answer choices include “never”, “rarely”, “sometimes”, “often”, or “always”.

Six of the fifteen SPB questions ask specifically about sunless tanning behaviors.

Participants will be asked to indicate on a scale of 1 to 5 (“1” being “Never”, “5” being “Always”) how often they use sunless tanning lotions, gels, and creams to look sun-tanned; use sunless spray-tanning products or services to look sun-tanned (Glanz et al., 2008); choose sunless tanning instead of sun-tanning outside (Mahoney et al., 2012); choose sunless tanning instead of using a sun-tanning bed/sun lamp to achieve the appearance of tan. Answer choices include “never”, “rarely”, “sometimes”, “often”, or “always”.

Participants will also be asked to indicate during the last twelve months (1 year) how many times they used a sunless-tanning product such as lotions, gels, or creams (not sunscreens) (AAD, n.d.); and during the last twelve months (1 year) how many times did they use sunless spray-tanning products or services. Participants will be asked to indicate on a scale of 1 to 6 (“1” being “not at all”, “6” being “more than once a week”). Answer choices include “not at all”, “a few times during the year”, “about once a month”, “two to three times a month”, “about once a week”, “more than once a week”.

Two of the sun-protective behavior questions are related to preventive screening. Participants will be asked to indicate whether they “have ever examined their entire body, including their back for skin cancer” and “have they ever had their skin checked for skin cancer from head to toe by a health professional” (Glanz et al., 2008). Answer choices are yes or no (“0” = “no”, “1” = “yes”). A mean sun-protective behavior (SPB) score will be calculated.

Predictive Factors (SCT/Attitude Questions). Participants will be asked to complete 32 items designed to assess attitudes (perceived benefits, sun-tanning appeal, peer norms, values and expectations of behaviors) of sun-tanning and sun protection. These items are from James, Tripp, Sweeney and Gritz (2002), Bandi et al. (2010), Jackson and Aiken (2000), Mahoney et al. (2012), Lazovich et al. (2008), Pagoto et al. (2010), and Andreeva et al. (2008).

Situation. Participant’s perception of the environment (social and peer normative values for sun-tanned skin) will be assessed by asking participants to complete eight items. Image norms for sun-tanned skin will be assessed by asking participants to indicate how much they agree or disagree with the following statements: “sun-tanned skin is desired in today’s society”, “there is a trend toward non-tanning in young people today” (Jackson & Aiken, 2000); “my friends think it is important to look a certain way” (James et al., 2002); “young people today think sun-tanning is a priority”(James et al., 2002); “people present a better image when they are sun-tanned” (Heckman et al., 2012); “my friends often sunbathe or use tanning beds”(Heckman et al., 2012); and two reverse scored items, “my parents discourage sun-tanning” “my friends regularly use sunscreen” (Heckman et al., 2012; Jackson & Aiken, 2000). A mean situation score will be calculated. Higher scores indicate stronger tan appeal attitudes.

Outcome Expectations. Tan appeal will be assessed by asking participants five questions about the anticipatory outcome of sun-tanning behavior. All items are scored on a five-point Likert-type scale (e.g., strongly disagree, disagree, neutral, agree, or strongly agree). Participants will be asked to indicate how much they agree or disagree with the following statements: “Sun-tanned skin helps hide flaws”, “I look more attractive with a suntan”, “I feel healthier with a suntan”, “Other people look more fit with a suntan”, “other people look healthier with a suntan” (James et al., 2002; Bandi et al., 2010; Heckman et al., 2012). A mean outcome expectations score will be calculated. Higher scores indicate stronger tan appeal attitudes.

Value Expectancies. Value that the participant places on a given outcome, or incentive for behavior will be assessed by asking participants five questions. All items are scored on a five-point Likert-type scale (e.g., strongly disagree, disagree, neutral, agree, or strongly agree). Participants will be asked to indicate how much they agree or disagree with the following statements: “It is important to protect my skin from the sun” (reverse scored item) (Heckman et al., 2012); “skin that is not sun-tanned is healthier than sun-tanned skin”(reverse scored item); “It is important for me to have a suntan”; “I worry about getting wrinkles and skin damage from sun-tanning” (reverse scored item) (Heckman et al., 2012); “I am concerned about getting skin cancer” (reverse scored item). A mean value expectancies score will be calculated. Higher scores indicate stronger tan appeal attitudes.

Reinforcement. Four questions will assess reinforcement of participant’s behaviors that may increase or decrease the likelihood of reoccurrence. All items are scored on a five-point Likert-type scale (e.g., strongly disagree, disagree, neutral, agree, or strongly agree).

Participants will be asked to indicate how much they agree or disagree with the following statements: “I have been told I look better without a suntan” (reverse scored item), “I am viewed positively when I have a suntan”; “people tell me I look good when I have a suntan”, “other people think that I suntan too much” (reverse scored item). A mean reinforcement score will be calculated. Higher scores indicate stronger tan appeal attitudes.

Self-efficacy. Self-efficacy for engaging in various sun protective practices (e.g., sun avoidance, protective clothing, and sunscreen) will be assessed using ten items from Heckman et al. (2012), Jackson and Aiken (2000), Lazovich et al. (2008) and the American Academy of Dermatology (n.d.). All items are scored on a five-point Likert-type scale of agreement. Participants will be asked to indicate how confident they feel in their ability to engage in sun protective behaviors such as “use sunless tanning lotions, gels, or creams” (Heckman et al., 2012; Jackson & Aiken, 2000); “use sunless tanning sprays” (Lazovich et al., 2008); “recognize signs and symptoms of skin cancer” , “check your own skin signs and symptoms of skin cancer”, “talk to a doctor or nurse about skin changes or concerns” , “take steps to keep from getting skin cancer” , “encourage others to use sunscreen” , “discourage others from sun-tanning” , “decide if an area is shaded enough to protect you from the sun” , “decide if a sunscreen product offers an SPF that will protect you from the sun” (AAD, n.d.). Answer choices include “unconfident”, “somewhat unconfident”, “neutral”, “somewhat confident”, or “confident”.

Social desirability scale. The Brief Social Desirability Scale (Haghighat, 2007), a four question validated scale will be used to measure and statistically control for social desirability bias. Response options are “yes” and “no” (“0” = “no”, “1” = “yes”) with the sum of 4 questions making up the SD score. Participants will be asked to indicate yes or no to the following

questions: “would you smile at people every time you meet them”, “do you always practice what your preach to people”, “if you say to people that you will do something, do you always keep your promise no matter how inconvenient is might be”, and “would you ever lie to people” (Haghighat, 2007).

Questionnaire Format

The survey used in this study (Appendix A) is a six page paper and pencil type survey. The first page is the front cover and includes directions for the survey. Pages one through five assess the variables of interest. The last page includes demographic items, a social desirability scale, and a conclusion statement thanking students for their participation in the survey. The survey is designed according to Dillman et al. (2009) *Internet, Mail and Mixed Mode Surveys: the Tailored Design Method*. Ordinal closed-ended (Likert-type) questions are an appropriate format to collect attitude and opinion data.

Respondents will be instructed to circle their answer choice, however manual coding and data entry, unlike optical reader software, will allow the researcher to capture any style of mark (i.e., circle, check mark or X) provided it clearly indicates a response. To help keep costs low, standard 8 ½ X 11 inch sized paper will be used. One attractive and eye-catching color graphic appears on the front page and one color graphic appearing on the last page indicates completion of the survey and thanks respondents for their participation. Additional layout and formatting considerations in designing the questionnaire include ensuring that Likert scales are visually balanced and response options are standardized to minimize response bias. Instructions are provided in larger and bolded font to provide contrast and draw respondent’s attention to particular areas of the survey (Dillman et al., 2009).

