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Similarities and differences between sun-related knowledge, attitudes, beliefs, and behaviors of South African and Californian university students

Katerina Hollblad-Fadiman
San Jose State University

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SIMILARITIES AND DIFFERENCES BETWEEN SUN-RELATED KNOWLEDGE, ATTITUDES, BELIEFS, AND BEHAVIORS OF SOUTH AFRICAN AND CALIFORNIAN UNIVERSITY STUDENTS

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Katerina Hollblad-Fadiman

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APPROVED FOR THE DEPARTMENT OF HEALTH SCIENCE

Kathleen Roe, Dr.P.H, M.P.H.

Daniel Perales, Dr.P.H., M.P.H.

William Washington, D.P.A, M.P.H., C.H.E.S

APPROVED FOR THE UNIVERSITY

M. Lou Swandorski

ABSTRACT

SIMILARITIES AND DIFFERENCES BETWEEN SUN-RELATED KNOWLEDGE, ATTITUDES, BELIEFS, AND BEHAVIORS OF SOUTH AFRICAN AND CALIFORNIAN UNIVERSITY STUDENTS

by Katerina Hollblad-Fadiman

Melanoma and non-melanoma skin cancers are assuming epidemic proportions in many countries. In the U.S., melanoma is the most rapidly increasing cancer. South Africa has the second highest incidence of melanoma on earth. The major risk factor for both skin cancers is sun exposure.

In this research, 160 white South African and 163 white Californian students were surveyed regarding sun-related attitudes, beliefs, knowledge, and behavior. Data were collected through an originally developed, anonymous questionnaire.

Analysis revealed that similarities between both groups far outnumbered differences. However, when significant differences were identified, South Africans reported less sun protection, more frequent sun exposure, and less knowledge of sun-related topics than Californians. The most important health education recommendations were to focus prevention on males in both countries and mothers in South Africa, and to increase utilization of media in health education.

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CHAPTER 1

Introduction

The purpose of this thesis was to systematically explore the similarities and differences between sun-related attitudes, knowledge, beliefs, and behaviors of white, English speaking, South African and Californian university students. An equally important purpose was to identify which predisposing and reinforcing factors affecting sun-related behavior seem universal and which are more culturally situated. A third purpose was to investigate the sun-related behavior of respondents' family and friends, as well as to identify the individuals who most influence respondents' sun-related behavior. In order to meet these objectives, an original survey was administered to college students in Richards Bay, South Africa and San Jose, California.

The resulting data were used to develop recommendations regarding the design of sun-related interventions that are both theoretically based and culturally sensitive. In addition, recommendations for future sun-related behavioral research were provided. The ultimate goal of this thesis was to generate data assisting health professionals, in both South Africa and California, to develop health educational interventions that may ultimately lead to a reduction of the current skin cancer epidemic.

Statement of the Problem

Skin cancer is the most common form of cancer in the United States (Rossi, Blais, & Weinstock, 1994; Friedman, Webb, Bruce, Weinberg, & Cooper, 1995), accounting for an estimated one million new cases annually (Koh, Geller, Miller, Grossbart, & Lew, 1996). There are three major types of skin cancer: Basal cell carcinoma and squamous cell carcinoma (non-melanoma skin cancers), and malignant melanoma.

Melanoma is comparatively rare, accounting for only 5% of all skin cancers (U.S. Department of Health and Human Services, 1996). However, it is the most serious form of skin cancer, producing 74% of all skin cancer deaths (Vail-Smith & Felts, 1993). From 1973/74 to 1985/86, the death rate for melanoma in the United States rose from 1.7 per 100,000 to 2.2 per 100,000 population. The incidence of melanoma is increasing at the rate of four percent per year, about 700% in the past 40 years. Indeed, the mortality rate from melanoma is increasing faster than for any other cancer except lung cancer (Vail-Smith & Felts, 1993). The melanoma incidence rate for women is almost twice that in men. On the other hand, the mortality rate has generally risen faster in men than in women (Streetly & Markowe, 1995).

South Africa has the second highest incidence of melanoma in the world ("Skin Cancer," 1994); Australia has the highest (Theobald, Marks, Hill, & Dorevitch, 1991; Marks, 1995d). In

addition, melanoma is the second most common cancer in white South African females, and the fourth most common in white South African males. One in 63 females and 1 in 57 males are expected to develop this cancer during their lifetime (Sitas & Pacella, 1994).