Questions are grouped by topic area in the following order: (a) attitudes, (b) behaviors, (c) social desirability scale, and (d) demographics. A general question about the perception of sun-tanning in “today’s society” was chosen as the first question in the survey because it is non-threatening (doesn’t yet ask for personal information), is not difficult to interpret or understand, it applies to everyone (even if they themselves do not sunbathe), and gives respondents a general indication of what the survey will be about. Demographics are intentionally placed at the end of the survey in the event some respondents find the questions objectionable and skip them or become fatigued and do not complete the survey; respondents will hopefully already have completed other questions related to variables of interest. Nominal closed-ended questions (i.e., demographics and skin phenotype) also allow for an “other” answer response option “thus allowing respondents who do not fit into the provided response categories to specify a different category that they do fit” (Dillman et al., 2009, p. 75). Questions requiring participants to recall past sun-tanning and sun-protective behaviors incorporate special instructions to provide a reference timeframe, limited size of line/space to indicate the length of response expected, and unit labels for the desired answer format.

Data Analysis

Each item on the survey will be coded and entered into Statistical Package for the Social Sciences (PASW/SPSS) version 19.0 (SPSS, Inc.) for analysis. Blank items will be coded as “99” to represent missing values. Descriptive statistics including measures of central tendency will be used to characterize the participant sample and the frequency and extent to which sun-tanning and sun-protective behaviors are present. Data output will be examined graphically to identify any possible outliers or findings that would seem unusual. Data will be evaluated for

acceptable levels of missing data. Provided the total percentage of missing data for any item is less than or equal to 5 %, list-wise deletion will be used (i.e., cases with missing values in at least one of the specified variables will be dropped from analysis with final analysis run on a complete set of data).

To determine which independent variables (factors) most strongly predict sun-tanning behaviors among high school adolescents, multiple regression with all independent variables simultaneously entered into the model to predict the mean “Sun Risk Behavior” score will be used. To determine which independent variables (factors) most strongly predict sun-protective behaviors, multiple regression with all independent variables simultaneously entered into the model to predict the mean “Sun-Protective Behavior” score will be used. If the data is not normally distributed, logistic regression will instead be used to draw conclusions regarding the population based on the sample data.

To determine if significant differences in sun-related behaviors exist among groups with different demographic characteristics, analysis of variance (ANOVA) for mean “Sun Risk Behavior” score by age, gender, race/ethnicity, SES, and skin phenotype and for mean “Sun-Protective Behavior” score by age, gender, race/ethnicity, SES, and skin phenotype will be used. A significance of $\alpha = .05$ will be utilized to assess significance in this study.

Instrument Validity and Reliability

Five students enrolled in a graduate-level survey research methodology course reviewed an initial draft of the questionnaire and provided feedback for improvement. Key changes made to the instrument based on that feedback included revision of negatively worded questions to alleviate potential confusion for participants and scale labels were changed to be

inclusive (i.e., “almost never” changed to “never” and “almost always” changed to “always”). In addition, the layout of the questionnaire was restructured into a matrix (grid) format to alleviate the cluttered text appearance and allow for quicker and easier response selection. Specifically, instead of repeating all response options after each question, response options are provided along the right side of each question with labels appearing at the top of each column, thus allowing respondents to quickly circle their desired responses. A matrix format is a consistent page layout, when used throughout an instrument, visually emphasizes instructions and questions making visual and cognitive processing easier for respondents thus improving accuracy and validity (Dillman et al., 2009).

To further assess validity, four doctoral-level health education students enrolled in a graduate Health Research Methods course and one associate professor with expertise in health education theory reviewed the revised instrument. A standardized scoring worksheet was used to assess the quality of the survey items and the degree to which reviewers felt the items represented the intended SCT constructs. A quantitative testing and measurement expert assisted in the development of the reviewer worksheet shown in Appendix F. Based on reviewer feedback, the researcher made minor revisions in terminology for consistency within the instrument (i.e. sun tanning, sun-tanning, sunbathing were all changed to sun-tanning); one question regarding “pale skin” regarded as ethnocentric was dropped; and questions intended to assess self-efficacy of sun-protective behaviors were clarified so as not to imply behavioral intent for those behaviors. Appendix F includes the email invitation and reviewer worksheet provided to panel members. Recommendations were shared with the researcher’s advisor and changes to the survey instrument were approved by the researcher’s advisor.

Pilot Study

Instrument reliability was determined through a pilot study. Institutional Review Board approval was granted. A copy of the approval email is included in Appendix F. The researcher was provided access to four sections of a pre-service teacher education elective course at Southern Illinois University Carbondale (SIUC) to pilot the questionnaire. The researcher, the two course instructors and the researcher's advisor discussed the purpose of the study and administration methods. After agreeing to participation in the pilot study, the course instructors and the researcher coordinated the delivery of the initial survey and re-survey data collection. The initial surveys were conducted on January 15 and 16, 2013. The follow-up surveys were conducted 14 days later on January 29 and 30, 2013. A total of 65 out of 79 students completed both the test-retest reliability surveys on Day 1 and Day 2.

Prior to survey administration Day 1, the researcher obtained a class roster from the course instructors. The researcher assigned students an identification number code. On the day of the survey, the survey administration script (provided in Appendix F) was read aloud to the class. Once the survey administration script was read, the researcher gave each student the assigned numbered survey and asked if there were any questions. The total amount of time for students to complete the survey on Day 1 was 16 minutes. On Day 2 of the pilot data collection, each student was given an assigned numbered survey corresponding to the assigned number from Day 1. In addition to the survey, on Day 2 participants completed a survey evaluation form (Appendix B) to provide feedback. The total amount of time for students to complete the survey and evaluation on Day 2 was 19 minutes.

The percent of students who reported their race/ethnicity as white was 61.3%, 5.3% male and 89.3% female respectively. The age of the respondents ranged from 22-38 years old. Natural un-tanned skin color and natural eye color were collected during the pilot. Socio-economic status was not captured. The question regarding free or reduced price lunch was not applicable to the pilot sample.

Table 8

Summary of Demographics of Pilot Study

Demographic Variable	Day 1		Day 2	
	Frequency (n)	(%)	Frequency (n)	(%)
Age (years)				
18	1	1.3	1	1.4
19	8	10.1	6	8.7
20	18	22.8	17	24.6
21	21	26.6	21	30.0
22	9	11.4	9	1.4
23	2	2.5	1	5.8
24	4	5.1	4	1.4
25	1	1.3	1	1.4
26	1	1.3	1	1.4
27	1	1.3	1	1.4
31	2	2.5	1	1.4
34	1	1.3	1	1.4
36	1	1.3	1	1.4
38	1	1.3	1	1.4
Missing data	4	10.1	2	2.8
Total	75	100	69	100
Absent	4		10	
Gender				
Male	4	5.3	3	4.3
Female	67	89.3	64	92.7
Missing data	4	5.3	3	2.9
Total	75	100	69	100
Natural Un-tanned Skin Color				
Very fair	5	6.6	4	5.8
Fair	31	41.3	24	34.7
Olive	4	5.3	7	10.1

Light Brown	22	29.3	18	26.0
Dark Brown	9	12.0	12	17.6
Very Dark	1	1.3	0	0
Missing data	3	4.0	4	5.8
Total	75	100	69	100
Natural Eye Color				
Pale or Blue	14	17.7	13	18.8
Green	4	5.1	4	5.8
Hazel Blue/Green	7	8.9	8	11.6
Hazel Green/Brown	15	19.0	7	10.1
Light/Medium Brown	9	11.4	8	11.6
Dark Brown/Very Dark	22	27.8	25	36.2
Other	0	0	0	0
Missing data	8	10.1	4	5.8
Total	79	100	69	100
Race/Ethnicity				
Black	19	25.3	21	30.4
Hispanic	4	5.3	2	2.8
White	46	61.3	42	60.8
Other	1	1.3	1	1.4
Missing data	5	6.6	3	4.3
Total	75	100	69	100

Instrument Reliability

To determine the reliability of the survey instrument, data from Day 1 and Day 2 were entered into SPSS by the researcher. To ensure data entry accuracy, every 3rd survey (n = 25) was rechecked. The original survey form was compared to the electronic data entered into the worksheet. Two data entry errors were found and corrected by the researcher. Frequency analysis was run for each separate variable to ensure responses fell within expected answer options. One error was found and corrected. McDermott and Sarvela (1999) suggest that a minimum alpha of .6 be used to establish reliability in health education research. Internal consistency reliability was assessed with Cronbach's alpha to determine the consistency of items in the proposed multiple-item scales. Table 9 summarizes the internal consistency reliability of the original subscales.

Table 9

Internal Consistency Reliability of Original Subscales

Subscale	Day 1 Number of subjects	Cronbach's α	Day 2 Number of subjects	Cronbach's α
Situation	73	.518	62	.462
Outcome expectation	74	.931	66	.953
Outcome values (Value Expectancy)	70	.493	64	.601
Reinforcements	71	.241	67	.375
Self-efficacy	71	.867	63	.819

Two scales showed low internal consistencies on both day one and day two. The situation subscale had alpha = .518 on day 1, and .462 on day 2. The reinforcements subscale had alpha = .241 on day 1 and .375 on day 2. The outcome values/value expectancy subscale showed low internal consistency on day one but was acceptable on day two (.493 on day 1 and .601 on day 2). The outcome expectation and self-efficacy scales showed acceptable alpha coefficients on both day 1 and day 2 (.931 and .876 respectively).

The situation and reinforcements subscales showed low consistency. The outcome values/value expectancy subscale showed low internal consistency on day one but was acceptable on day two. The outcome expectation and self-efficacy scales showed acceptable alpha coefficients on both day one and day two. An initial round of factor analysis was conducted to determine if there was a more appropriate grouping of variables which may better reflect underlying constructs. Revised subscales are presented in Table 10.

Table 10

Internal Consistency Reliability of Revised Subscales

Subscale	N	Cronbach's α
Outcome Expectations (10 items)	70	.946
Self-efficacy (7 items)	71	.882
Reinforcements (4 items)	72	.777
Value expectancies (5 items)	73	.608
Situation (3 items)	75	.658

Table 11

Comparison of Original and Revised Subscale Items

Subscale	Items	
	Original	Revised
Outcome Expectations	9,10,11,13,14	6,7,9,10,11,13,14,17,20,22
Self-efficacy	23,24,25,26,27,28,29,30,31,32	23,24,27,28,29,30,31
Reinforcement	19r,20,21r,22	4r,25,26,32
Value expectancies	12r,15r,16r,17,18r	8r,12r,15r,18r,19r
Situation	1,2,3,4r,5,6,7,8r	1,3,5

Note: "r" indicates a reverse scored item

Test-retest reliability. Temporal stability of the survey was evaluated by conducting test-retest reliability analysis of all the items. A correlation of response patterns for each item on Day 1 and Day 2 of the pilot survey was determined by using Pearson correlations. Each participant's responses from Day 1 were compared to their responses on Day 2 and strong, significant positive correlations ($p < .01$) were found for most independent variables. Twenty-one items showed less than acceptable correlations between responses on Day 1 and Day 2. Sixteen of those items, however, have been validated in previous sun-tanning research (Glanz et al., 2008; Haight, 2007; Jackson & Aiken, 2000; Heckman et al., 2012; AAD, n.d.). Due to

reliability having been established in previous studies, these questions will be retained for the research study. The remaining five items with low reliability were developed or modified by the researcher. Two of the researcher developed questions were previously validated questions that the researcher modified to be negatively worded, which may have been confusing to participants. The researcher proposes to use the original validated question wording for these two items. Two of the researcher developed questions may not be measuring the intended attribute, and one researcher developed question may be not needed for analysis. The researcher proposes to revise and retain all three questions for the research study, at which time reliability will again be assessed. During the pilot or in previous studies cited as the source of survey items tested in the pilot study, 93% of total questions (n=67), were found reliable. With use of the two original un-modified questions, 96% of items in the pilot study have been found reliable, thus establishing the overall test-retest reliability of the survey instrument.

Table 12

Test-retest Reliability of Demographic Items

Item	N	r ²
Age	64	.989**
Gender	64	.905**
Race/Ethnicity	64	.977**
Natural Un-tanned Skin Color	64	.915**
Natural Eye Color	61	.968**

** $p < .01$

Table 13

Test-retest Reliability of Sun Risk Behavior Items

Item	N	r^2
I use a tanning bed or sun lamp to look sun-tanned.	61	.903**
I "layout" in the sun outdoors to get a suntan.	61	.869**
I suntan for special events (weddings, dances, social events).	62	.902**
Thinking about the last twelve months (1 year): How many times did you use a tanning bed or sun lamp?	62	.721**
Thinking about the last twelve months (1 year): How many times did you suntan outdoors?	62	.595**
Thinking about the last twelve months (1 year): How many minutes was your typical indoor sun-tanning bed/ sun lamp session?	62	.613**
Thinking about the last twelve months (1 year): How many minutes was your typical outdoor sun-tanning session?	62	.341**
Thinking about the last twelve months (1 year): How many times did you have a red or painful sunburn that lasted a day or more?	62	.418**
In the summer, on average, how many hours are you outside per day between 10 am and 4 pm...on WEEKDAYS (Monday-Friday)?	62	.578**
In the summer, on average, how many hours are you outside per day between 10 am and 4 pm...on WEEKEND DAYS (Saturday & Sunday)?	62	.673**

** $p < .01$

Table 14

Test-retest Reliability of Sun Protective Behavior Items

Item	N	r^2
I use a sunscreen when outdoors.	61	.638**
I use sunless tanning <u>lotions, gels, and creams</u> to look sun-tanned.	61	.630**
I use sunless <u>spray-tanning</u> products or services to look sun-tanned.	61	.575**
I avoid intentional (on-purpose) sun-tanning.	61	.454**
To avoid a <u>suntan</u> , I purposely stay inside during peak sun hours (10 am - 4 pm).	61	.576**
To avoid <u>sunburn</u> , I purposely stay inside during peak sun hours (10 am - 4 pm).	60	.762**

When I go outside on a warm sunny day for more than an hour, I wear sun protective clothing (hats, long sleeves, long pants, or other).	61	.623**
When I go outside on a warm sunny day for more than an hour, I use sunscreen with an SPF of 15 or greater.	61	.766**
When I go outside on a warm sunny day for more than an hour, I stay in the shade.	61	.650**
I choose sunless tanning instead of sun-tanning outside.	62	.473**
I choose sunless tanning instead of using a sun-tanning bed/sun lamp?	62	.634**
Thinking about the last twelve months (1 year): How many times did you use a sunless tanning product such as lotions, gels, or creams (not sunscreens)?	62	.739**
Thinking about the last twelve months (1 year): How many times did you use sunless spray-tanning products or services?	55	.700**
Have you ever examined your entire body, including your back, for skin cancer?	62	.616**
Have you EVER had your skin checked for skin cancer from head to toe by a health professional?	62	.605**

** $p < .01$

Table 15

Test-retest Reliability of Situation Subscale Items

Item	N	r^2
Sun-tanned skin is desired in today's society.	64	.628**
There is a trend toward non-tanning in young people today.	63	.41**
My friends think it is important to look a certain way.	62	.613**
My parents discourage sun-tanning.	64	.743**
Young people today think sun-tanning is a priority.	64	.747**
People present a better image when they are sun-tanned.	62	.663**
My friends often sunbathe or use tanning beds.	65	.923**
My friends regularly use sunscreen.	65	.701**