Sun exposure has been identified as the major cause of the increase in skin cancers in both the United States (Rossi et al., 1994) and South Africa ("Suntanning," 1990). Non-melanoma skin cancers are directly related to cumulative exposure to sunlight over a lifetime, while melanomas appear to be related to intermittent intense sun exposure (Campbell & Birdsell, 1994).

Unfortunately, the perceived importance of a "perfect tan" has grown considerably in populations as geographically diverse as white South Africans, Australians, and Americans since the 1940s (Chapman, Marks, & King, 1992). This has resulted in a marked increase in sun exposure. In both California and South Africa, an increasing number of people spend much of their leisure time in the sun ("Suntanning," 1990). Thus, as the development of both non-melanoma and melanoma skin cancers is behaviorally determined, it seems in large part preventable.

However, not all exposure to the sun's harmful ultraviolet rays is voluntary. The on-going ozone depletion is resulting in greater exposure to ultraviolet radiation, and is expected to further increase the incidence rates of skin cancers (Lloyd,

1993). It is estimated that for every one percent decrease in ozone, a one percent increase in the melanoma incidence will occur, as well as a two to six percent increase in the incidence of non-melanoma skin cancers (Welch, 1994). South Africa in particular, due to its proximity to the South Pole, has among the highest measured ultraviolet radiation levels in the world (Summers, 1995).

The most important strategy, besides halting ozone depletion, in decreasing future skin cancers is sun avoidance. Despite the development of many health education programs, the number of people spending a large amount of their time in the sun remains high. An estimated 30% of adults and 50% of adolescents engage in sun tanning in the United States (U.S. Department of Health and Human Services, 1991). In South Africa, Schirnding, Strauss, Mathee, Robertson, and Blignaut (1991/2) reported that 67% of their study's respondents had spent more than 10 days sunbathing in direct sunlight during their study year's past summer.

One reason for this continued behavior may be that the latency period of both non-melanoma skin cancers and melanomas is so long as to provide no perceivable threat to the "sun-worshippers" of today. A second reason seems to be that concern with attractiveness is an important motivator for continued tanning. Furthermore, it is the author's belief that

insufficient emphasis has been placed on researching attitudes, knowledge, and beliefs that form the basis of sun-related behavior. Developing an understanding of these antecedents of behavior is a necessary first step in formulating interventions (Green, Kreuter, Deeds, & Partridge, 1980; Cockburn, Hennrikus, Scott, & Sanson-Fischer, 1989).

Several studies exploring sun-related attitudes, beliefs, knowledge, and behaviors have been identified (Banks, Silverman, Schwartz, & Tunnessen, 1992; Vail-Smith & Felts, 1993; Campbell & Birdsell, 1994). This literature is reviewed in Chapter 2. However, only one study comparing sun-related attitudes, knowledge, beliefs, and behaviors in two different countries (Italy and England) has been reported (Eiser, Eiser, Sani, Sell, & Casas, 1995). The results confirmed that people's habits and associated beliefs reflect both their cultural context and individual experience.

In 1996, this researcher had the unique opportunity to do research in South Africa and California. These two countries have white populations with common recreational sun-exposure habits (U.S. Department of Health and Human Services, 1991; "Suntanning," 1990), similarly high skin cancer incidence, as well as at least one common language (English). On the other hand, the two countries have vast historical and geographic differences.

At least two differences have relevance for this research: The composition of the white populations and the exposure to health education regarding sun exposure. California has an extremely diverse white population, due to immigration from throughout Europe and extensive intermarriage between immigrants and Americans. In contrast, South Africa's white population (of mainly British and Dutch descent) has been relatively isolated, especially during the decades of the apartheid era. Over the past decade, a substantial amount of health promotion regarding sun-behavior has taken place in California in the form of media campaigns, as well as through health education programs targeting both specific groups and individuals. This has not been the case in South Africa.

California and South Africa thus provided a unique opportunity for both separate study and systematic comparison of sun-related attitudes, beliefs, knowledge, and behaviors in two demographically similar but geographically and historically different populations. It was hoped that the resulting data would enhance health professionals' understanding of which predisposing and reinforcing factors seem universal, and which are more culturally unique, thus improving the effectiveness of future health education programs.

Research Question and Objectives

This thesis was designed to address the following research question:

What are the similarities and differences regarding sun-related knowledge, attitudes, beliefs, and behaviors between white Californian and South African university students?

The study was designed to meet the following objectives:

1. To systematically describe sun-related knowledge, attitudes, beliefs, and behaviors of white university students in Richards Bay, KwaZulu/Natal, South Africa, and San Jose, California.