** $p < .01$

Table 16

Test-retest Reliability of Outcome Expectation Subscale Items

Item	N	r ²
Sun-tanned skin helps hide flaws.	65	.886**
I look more attractive with a suntan.	65	.844**
I feel healthier with a suntan.	63	.770**
Other people look more fit with a suntan.	65	.767**
Other people look healthier with a suntan.	65	.804**

** $p < .01$

Table 17

Test-retest Reliability of Value Expectancies Subscale Items

Item	N	r ²
It is important to protect my skin from the sun.	65	.542**
Skin that is <u>not</u> sun-tanned is healthier than sun-tanned skin.	63	.365**
It is important for me to have a suntan.	61	.867**
I worry about getting wrinkles and skin damage from sun-tanning.	65	.669**
I am concerned about getting skin cancer.	63	.737**

** $p < .01$

Table 18

Test-retest Reliability of Reinforcement Subscale Items

Item	N	r ²
I have been told I look better without a suntan.	63	.319*
I am viewed positively when I have a suntan.	61	.753**
People tell me I look good when I have a suntan.	63	.436**
Other people think that I suntan too much.	63	.783**

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

Table 19

Test-retest Reliability of Self-efficacy Subscale Items

Item	N	r ²
How confident do you feel in your ability to:		
Use sunless tanning lotions, gels, or creams to look sun-tanned?	61	.550**
Use sunless spray-tanning products or services to look sun-tanned?	61	.560**
Recognize signs and symptoms of skin cancer?	61	.702**
Check your own skin signs and symptoms of skin cancer?	60	.669**
Talk to a doctor or nurse about skin changes or concerns?	60	.557**
Take steps to keep from getting skin cancer?	61	.450**
Encourage others to use sunscreen.	61	.609**
Discourage others from sun-tanning?	61	.458**
Decide if an area is shaded enough to protect you from the sun?	61	.428**
Decide if a sunscreen product offers an SPF that will protect you from the sun?	61	.549**

** $p < .01$

Table 20

Test-retest Reliability of Brief Social Desirability Scale

Item	N	r ²
Would you smile at people every time you meet them?	64	.566**
Do you always practice what you preach to people?	64	.656**
If you say to people that you will do something, do you always keep your promise no matter how inconvenient it might be?	64	.489**
Would you ever lie to people?	64	.698**

** $p < .01$

Pilot Study Evaluation. On Day 2 of the survey, pilot study survey evaluation forms were given to all participants. Students were asked to complete the survey and attached

evaluation form. Of the 69 students who were present on the second day of data collection, the majority completed the evaluation form as well (n =65, 94.2%). Appendix B contains the pilot study evaluation form and the collated responses.

Summary

This chapter provided an overview of the cross-sectional research design of the proposed study. The independent and dependent variables were described. Sources of survey items were identified from previously established valid and reliable instruments. Pilot study results were reviewed.

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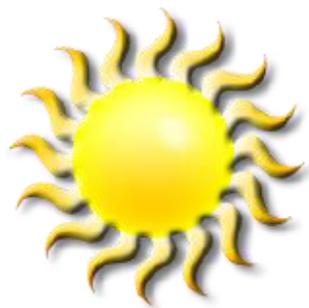
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APPENDIX A



SUN-TANNING SURVEY

Dear participant: Thank you for agreeing to fill out this survey about sun-tanning.

- Do not write your name on this survey. Please try to answer the questions honestly and as best as you can. Only the researcher will see the answers. Your friends, teachers, parents, principal, or anyone else will not see your answers.
- You do not have to fill out the survey. If you do not want to answer a question or if you do not want to finish the survey, you may stop and wait quietly until the other students are finished. Your grade will not be affected.
- Immediately after everyone finishes the surveys, place in the envelope labeled "RETURN SURVEYS." The envelope will be sealed and returned directly to the researcher from Southern Illinois University.

Attitudes	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Please read the following statements and circle <u>one</u> answer that shows how much you agree or disagree.					
Sun-tanned skin is desired in today's society.	1	2	3	4	5
There is a trend toward non-tanning in young people today.	1	2	3	4	5
My friends think it is important to look a certain way.	1	2	3	4	5
My parents discourage sun-tanning.	1	2	3	4	5
Young people today think sun-tanning is a priority.	1	2	3	4	5
People present a better image when they are sun-tanned.	1	2	3	4	5
My friends often sunbathe or use tanning beds.	1	2	3	4	5
My friends regularly use sunscreen.	1	2	3	4	5
Sun-tanned skin helps hide flaws.	1	2	3	4	5
I look more attractive with a suntan.	1	2	3	4	5
I feel healthier with a suntan.	1	2	3	4	5
I am concerned about getting skin cancer.	1	2	3	4	5
Other people look more fit with a suntan.	1	2	3	4	5
Other people look healthier with a suntan.	1	2	3	4	5
It is important to protect my skin from the sun.	1	2	3	4	5
Skin that is <u>not</u> sun-tanned is healthier than sun-tanned skin.	1	2	3	4	5
It is important for me to have a suntan.	1	2	3	4	5



Continued on next page

Attitudes (continued)	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Please read the following statements and circle <u>one</u> answer that shows how much you agree or disagree.					
I worry about getting wrinkles and sun damage from sun-tanning.	1	2	3	4	5
I have been told I look better without a suntan.	1	2	3	4	5
I am viewed positively when I have a suntan.	1	2	3	4	5
Other people think that I suntan too much.	1	2	3	4	5
People tell me I look good when I have a suntan.	1	2	3	4	5

Confidence	Very Unconfident	Somewhat Unconfident	Neither Confident nor Unconfident	Somewhat Confident	Very Confident
Please read the following statements and circle <u>one</u> answer that shows how confident or unconfident you are for each statement.					
<i>How confident do you feel that you could:</i>					
Decide if an area is shaded enough to protect you from the sun?	1	2	3	4	5
Decide if a sunscreen product offers an SPF that will protect you from the sun?	1	2	3	4	5
Use sunless tanning <u>lotions, gels, or creams</u> to look sun-tanned?	1	2	3	4	5
Use sunless <u>spray-tanning</u> products or services to look sun-fanned?	1	2	3	4	5
Recognize signs and symptoms of skin cancer?	1	2	3	4	5
Check your own skin for signs and symptoms of skin cancer?	1	2	3	4	5
Talk to a doctor or nurse about skin changes or concerns?	1	2	3	4	5
Take steps to keep yourself from getting skin cancer?	1	2	3	4	5
Encourage others to use sunscreen?	1	2	3	4	5
Discourage others from sun-tanning?	1	2	3	4	5

Continued on next page



Behaviors	Never	Rarely	Sometimes	Often	Always
Please read the following statements below and circle <u>one</u> answer that best describes you.					
I use a sunscreen when outdoors.	1	2	3	4	5
I use sunless <u>lotions, gels, and creams</u> to look sun-tanned.	1	2	3	4	5
I use sunless <u>spray-tanning</u> products or services to look sun-tanned.	1	2	3	4	5
I use a tanning bed or sun lamp to look sun-tanned.	1	2	3	4	5
I "layout" in the sun outdoors to get a suntan.	1	2	3	4	5
I avoid intentional (on purpose) sun-tanning.	1	2	3	4	5
I suntan for special events (weddings, dances, social events).	1	2	3	4	5
To avoid a <u>suntan</u> , I purposely stay inside during peak sun hours (10 am – 4 pm).	1	2	3	4	5
To avoid a <u>sunburn</u> , I purposely stay inside during peak sun hours (10 am – 4 pm).	1	2	3	4	5
When I go outside on a warm sunny day for more than an hour I wear sun protective clothing (such as hats, long sleeves, long pants or other).	1	2	3	4	5
When I go outside on a warm sunny day for more than an hour I use sunscreen with an SPF of 15 or greater.	1	2	3	4	5
When I go outside on a warm sunny day for more than an hour, I stay in the shade.	1	2	3	4	5
I choose sunless tanning instead of sun-tanning outside.	1	2	3	4	5
	6 Does not apply– I do not suntan outside.				
I choose sunless tanning instead of using a sun-tanning bed/sun lamp.	1	2	3	4	5
	6 Does not apply– I do not use a sun-tanning bed/ lamp.				

Continued on next page



Behaviors (Continued)	Not at all	A few times during the year	About once a month	Two to three times a month	About once a week	More than once a week
Thinking about the last twelve months (1 year), please circle one answer that best describes you.						
You can give your best guess, even if you are not sure.						
How many times did you use a tanning bed or sun lamp?	1	2	3	4	5	6
How many times did you suntan outdoors?	1	2	3	4	5	6
How many times did you use a sunless tanning product such as <u>lotions, gels, or creams</u> (not sunscreens)?	1	2	3	4	5	6
How many times did you use sunless <u>spray-tanning</u> products or services?	1	2	3	4	5	6

	Less than 5 minutes	5 to 10 minutes	11 to 15 minutes	16 to 20 minutes	More than 20 minutes	Does not apply to me
How many minutes was your typical indoor tanning session?	1	2	3	4	5	N/A
How many minutes was your typical outdoor sun-tanning session?	1	2	3	4	5	N/A

	1 time	2 times	3 times	4 times	5 or more times	None
How many times in the last year did you have a red or painful sunburn that lasted a day or more?	1	2	3	4	5	N/A

Please read each question below and circle <u>one</u> answer that best describes you.							
In the summer, on average, how many hours are you outside per day between 10 am – 4 pm...on WEEKDAYS (Monday-Friday)?	30 min or less	31 min to 1 hour	2 hours	3 hours	4 hours	5 hours	6 or more hours
In the summer, on average, how many hours are you outside per day between 10 am – 4 pm...on WEEKEND DAYS (Saturday & Sunday)?	30 min or less	31 min to 1 hour	2 hours	3 hours	4 hours	5 hours	6 or more hours

Continued on next page



Behaviors (Continued)		
<i>Please read each question below and circle yes or no to show how it best describes you.</i>		
Have you EVER examined your entire body, including your back, for skin cancer?	Yes	No
Have you EVER had your skin checked for skin cancer from head to toe by a health professional?	Yes	No

Social		
<i>Please read each question below and circle yes or no to show how it best describes you.</i>		
Would you smile at people every time you meet them?	Yes	No
Do you always practice what you preach to people?	Yes	No
If you say to people that you will do something, do you always keep your promise no matter how inconvenient it might be?	Yes	No
Would you ever lie to people?	Yes	No

Continued on next page



Demographics

Please read each question below and make one choice for each that best describes you.

What is your age? _____ years

What is your gender? _____ Male _____ Female

What is your race/ethnicity?

_____ Asian/Pacific Islander

_____ Black/Non-Hispanic

_____ White/Non-Hispanic

_____ Hispanic/Latino

_____ Native American

_____ Other (please specify)

What is the natural color of your un-tanned skin?

_____ Very Fair

_____ Fair

_____ Olive

_____ Light Brown

_____ Dark Brown

_____ Very Dark

What is the natural color of your eyes?

_____ Pale or Blue

_____ Green

_____ Hazel Blue/Green

_____ Hazel Green/Brown

_____ Light/Medium Brown

_____ Dark Brown/Very Dark

_____ Other (please specify)



This completes the Sun-tanning Survey.

Thank you for your participation!

APPENDIX B

EVALUATION FORM	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Avg Score (N=65)
Please read the following statements and circle <u>one</u> answer that shows how much you agree or disagree.						
The instructions for completing the survey were easy to follow.	1	2	3	4	5	4.23
The questions in the survey were clear.	1	2	3	4	5	4.26
The survey was well-organized.	1	2	3	4	5	4.28
<p>Suggestions for improving survey items:</p> <p>Don't give to people who don't suntan or sunbathe.</p> <p>Consider the seasonal tanner when writing questions. I only tan in winter.</p> <p>None</p> <p>I am unsure why there needs to be a #6 for the Behaviors sections because #1 is already a Never.</p>						
<p>Additional comments:</p> <p>None</p> <p>Great Job! I hope the results go Well! Hope you find what you're looking for. If not hope the info you do find is interesting! Good Luck!</p> <p>Well thought out survey.</p>						

Appendix C
Letter to Principal

<DATE>

Dear Mr. Booth,

My name is Diane Land and I am a graduate student in Health Education at Southern Illinois University – Carbondale. I am nearing completion of my doctorate of philosophy degree and am conducting a research study to investigate sunless tanning and sun-tanning attitudes and behaviors of young people. Sun-tanning is one cause of skin cancer. Understanding what young people think and do may better inform health education efforts to prevent skin cancer.

I am contacting you today at the suggestion of Dr. Joyce Fetro, to ask for permission to include Carbondale Community High School students in this study. I would like to come to your school to administer a survey to your students when they return to classes in the Fall 2014. The survey should take approximately 20 minutes to complete.

This project will be reviewed and approved by the SIUC Human Subjects Committee of the Office of Sponsored Projects Administration. Participation is voluntary and will require written parental/guardian consent. No names will be written on the surveys and there will be no way to identify an individual's responses. The results of the study will be published in a doctoral dissertation and a health journal, however, your school will never be disclosed.

I have attached a copy of the survey for your reference and the letter with consent form I propose to send home to the parent/guardian of your students to obtain permission for their child to be allowed to participate in the survey. Please let me know at your earliest convenience if I may include CCHS in my research study and to discuss my request further. You may contact me anytime at (618) 924-0852 (cell), or (618) 457-5200, ext. 67834 (work) or by email at diane.land@sih.net. Thank you in advance.

If you have any questions about the study, you may also contact my faculty advisor Dr. Roberta Ogletree at (618) 453-2777 or the SIU Office of Sponsored Projects Administration, at (618) 453-4533.

Sincerely,

Diane Land
Doctoral Student, Health Education and Recreation, Southern Illinois University Carbondale

Appendix D

<DATE>

Dear Parent or Guardian,

My name is Diane Land and I am a graduate student Southern Illinois University – Carbondale. I am conducting a research study to complete my Doctorate of Philosophy (Ph.D.) in Health Education. I am asking for permission to include your child in a survey to investigate sunless tanning and sun-tanning attitudes and behaviors of young people. Sun-tanning is one cause of skin cancer. Even if your child does not suntan on purpose or use sunless tanning products, understanding what young people think and do may help improve health education efforts to prevent skin cancer.

During the week of <DATE To Be Determined>, I will come to Carbondale Community High School to administer a survey to children during their physical education class. The survey should take approximately 20 minutes to complete. Myself and another research assistant from Southern Illinois University Carbondale will be available to help your child if he or she needs help reading or responding to the questions.

Will you allow your child permission to take the survey? Please check “Yes” or “No” on the attached informed consent form and ask your child to return it to his or her physical education teacher by Wednesday, <DATE To Be Determined>, 2014. As a token of my appreciation for your child returning the completed informed consent form, regardless if you allow him or her to participate or not, your child’s name will be entered into a random drawing of \$5.00 cash prizes. The odds of your child winning a \$5.00 cash prize are 1 out of every 50 children. Prizes will be awarded to children during the physical education class on Tuesday, <DATE To Be Determined>, 2014. If your child is absent that day, his or her physical education teacher will be instructed to give the prize to your child when he or she returns to class.

Any information that is obtained through this study that can be identified with your child is confidential within reasonable limits. Your child’s responses will not be linked to their name in any written or verbal report of this research project. Only those directly involved with this project will have access to the data.