2. To explore the similarities and differences between sun-related knowledge, attitudes, beliefs, and behaviors of South African and Californian university students.

3. To identify predisposing factors with the potential to affect sun-related behavior in these students.

4. To identify reinforcing factors with the potential to affect sun-related behavior in these students.

5. To use these data to develop recommendations with which to assist health professionals in developing effective sun-related behavioral interventions in South Africa and California.

6. To contribute to the existing body of literature on sun-

related knowledge, attitudes, beliefs, and behaviors.

Methodology

This study used a non-experimental, cross-sectional design, collecting both qualitative and quantitative data through an anonymous questionnaire. The research was carried out in two stages. The first stage, conducted in South Africa, consisted of describing, documenting, and analyzing sun-related knowledge, attitudes, beliefs, and behavior of white students at Richards Bay Technical College (RBTC) and John Ross College (JRC), Richards Bay, KwaZulu/Natal, South Africa. At RBTC, ten classes were selected through random sampling. Subsequently, the four classes containing the oldest students (ages 17-19) were chosen in JRC. Students in these selected classes received the questionnaire during one class session, and returned it the second day.

During the second stage of the research, sun-related knowledge, attitudes, beliefs, and behavior of white students at San Jose State University, in San Jose, California, were described, documented, and analyzed. Twenty classes from the Colleges of Business and Humanities/Arts were randomly selected. Within each of these, questionnaires were both distributed and collected during one class session. Subsequently, the South African and Californian students' knowledge, attitudes,

beliefs, and behaviors were systematically compared.

Although all students in the selected classes were invited to participate in the survey, only responses from white, English speaking students were eligible for inclusion in the final sample. Only white students' surveys were analyzed, as both non-melanoma and melanoma skin cancer incidence is considerably higher in white populations of both South Africa and the United States (Rippey & Rippey, 1984; Hudson & Krige, 1995).

The questionnaire assessed the following:

1. Demographic characteristics such as age, gender, ethnicity, and skin response to the sun (based on skin typology by Fitzpatrick [1975]).
2. Sun protection measures, (i.e., application of sunscreens, wearing of protective clothing/hat, and staying out of the sun during highest radiation intensity).
3. Attitudes and beliefs towards skin protection and tanning.
4. Knowledge of risks of sun exposure and increasing incidence of skin cancer.
5. Self-reported sun-related behavior of participants, participants' parents, friends, and siblings.

This section of the questionnaire included questions with true-false and five-point Likert scale answers. The questionnaire also included two categories of open ended

questions. One category explored the reasons for participants' initiation of sun-protective behavior. The other attempted to identify those individuals who most strongly influence participants' sun-related behavior (see Appendix B).

Definitions: Conceptual

Attitude: Way of feeling, thinking, and behaving (Hornby, 1974).

Belief: Conviction that certain things are true (Guralnik, 1982).

Culture: What everybody knows that everybody else knows (Chen, 1993).

Knowledge: Range of information or understanding (Guralnik, 1982)

Predisposing Factors: A person's attitudes, values, beliefs, and perceptions (Green et al., 1980).

Reinforcing Factors: The different types of feedback a person receives, which may either encourage or discourage his/her behavior change (Green et al., 1980).

Sun-protective behavior: Group of behaviors known to decrease the risk of developing skin cancer, as well as premature aging of the skin.

Sun exposure: Behavior known to increase the risk of developing skin cancer, as well as premature aging of the skin.

Definitions: Operational

Californian University Students: White students, aged 17 and older, at San Jose State University, San Jose, California.

South African University Students: White students, aged 17 and older, at John Ross College and Richards Bay Technical College, Richards Bay, KwaZulu/Natal, South Africa.

Attitude: The way the study participant felt and thought about sun-related behavior, as indicated in questions 20 to 23, and 28 to 29, on the survey instrument (see Appendix B).

Belief: An idea about sun-related behavior accepted as true and real by the study participant, as indicated in questions 10 to 19, and 24 to 27, on the survey instrument (see Appendix B).

Knowledge: The range of understanding with regard to sun-related behavior demonstrated by the study participant, as indicated in questions 10 to 19, and 24 to 27, on the survey instrument (see Appendix B).

Predisposing Factors: Study participant's knowledge, attitudes, and beliefs regarding sun-related behavior.

Reinforcing Factors: Those individuals who most strongly influence the study participant's sun-related behavior, as indicated in questions 51 and 52, on the survey instrument (see Appendix B).