Your decision to allow your child to participate will not affect any current or future relationship with their teacher, CCHS, the researcher, or Southern Illinois University. The survey is voluntary. Your child may stop participating in the survey at any time. If you have any questions about the study, please contact my faculty advisor Dr. Roberta Ogletree at (618) 453-2777, or the SIU Office of Sponsored Projects Administration, at (618) 453-4533.

Thank you for taking the time to assist me in this research.

Sincerely,

Diane Land
Doctoral Student, Health Education and Recreation, Southern Illinois University Carbondale

INFORMED CONSENT FORM

You are making a decision about whether to allow your child to participate in this voluntary survey to investigate sunless tanning and sun-tanning attitudes and behaviors of young people. Your response and signature below indicate that you have read the information provided above.

Please ask your child to return this form to his or her physical education teacher by Friday, <DATE tbd> , 2014

<i>Please check (✓) one:</i> <input type="checkbox"/> <i>Yes, I give my child permission to participate in the survey.</i> <input type="checkbox"/> <i>No, I do not give my child permission to participate in the survey.</i>	
<i>Printed Name of (son/daughter/child/adolescent youth)</i> 	
<i>Printed Name of Parent(s) or Legal Guardian</i> 	
<i>Signature of Parent(s) or Legal Guardian</i> 	<i>Date</i>

This project has been reviewed and approved by the SIUC Human Subjects Committee. Questions concerning your rights as a participant in this research may be addressed to the Committee Chairperson, Office of Sponsored Projects Administration, SIUC, Carbondale, IL 62901-4709. Phone (618) 453-4533. E-mail: siuhsc@siu.edu

Appendix E

Codebook for Survey to Assess Psychosocial Predictors of High School Adolescents' Sun-tanning and Sun-protective Behaviors

Situation: Person's perception of the environment, perceived norms			
	Item	Response Values	Source
1	Sun-tanned skin is desired in today's society.	1 = Strongly Disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly Agree 99 = Missing r = Reverse scored item	Researcher
2	There is a trend toward non-tanning in young people today.		Jackson & Aiken, 2000
3	My friends think it is important to look a certain way.		James et al., 2002
4r	My parents discourage sun-tanning.		Heckman et al., 2012; Jackson & Aiden, 2000
5	Young people today think sun-tanning is a priority.		James et al., 2002
6	People present a better image when they are sun-tanned.		Heckman et al., 2012; Jackson & Aiden, 2000
7	My friends often sunbathe or use tanning beds.		Heckman et al., 2012
8r	My friends regularly use sunscreen.		Heckman et al., 2012; Jackson & Aiden, 2000

Outcome Expectation: anticipatory outcome of behavior			
	Item	Response Values	Source
9	Sun-tanned skin helps hide flaws.	1 = Strongly Disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly Agree 99 = Missing	Researcher
10	I look more attractive with a suntan.		James et al., 2002
11	I feel healthier with a suntan.		James et al., 2002
13	Other people look more fit with a suntan.		James et al., 2002
14	Other people look healthier with a suntan.		James et al., 2002; Bandi at al., 2010; Heckman et al., 2012

Value Expectancies: Values the person places on a given outcome; incentive			
	Item	Response Values	Source
15r	It is important to protect my skin from the sun.	1 = Strongly Disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly Agree 99 = Missing r = Reverse scored item	Heckman et al., 2012
16r	Skin that is <u>not</u> sun-tanned is healthier than sun-tanned skin.		Researcher
17	It is important for me to have a suntan.		Researcher
18r	I worry about getting wrinkles and skin damage from sun-tanning.		Researcher
12r	I am concerned about getting skin cancer.		Researcher

Reinforcement: responses to a person's behavior that increase/decrease likelihood of reoccurrence			
	Item	Response Values	Source
19r	I have been told I look better without a suntan.	1 = Strongly Disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly Agree 99 = Missing r = Reverse scored item	Researcher
20	I am viewed positively when I have a suntan.		Researcher
22	People tell me I look good when I have a suntan.		Researcher
21r	Other people think that I suntan too much.		Researcher

Self-efficacy: belief in one's ability to do or accomplish a specific task			
	Item	Possible Values	Source
	<i>How confident do you feel in your ability to:</i>	1 = Very unconfident 2 = Somewhat unconfident 3 = Neither confident nor unconfident 4 = Somewhat confident 5 = Very confident 99 = Missing	
25	Use sunless tanning <u>lotions, gels, or creams</u> to look sun-tanned?		Heckman et al., 2012; Jackson & Aiken, 2000
26	Use sunless <u>spray-tanning</u> products or services to look sun-tanned?		Lazovich et al., 2008
27	Recognize signs and symptoms of skin cancer?		AAD, n.d.
28	Check your own skin signs and symptoms of skin cancer?		AAD, n.d.
29	Talk to a doctor or nurse about skin changes or concerns?		AAD, n.d.
30	Take steps to keep from getting skin cancer?		AAD, n.d.
31	Encourage others to use sunscreen.		Researcher
32	Discourage others from sun-tanning?		Researcher
23	Decide if an area is shaded enough to protect you from the sun?		AAD, n.d.
24	Decide if a sunscreen product offers an SPF that will protect you from the sun?	AAD, n.d.	

Sun Protective Behaviors (SPB)				
	Item	Possible Values	Source	
33	I use a sunscreen when outdoors.	1 = Never 2 = Rarely 3 = Sometimes 4 = Often 5 = Always 99 = Missing	Glanz et al., 2008	
34	I use sunless tanning <u>lotions, gels, and creams</u> to look sun-tanned.		Glanz et al., 2008	
35	I use sunless <u>spray-tanning</u> products or services to look sun-tanned.		Glanz et al., 2008	
38	I avoid intentional (on-purpose) sun-tanning.		Researcher	
40	To avoid a <u>suntan</u> , I purposely stay inside during peak sun hours (10 am - 4 pm).		Glanz et al., 2008	
41	To avoid <u>sunburn</u> , I purposely stay inside during peak sun hours (10 am - 4 pm).		Glanz et al., 2008	
42	When I go outside on a warm sunny day for more than an hour, I wear sun protective clothing (hats, long sleeves, long pants, or other).		Glanz et al., 2008; James et al., 2002	
43	When I go outside on a warm sunny day for more than an hour, I use sunscreen with an SPF of 15 or greater.		Glanz et al., 2008; James et al. 2002; Reed	
44	When I go outside on a warm sunny day for more than an hour, I stay in the shade.		Glanz et al., 2008; James et al., 2002	
45	I choose sunless tanning instead of sun-tanning outside.		Mahoney et al., 2012	
46	I choose sunless tanning instead of using a sun-tanning bed/sun lamp?		Researcher	
49	Thinking about the last twelve months (1 year): How many times did you use a sunless tanning product such as <u>lotions, gels, or creams</u> (not sunscreens)?		1 = Not at all 2 = A few times during the year 3 = About once a month 4 = Two to three times a month 5 = About once a week 6 = More than once a week	AAD, n.d.
50	Thinking about the last twelve months (1 year): How many times did you use sunless <u>spray-tanning</u> products or services?			Researcher
56	Have you ever examined your entire body, including your back, for skin cancer?		0 = No, 1 = Yes	Glanz et al., 2008
57	Have you EVER had your skin checked for skin cancer from head to toe by a health professional?	0 = No, 1 = Yes	Glanz et al., 2008	

Sun Risk Behaviors (RISK)			
36	I use a tanning bed or sun lamp to look sun-tanned.	1 = Never 2 = Rarely 3 = Sometimes 4 = Often 5 = Always 6 = Does not apply 99 = Missing	Glanz et al., 2008
37	I "layout" in the sun outdoors to get a suntan.		Glanz et al., 2008
39	I suntan for special events (weddings, dances, social events).		Mahoney et al., 2012
47	Thinking about the last twelve months (1 year): How many times did you use a tanning bed or sun lamp?	1 = Not at all 2 = A few times during the year 3 = About once a month 4 = Two to three times a month 5 = About once a week 6 = More than once a week	AAD, n.d.
48	Thinking about the last twelve months (1 year): How many times did you suntan outdoors?		AAD, n.d.
51	Thinking about the last twelve months (1 year): How many minutes was your typical indoor sun-tanning bed/ sun lamp session?	0 = Does not apply to me (I do not suntan indoors). 1 = Less than 5 minutes 2 = 5 to 10 minutes 3 = 11 to 15 minutes 4 = 16 to 20 minutes 5 = More than 20 minutes	AAD, n.d.
52	Thinking about the last twelve months (1 year): How many minutes was your typical outdoor sun-tanning session?		AAD, n.d.
53	Thinking about the last twelve months (1 year): How many times did you have a red or painful sunburn that lasted a day or more?	0 = Does not apply to me (I have not gotten a sunburn in the last twelve months) 1 = 1 2 = 2 3 = 3 4 = 4 5 = 5 or more times	Glanz et al., 2008
54	In the summer, on average, how many hours are you outside <u>per day</u> between 10 am and 4 pm...on WEEKDAYS (Monday-Friday)?	0 = 30 minutes or less 1 = 31 minutes to 1 hour 2 = 2 hours 3 = 3 hours 4 = 4 hours	Glanz et al., 2008

		5 = 5 hours 6 = 6 hours	
55	In the summer, on average, how many hours are you outside <u>per day</u> between 10 am and 4 pm...on WEEKEND DAYS (Saturday & Sunday)?	30 minutes or less 31 minutes to 1 hour 2 hours 3 hours 4 hours 5 hours 6 hours	Glanz et al., 2008

Demographics			
62	What is your age?	12-25+	Researcher
63	What is your gender?	0 = Male, 1 = Female	Researcher
67	Do you receive free or reduced price lunch?	0 = No, 1 = Yes	McClary-King, 2008
65	What is the natural color of your un-tanned skin?	1 = Very Fair 2 = Fair 3 = Olive 4 = Light Brown 5 = Dark Brown 6 = Very Dark 99 = Missing	Fitzpatrick, 1988; Glanz et al., 2008
64	What is your race/ethnicity	1 = Asian/Pacific Islander 2 = Black/Non-Hispanic 3 = White/Non-Hispanic 4 = Hispanic/Latino 5 = Native American 6 = Other (please specify) 6a Open-text field 99 = Missing	Researcher

66	What is the natural color of your eyes?	1 = Pale or Blue 2 = Green 3 = Hazel Blue/Green 4 = Hazel Green/Brown 5 = Light/Medium Brown 6 = Dark Brown/Very Dark 7 = Other (please specify) 7a Open-text field 99 = Missing	Researcher
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Brief Social Desirability Scale (BSDS)			
	Item	Possible Values	Source
58	Would you smile at people every time you meet them?	0 = No 1 = Yes	Haghighat, 2007
29	Do you always practice what you preach to people?		Haghighat, 2007
60	If you say to people that you will do something, do you always keep your promise no matter how inconvenient it might be?		Haghighat, 2007
61	Would you ever lie to people?		Haghighat, 2007

APPENDIX F

HSC approval

1 message

SIU Human Subjects Committee <siuhsc@siu.edu>

Wed, Nov 28, 2012 at 10:47 AM

To: Diane Land <dianeland@siu.edu>

Cc: jfetro@siu.edu

Hello,

The HSC has approved your revisions and you may begin. The approval paperwork will be sent in the next few days.

Good luck with your research.

Karen

At 04:07 PM 11/26/2012, you wrote:

Yes, thank you. Re-attached.

Diane

On Mon, Nov 26, 2012 at 4:03 PM, SIU Human Subjects Committee <siuhsc@siu.edu> wrote:

Form B-2 #3 still says "yes" on the application form I received. Did you perhaps attach the wrong version?

Thanks,
kr

At 03:37 PM 11/26/2012, you wrote:

Hi Karen, thanks for the email. The requested revisions are in bold font and highlighted in the attached documents.

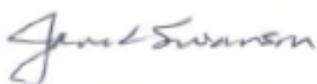
Revisions include:

1. Form B-2, question #3 changed to "No" to indicate confidential not anonymous participation.
2. Survey cover letter and consent form wording changed to "confidential" rather than anonymous participation.
3. Signature line added to the consent form.

Please let me know if any other revisions are requested. Thanks!

Diane Land, MPH, CHES
Doctoral Student
Department of Health Education & Recreation
Southern Illinois University Carbondale
dianeland@siu.edu
618.534.0050

To: Diane Land

From: Jane L. Swanson, Ph.D.
Chair, Human Subjects Committee 

Date: October 24, 2012

Subject: *Psychosocial Predictors of Sun-tanning and Sun Protective Behaviors*

Protocol Number: 12440

The above referenced protocol has been reviewed by the Human Subjects Committee (HSC). A decision has been deferred pending receipt of the following revisions/clarifications:

1. From what course will you be recruiting subjects?
2. Change ORDA to OSPA in the recruitment script and consent form.
3. In the consent form, include a statement that completion of the survey indicates consent to participate.
4. How will you match surveys if there is no identifying information?

Please submit revisions/clarifications by mail, fax or by e-mail to the HSC secretary at sihusc@siu.edu. They will be reviewed upon receipt, and you will be notified of your status as soon as possible. **Please bold or highlight revisions.**

NOTE: If the requested revisions are not received in the HSC office within 90 days from the date of this memo, your research application will be removed from active consideration. If at a future date you wish to proceed with the project, you will be required to fill out a new application.

JS:kr

Cc: Joyce Fetro

Survey Administration Script/Cover

Sun-tanning Survey Pilot

My name is Diane Land. I am a graduate student in the Department of Health Education & Recreation at Southern Illinois University. I am conducting a pilot study to test a questionnaire about sun-tanning. I am asking for your voluntary participation.

The survey should take about 10-15 minutes to complete and involves answering some questions about your attitudes and behaviors related to sun-tanning and sun protection behaviors – once today and then completing the same questionnaire in about two weeks.

If you are at least 18 years old, you are eligible to participate in the survey.

Your participation in the survey is voluntary. You do not have to answer any question you would rather not answer. You can stop participating at any time. There are no consequences if you decide not to complete the survey. Completion of this survey indicates consent to participate in this study.

The surveys will be numbered in order to match up the first and second surveys completion but no individual identifying information will be collected. Results of the survey will be analyzed at the group level to protect your privacy and allow for your confidential participation. All your responses will be kept confidential within reasonable limits. Completed surveys will be kept in a secure, locked file cabinet to which only the researcher has access. Surveys will be kept for three years after completion of the study, and then securely destroyed.

If you DO agree to complete the survey, please do not write your name on the survey. After you complete the survey, please place it in the envelope or box provided.

If you DO NOT want to participate in the survey, you can just place the blank survey in the envelope or box.

If you have any questions about this study, please contact Dr. Joyce Fetro at 618-453-3777 or jfetro@siu.edu.

Please keep this copy for your records. Thank you for your participation!

This project has been reviewed and approved by the SIUC Human Subjects Committee. Questions concerning your rights as a participant in this research may be addressed to the Committee Chairperson, Office of Sponsored Projects Administration, Southern Illinois University, Carbondale, IL 62901-4709. Phone (618) 453-4533. E-mail siuhsc@siu.edu

Consent Form

Sun-tanning Survey Pilot

My name is Diane Land. I am a graduate student in the Department of Health Education & Recreation at Southern Illinois University. I am conducting a pilot study to test a questionnaire about sun-tanning. I am asking for your voluntary participation.

The survey should take about 10-15 minutes to complete and involves answering some questions about your attitudes and behaviors related to sun-tanning and sun protection behaviors – once today and then completing the same questionnaire in about two weeks.