Sun-protective behavior: Specific behaviors identified in the survey instrument, including:

1. Avoiding sun exposure between ten in the morning, and three in the afternoon.

2. Covering arms and legs with clothing when planning to be in the sun more than one half hour.

3. Putting on a hat when planning to be in the sun more than one half hour.

4. Using sunscreen with a minimum sun protection factor (SPF) of 15 when planning to be in the sun more than one half hour.

Sun exposure habits: The length of time the study participant, on the average, spent in the sun, as reported in question 9 on the survey instrument (see Appendix B).

Sun-related behavior: The study participant's self-reported sun-protective behavior, as well as sun exposure habits.

Limitations

One limitation of this data collection method involves the possibility of demand characteristics, i.e., the tendency of respondents to give "socially desirable" answers. For example, questions 5 to 8 on the survey instrument explored sun-protective behavior. This behavior is "socially desirable," especially in California where a substantial amount of health promotion regarding sun-related behavior has taken place. Thus, participants may have felt tempted to give answers indicating

higher use of sun protection. Anonymous questionnaires and several types of question and answer formats were used to minimize the effect of this limitation on the reliability and validity of the self-reported data.

A second limitation concerned the utilization of university students as the study's sample, thus decreasing the generalizability of the study results. Specifically, university students may represent a younger and more affluent segment of the general population. However, those 30 years or younger are more likely to report a higher incidence of sun exposure, and those of higher socioeconomic status tend to be at an increased risk of skin cancer (Vail-Smith & Felts, 1993). Furthermore, university students are often utilized in research, as they represent the leaders of future trends, as well as being a meaningful and convenient sample. In consequence, this researcher chose to utilize students as their responses were likely to provide important insight into factors affecting both sun exposure and preventive measures.

Significance

Skin cancer incidence is assuming epidemic proportions in many countries, including the United States and South Africa. Sun exposure has been identified as the major risk factor in the development of these cancers. Unfortunately, sun-related

behaviors are deeply ingrained in many societies with Western/West European influence; thus, have proven difficult to change. In consequence, deeper understanding of values and beliefs underlying these behaviors is both timely and warranted.

Research projects in several countries have been published on the topic of sun-related behavior. However, only one study has been published comparing attitudes, beliefs, knowledge, and behaviors in two different countries. California and South Africa provided a unique opportunity for both separate study and systematic comparison of these factors, in two demographically similar but geographically and historically different populations. It is hoped that data from this study will contribute to an increased understanding of the commonalities and uniqueness of the antecedents of each population's sun-related behavior.

This enhanced understanding may assist health professionals in both countries to develop sun-related behavioral interventions that are both theoretically based and culturally sensitive. In addition, the study may focus future interventions on the parts of each culture identified as primarily responsible for the acquisition of sun-related knowledge, attitudes, and beliefs. Finally, it is the author's hope that this research will contribute, however slightly, to a reduction of the current skin cancer epidemic, and eventually, to a decrease in skin cancer incidence world wide.

CHAPTER 2

Literature Review

Many epidemiological studies have demonstrated that the incidence of skin cancer has increased rapidly over the last half century. Basal cell carcinoma, one of the main types of skin cancer, is currently the most common malignant disease throughout the world (Gloster & Brodland, 1996). Sun exposure is the main risk factor for all skin cancers; thus, preventive programs focusing on education of the public about the hazards of the sun have been developed in many countries. This literature review will discuss the skin cancer epidemic and preventive programs, as well as factors affecting sun-related behavior.

Skin cancer: Background

There are three main types of skin cancer. The most common is basal cell carcinoma (BCC), the second most common is squamous cell carcinoma (SCC). Over 95% of these cancers are curable (Austoker, 1994). The third type is malignant melanoma, the most serious skin cancer.

Basal and squamous cell carcinomas are also called non-melanoma skin cancers (NMSCs), and they make up approximately 95% of all skin cancers (U.S. Department of Health and Human Services, 1996). Basal cell carcinoma (BCC) accounts

for 80% of NMSCs and squamous cell carcinoma (SCC) for 20% (Kibarian & Hruza, 1995). These cancers usually occur on sun-exposed areas of the body, such as the head, neck, and forearms (Campbell & Birdsell, 1994).

Basal cell carcinoma commonly occurs as a single, slowly growing lesion. Less than 0.5% metastasize, mostly the lesion grows locally (Wilson et al., 1991). Thus, the dominant problem with NMSC is local tissue destruction (Rhodes, 1994).

Squamous cell carcinoma commonly develops from sun-damaged skin, a chronic scar or a chronic skin ulcer. The lesion typically looks like an ulcer with raised margins. Approximately 10-30% of these lesions metastasize, especially those which have infiltrated the deep layers of the skin (Wilson et al., 1991).

Malignant melanoma is the rarest form of skin cancer, as well as the most serious (74% of all skin cancer deaths) (Vail-Smith & Felts, 1993). In contrast to non-melanoma skin cancer (NMSC), which mainly affects older individuals, the frequency of malignant melanoma peaks in young people aged 20-45 years. Approximately 50% of melanomas occur in individuals under 55 years of age, and 30% occur in those less than 45 years old (Gloster & Brodland, 1996).

There are four types of melanoma. Three initially spread superficially, while the fourth grows deeply from the beginning. Melanomas can resemble both irregular, dark moles as well as

skin nodules (Pullara Brandt, 1996). During the early growth phases, melanomas are characterized by irregular borders, variation in pigmentation as well as color. Bleeding and ulceration are usually late signs.

The most common site of melanomas in men is the trunk. In women, they are mostly found on the extremities (Taylor & Gore, 1995). Prognosis is related to depth of the growth; deeper growing melanomas have a higher risk of metastasizing than those growing superficially. Melanomas can spread to the brain, liver, lung, and bones. Cure is not likely once metastases have developed (Wilson et al., 1991). However, when diagnosed and excised at an early, thin level, more than 95% of melanomas are curable (Paul Kelly, 1991).

Skin cancer: The Epidemic

An estimated one million Americans are diagnosed annually with skin cancer, the most commonly diagnosed cancer in the United States (Friedman, Webb, Bruce, Weinberg, & Cooper, 1995; Goldsmith et al., 1996; Koh, Geller, Miller, Grossbart, & Lew, 1996; U.S. Department of Health and Human Services, 1996). Melanomas cause the most deaths of all skin disorders (Katris, Crock, & Gray, 1996; Weinstock, Goldstein, Dube', Rhodes, & Sober, 1996). In the U.S., the incidence of melanoma nearly doubled from 1973 to 1990 (Koh et al., 1996).

Melanoma is also the most rapidly increasing form of cancer in the United States (Gloster & Brodland, 1996). In 1935, the lifetime risk of an American developing melanoma was 1 in 1,500. The risk is now approaching 1 in 100, and by the year 2000 will reach 1 in 75 (Pullara Brandt, 1996). While all reviewed authors agree on the rapidly rising incidence of melanomas, some argue that the rise may at least in part be attributed to the more aggressive case detection of recent years (Roy & Wagner, 1992; Rhodes, 1994; Gloster & Brodland, 1996).

South Africa has the second highest incidence of melanoma in the world ("Skin Cancer," 1994). It is the second most common cancer in white South African females, as well as the fourth most common in white males. One in 63 South African white females (1:82 in 1988) and 1 in 57 white males (1:82 in 1988) are expected to develop this cancer during their lifetime (Sitas & Pacella, 1994).

In addition to the United States and South Africa, melanoma incidence is assuming epidemic proportions in many other countries as well. Australia has the highest incidence of skin cancer in the world (Chapman, Marks, & King, 1992; Hill, White, Marks, & Borland, 1993; Arthey & Clarke, 1995; Martin, 1995). In Sweden, melanomas are the most rapidly increasing form of cancer (Boldeman, Jansson, & Holm, 1991; Boldeman, Ullen, Mansson-Brahme, & Holm, 1993). In the United Kingdom, the

incidence of melanoma increased by 88% between 1977 and 1987 (Jackson, 1995). And in Norway, melanomas are increasing by 6-7% per year (Wichstrom, 1994).

Worldwide, non-melanoma skin cancers (NMSCs) are three times more common than lung cancer, the next most common cancer (Armstrong & Kricker, 1995). In the United States, the incidence of NMSC is approximately equal to that of all non-skin cancers. Although NMSC mortality is low, the associated morbidity is a significant concern. Office visits for NMSC in the U.S. have increased more than 50% since 1975, contributing hundreds of millions of dollars to the yearly cost of health care (Rossi, Blais, Redding, & Weinstock, 1995).

In South Africa, basal cell carcinoma (BCC) and squamous cell carcinoma (SCC) are the most common cancers in the white population. One in five and 1 in 16 white males, as well as 1 in 10 and 1 in 42 white females, will develop either BCC or SCC respectively in their lifetimes (Sitas & Pacella, 1994). In Australia as well, non-melanoma skin cancer (NMSC) is the most common, as well as the most preventable, cancer (Girgis, Sanson-Fisher, Tripodi, & Golding, 1993; Del Mar, 1995). And in Japan, research by Ichihashi et al. (1995) indicates that the prevalence of NMSC has increased during the last three decades.