If you are at least 18 years old, you are eligible to participate in the survey.

Your participation in the survey is voluntary. You do not have to answer any question you would rather not answer. You can stop participating at any time. There are no consequences if you decide not to complete the survey.

The surveys will be numbered in order to match up the first and second surveys completion but no individual identifying information will be collected. Results of the survey will be analyzed at the group level to protect your privacy and allow for your confidential participation. All your responses will be kept confidential within reasonable limits. Completed surveys will be kept in a secure, locked file cabinet to which only the researcher has access. Surveys will be kept for three years after completion of the study, and then securely destroyed.

If you DO agree to complete the survey, please do not write your name on the survey. After you complete the survey, please place it in the envelope or box provided.

If you DO NOT want to participate in the survey, you can just place the blank survey in the envelope or box.

If you have any questions about this study, please contact, Dr. Joyce Fetro at 618-453-3777 or jfetro@siu.edu.

Thank you for your participation!

Participant Signature and Date

This project has been reviewed and approved by the SIUC Human Subjects Committee. Questions concerning your rights as a participant in this research may be addressed to the Committee Chairperson, Office of Sponsored Projects Administration, Southern Illinois University, Carbondale, IL 62901-4709. Phone (618) 453-4533. E-mail siuhsc@siu.edu

[Email]

Sept. 2, 2012

Dear Dr. Miller:

I am a doctoral candidate in Health Education at Southern Illinois University Carbondale. Dr. Joyce Fetro, my committee chair, suggested that I ask you to serve as one of my panel of experts in my instrument development process. Would you be willing to review the survey instrument for content validity?

My dissertation is entitled "Psychosocial Predictors of Sun-tanning and Sun-protective Behaviors of Adolescents." The variables included in my investigation are perception of the environment (perceived norms), outcome expectations, outcome values, social reinforcement, and self-efficacy for sun protective behaviors.

I have attached a copy of the questionnaire that will be administered to high-school aged adolescents and a "Content Validity Worksheet" for your review and feedback. For each question please consider how well the item matches the intended construct (as defined), and whether the item is of high quality (i.e., clear and age appropriate).

I would appreciate any additional comments you may have about the proposed items or if you have suggestions for additional items that should be included or considered. Please return your completed review electronically to dianeland@siu.edu.

You may contact me anytime at (618) 924-0852 or by email if you have questions or comments. If at all possible, please return your review by September 15, 2012.

Thank you.

Sincerely,

Diane M. Land, MPH, CHES

Attachments (2)

CONTENT VALIDITY WORKSHEET

REVIEWER'S Name: _____

Purpose: This worksheet has been designed to gather expert feedback during survey instrument development. The proposed items are intended to assess psychosocial predictors of sun-tanning and sun protective behaviors in adolescents.

DIRECTIONS FOR REVIEWERS

First: For each questionnaire item listed below, consider these two statements:

- The item matches the distinct construct. (*Note:* a brief description of each construct is listed at the top of each section)
- The item is of high quality (i.e., question is clear and developmentally appropriate)

Then: Use the 5-point scale to the right to show how much you agree or disagree with each statement. Enter those codes in the last two columns.

Please add any additional questions or suggestions you may have.

- 5 = Strongly Agree
4 = Agree
3 = Neutral
2 = Disagree
1 = Strongly Disagree



Item	Match How Well?	Item Quality?
<i>Situation (person's perception of the environment; perceived norms)</i>		
1 Sun-tanned skin is desired in today's society.	<input type="text"/>	<input type="text"/>
2 There is a trend toward non-tanning in young people today.	<input type="text"/>	<input type="text"/>
3 My friends think it is important to look a certain way.	<input type="text"/>	<input type="text"/>
4 My parents discourage sun-tanning.	<input type="text"/>	<input type="text"/>
5 Young people today think sun-tanning is a priority.	<input type="text"/>	<input type="text"/>
6 People present a better image when they are sun-tanned.	<input type="text"/>	<input type="text"/>
Add: Click here to enter text.		
Add: Click here to enter text.		

5 = Strongly Agree
 4 = Agree
 3 = Neutral
 2 = Disagree
 1 = Strongly Disagree



Item	Match How Well?	Item Quality?
Outcome Expectations (anticipatory outcomes of a behavior)		
7 Sun-tanned skin helps hide flaws.	<input type="text"/>	<input type="text"/>
8 I look more attractive with a suntan.	<input type="text"/>	<input type="text"/>
9 I feel healthier with a suntan.	<input type="text"/>	<input type="text"/>
10 Other people look more fit with a suntan.	<input type="text"/>	<input type="text"/>
11 Other people look healthier with a suntan.	<input type="text"/>	<input type="text"/>
Add: Click here to enter text.		
Add: Click here to enter text.		

Item	Match How Well?	Item Quality?
Value expectancies (values the person places on a given outcome, incentive)		
12 It is important to protect my skin from the sun.	<input type="text"/>	<input type="text"/>
13 Skin that is <u>not</u> sun-tanned is healthier than sun-tanned skin.	<input type="text"/>	<input type="text"/>
14 It is important for me to have a suntan.	<input type="text"/>	<input type="text"/>
15 I worry about getting wrinkles and sun damage from sun-tanning.	<input type="text"/>	<input type="text"/>
16 I am concerned about getting skin cancer.	<input type="text"/>	<input type="text"/>
Add: Click here to enter text.		
Add: Click here to enter text.		

5 = Strongly Agree
 4 = Agree
 3 = Neutral
 2 = Disagree
 1 = Strongly Disagree

Item	Match How Well?	Item Quality?
Reinforcements (<i>responses to a person's behavior that increase/decrease likelihood of reoccurrence</i>)		
17 I have been told I look better without a suntan.	<input type="checkbox"/>	<input type="checkbox"/>
18 I am viewed positively when I have a suntan.	<input type="checkbox"/>	<input type="checkbox"/>
19 People tell me I look good when I have a suntan.	<input type="checkbox"/>	<input type="checkbox"/>
20 Other people think that I suntan too much.	<input type="checkbox"/>	<input type="checkbox"/>
Add: Click here to enter text.		
Add: Click here to enter text.		

Item	Match How Well?	Item Quality?
Self-efficacy (<i>belief in one's ability to do or accomplish a specific task.</i>)		
21 How confident do you feel in your ability to:		
a. Stay inside during peak sun hours (10 am – 4 pm).	<input type="checkbox"/>	<input type="checkbox"/>
b. Wear clothing such as hats or long sleeves to protect me from the sun.	<input type="checkbox"/>	<input type="checkbox"/>
c. Use sunscreen with SPF 15+ when spending time outside.	<input type="checkbox"/>	<input type="checkbox"/>
d. Use artificial/faux sun-tanning <u>lotions, gels, or creams</u> to obtain a sun-tanned appearance.	<input type="checkbox"/>	<input type="checkbox"/>
e. Use artificial/faux <u>spray-tanning</u> products or services to obtain a sun-tanned appearance.	<input type="checkbox"/>	<input type="checkbox"/>
f. Recognize signs and symptoms of skin cancer.	<input type="checkbox"/>	<input type="checkbox"/>
g. Perform skin self-checks for signs and symptoms of skin cancer.	<input type="checkbox"/>	<input type="checkbox"/>
h. Talk to a medical professional about any skin changes and concerns.	<input type="checkbox"/>	<input type="checkbox"/>
i. Take steps to prevent skin cancer.	<input type="checkbox"/>	<input type="checkbox"/>
Add: Click here to enter text.		
Add: Click here to enter text.		

Please use the space below to provide any additional feedback/comments you may have regarding the proposed questionnaire items.

Click here to enter text.

Thank you for your time and effort to review the questions and provide your feedback.

Please save your comments and return them to me at: dianeland@siu.edu.