Risk factors for the development of melanomas are a history of previous NMSC (Marghoob et al., 1995), as well as

blonde or red hair, fair skin, freckling, and a tendency to sunburn (Mermelstein & Riesenberg, 1992; Crane, Marcus, & Pike, 1993; Jackson, 1995; Katsambas & Nicolaidou, 1996). However, the major risk factor for the development of all types of skin cancer is sun exposure (Hill & Rassaby, 1984; Rossi, Blais, & Weinstock, 1994; Ichihashi et al., 1995; Koh et al., 1996). In addition to being linked to skin cancer, sun exposure is associated with skin erythema, sunburn, and skin aging (Campbell & Birdsell, 1994).

Non-melanoma skin cancers (NMSCs) are linked to cumulative sun exposure over a lifetime (Marks, 1995b). Furthermore, the incidence of squamous cell carcinoma doubles with every decline of 8 to 10 degrees in latitude (Hacker & Flowers, 1993; Gloster & Brodland, 1996). This fact would explain why, for example, Australia and South Africa have such high NMSC incidence rates, or why World War II veterans exposed to high intensity sun in the Pacific had a statistically greater number of NMSCs than veterans in Europe (Gloster & Brodland, 1996).

Melanomas, on the other hand, appear to be related to intermittent, intense sun exposure, especially during childhood, rather than cumulative exposure (Holman, Armstrong, & Heenan, 1986; Campbell & Birdsell, 1994; Taylor & Gore, 1995). As few as three episodes of blistering sunburns before age 20 increase an individual's risk for developing melanoma two to three times

(Kamin, O'Neill, & Ahearn, 1993).

However, the scientific opinion is divided on how great a risk factor for skin cancer the sun's radiation is. Armstrong and Kricker (1995) argue that 96% of melanomas in U.S. men and 92% in U.S. women were caused by sun exposure. Vail-Smith and Felts (1993) suggest that sun exposure accounts for more than 90% of all cancers. However, in a recent publication, Koh et al. (1996) state that only two thirds of the cases of melanoma may be attributed to excessive sunlight exposure. While authors disagree on the risk level, all reviewed authors agree that the sun's radiation is a major skin cancer risk factor.

Unfortunately, over the last 30 years a tanned look in white populations worldwide has become associated with affluence, high self-esteem, health, and success (Arthey & Clarke, 1995). In consequence, voluntary exposure to the sun has increased dramatically, occurring mainly during leisure and social activities (Carmel, Shani, & Rosenberg, 1994). In the U.S., for example, according to the Department of Health and Human Services (1991), 30% of adults and 50% of adolescents engage in sun tanning. In Great Britain, 37% of women and 29% of men in a 1993 survey sample had tried to tan in the last 12 months (Melia & Bulman, 1995). In South Africa, Schirnding et al. (1991/2) reported that 67% of their study respondents had spent more than 10 days sunbathing in direct sunlight during their study

year's past summer.

Some exposure to damaging radiation from the sun, however, is not voluntary. The on-going ozone depletion is resulting in greater exposure to harmful ultraviolet (UV) rays from the sun (Lloyd, 1993; Carmel et al., 1994). Upon entering the earth's atmosphere, most of these UV-rays used to be absorbed by the ozone layer. Unfortunately, the ozone layer has been depleted by different chemicals, mainly chlorofluorocarbons (CFCs), over the last 20 years. The result has been an approximate 2% decrease in the ozone layer over the past 20 years (Gloster & Brodland, 1996). In consequence, an increasing amount of UV-rays continue to reach earth.

While a major step was taken toward decreasing ozone-depletion by signing of the Montreal Protocol, (a 1987 international accord aimed at controlling the chemicals most responsible for the ozone layer depletion), it does not prevent further loss of ozone. The CFCs already released will remain in the atmosphere for decades, continuing to deplete the ozone layer (Nadakavukaren, 1995). This depletion is expected to peak towards the end of this century, and only begin to improve thereafter (Marks, 1995a). Until then, however, it is estimated that for every 1% decrease in ozone, there will be a 2-6% increase in the incidence of both basal cell carcinoma (BCC) and

squamous cell carcinoma (SCC). More important, it is estimated that there will be about a 1% increase in the incidence of melanoma for each 1% depletion of ozone (Welch, 1994).

Although regulatory measures to decrease ozone depletion have been implemented, the depletion continues. In consequence, involuntary exposure to ultraviolet rays continues to increase the risk of skin cancer worldwide. Any meaningful reduction in skin cancer incidence must therefore come from voluntary limitation of sun exposure (Foltz, 1993).

Prevention: United States

Approximately 80% of all skin cancers are preventable (Foltz, 1993). Furthermore, voluntary sun exposure is the only major causative factor for skin cancer for which prevention is feasible (Rossi, Blais, Redding, & Weinstock, 1995). Since it is estimated that 50-80% of a person's life-time sun exposure occurs by the ages of 18-21 (Rossi et al., 1995), and that the use of sunscreens during the first 18 years of life may reduce the incidence of non-melanoma skin cancer by 78% (Hacker & Flowers, 1993; Kibarian & Hruza, 1995; Wentzell, 1996), reduction of excessive sun exposure should ideally begin in childhood. Based on these data, many skin cancer prevention programs have been developed in the United States over the past decade, specifically targeting children.

One such program in the 1980s was the "Sunshine and Skin Cancer" curriculum in Arizona. Children were educated about the sun's benefits and disadvantages, as well as about the skin, skin cancer, and sun damage prevention. The program was shown to significantly change both the knowledge and self-reported sun-related behavior of the children (Ramstack, White, Hazelkorn, & Meyskens, 1986).

The curriculum evolved into a revised version, "Sunny Days, Healthy Ways," in the late 1980s. In 1990, the "Be Sun Safe" preschool curriculum was developed in Arizona as well. This curriculum emphasizes the relationship between sun safety and overall health, rather than teaching about skin cancer (Loescher, Klein Buller, Buller, Emerson, & Taylor, 1995).

Another prevention program was the "Texas Peer Education Sun Awareness Project for Children" (Fork, Wagner, & Wagner, 1992). In this program, developed in 1991, first grade students were educated about skin cancer prevention by students from third to fifth grade. These older students educated their younger peers through self-created skits, as well as through easy lotteries and competitions. Both student groups significantly improved their knowledge about sun protection (Fork, Wagner, & Wagner, 1992).

A similar program was initiated in 1991 in northern Wisconsin. This program was developed to ensure access to

cancer education for rural children. Students from an agricultural high school taught the "Children's Guide to Sun Protection" curriculum to third-grade students. These students also showed a significant improvement of their sun-protection knowledge (Reding, Fischer, Gunderson, & Lappe, 1995).

Many primary prevention campaigns in the United States focusing on adult populations have been stimulated by exceptional prevention programs in Australia (the two most noteworthy were the multimedia "Slip! Slop! Slap!" and "SunSmart" campaigns). One such campaign is the free skin cancer education by the American Academy of Dermatology and the American Cancer Society. Their educational messages are disseminated, generally during the spring of each year, through the national and local media. For example, in May 1992, 238 television stations in more than 150 U.S. cities (with populations greater than 50,000) carried skin cancer broadcasts during prime-time news coverage (Koh, Geller, Miller, & Lew, 1995).

Another primary prevention campaign was the "Under Cover Skin Cancer Prevention Project," which was developed in Texas in 1989. In this program, UV-light meters were placed on rooftops in several Texan cities. These meters were then linked to a center for continuous monitoring. Skin cancer education and behavioral messages based on the meters' readings were disseminated to the public via participating media. Evaluation of

the project showed significant behavior changes with regard to sun protection practices (Bryant Boutwell, 1995).

The "Rhode Island Sun Smart Project," implemented on several Rhode Island beaches during the summers of 1991 and 1992, is another innovative prevention program (Rossi et al., 1994). The interventions consisted of distribution of a pamphlet as well as free sunscreen samples, educational video screenings, and several different methods of showing actual UV-light skin damage. To recruit participants, a $500 lottery incentive was offered. Unfortunately, no evaluation results have been reported.

Another campaign was implemented in 1993 in Hawaii. During this campaign, American Cancer Society volunteers went door-to-door statewide, giving away educational kits. These kits contained, among other things, educational pamphlets and sunscreen samples (Free, 1993). Unfortunately, no evaluation results have been reported for this program either.

A campaign that chose to target both children and adults was the "Skin Cancer/Melanoma Awareness Campaign" implemented in Texas during 1989. Occupational health nurses delivered the curriculum at different worksites; other nurses promoted the program at schools, preschools, and parent education programs. The curriculum consisted of pamphlets, posters, and videos, and the nurses were free to use a creative

approach to the public. In addition, the media broadcast related educational messages. Evaluation showed a 17% increase in awareness of skin cancer between pre- and post-test surveys (Paul Kelly, 1991).

Prevention: South Africa

Skin cancer has been identified as one of the most targetable malignancies in South Africa due to the problem's magnitude and its preventability (Ncayiyana, 1994). Despite this, there has been only one skin cancer education program in the country (C. Jeffrey, personal communication, March 1996). In 1990, the Cancer Association of South Africa (CANSA) launched the C.A.R.E. campaign, (the "C" in C.A.R.E. stood for "Cover up," "A" for "Avoid tanning from 11-3," "R" for "Rub on effective sunscreen," and "E" for "Examine your skin regularly" ["Suntanning," 1990]). The curriculum consisted of TV commercials, posters in public places, and information to (then all-white) high schools. Unfortunately, no post-intervention evaluation has taken place (C. Jeffrey, personal communication, March 1996).

In KwaZulu/Natal, South Africa, the researcher observed occasional educational materials in commercial settings (i.e., posters in shop windows, free pamphlets in salons and shops). However, during the first seven months of 1996, no sun-related

health education was observed in the national media (TV and newspapers). In addition, none of the five medical practitioners the researcher informally contacted in KwaZulu/Natal were even aware of the rising skin cancer incidence, or educated their patients on sun-protective behavior. Clearly, there is much to be done to engender safe sun habits in the South African population (Summers, 1995).

Sun-related Knowledge, Attitudes, Beliefs, and Behavior

Several research studies have been published on the topic of sun-related knowledge, attitudes, beliefs, and behavior in different populations worldwide. A 1989 study, for example, surveyed Washington, D.C. adolescents. The results showed that teenagers in the study were more likely to use sunscreen if their parents had insisted on its use in early childhood, and also if a friend used sunscreen. The researchers concluded that both of these associations could be altered by changing parental attitudes toward sun exposure (Banks, Silverman, Schwartz, & Tunnessen, 1992).

Another important study was conducted in 1990 with U.S. college students. More than 90% of the respondents in this survey declared that they looked better with a suntan, and 73% reported that suntanned skin was more attractive. These results suggest that concern with attractiveness appears to be a major

motivation for frequent sun exposure. In consequence, it was concluded that educational strategies attempting to change these attitudes should not only stress health outcomes, but also the sun's other detrimental effects, such as skin aging (Vail-Smith & Felts, 1993).

A third important study was conducted in Canada in 1987. In this study, only 45% of respondents believed sun exposure greatly affected the chances of getting cancer. In addition, only 35.5% of the men and 58.3% of the women surveyed believed avoiding sun exposure was very important in reducing the chances of getting cancer. The researchers concluded that behavior change requires an awareness of the problem, knowledge of solutions, and belief that risk can be reduced by behavior change (Campbell & Birdsell, 1994).

In 1989, general practice patients were surveyed in an Australian study of sun-related knowledge. The results showed that 86.2% of respondents were aware that getting sunburned is a risk factor for skin cancer. In addition, 88.6% knew that prolonged exposure to the sun is another risk factor (Martin, 1995). Obviously, intensive health education in Australia over the last 20 years has produced a higher degree of skin cancer awareness than, for example, in the U.S. or Canada.

Only one sun-related study from South Africa has been reported in the professional literature during the last decade. In

this study, the beach-going public in Cape Town was surveyed. A surprisingly high number of respondents (90%) were aware that over-exposure to sunlight is associated with an increase in the risk of skin cancer. However, only 23% thought that an SPF of 15 was necessary to provide adequate protection. The researchers concluded that a major effort is needed to improve attitudes and practices in South Africa with regard to sun-tanning activities (Schirnding, Strauss, Mathee, Robertson, & Blignaut, 1991/2).

Finally, the only reported study which compared the sun-related attitudes, beliefs, knowledge, and behaviors in two cultures, took place in Italy and England in 1992. The study demonstrated a clear difference between the British and Italian samples. The British described themselves as better informed about skin cancer and environmental issues. Furthermore, the British respondents more often agreed with questionnaire items concerning appropriate protective behaviors, including self-reported use of sunscreens. The authors concluded that people's behaviors and beliefs may reflect both their cultural context and individual experience (Eiser, Eiser, Sani, Sell, & Casas, 1995).

Conclusion

Despite many skin cancer prevention programs developed to date in the United States and elsewhere, individuals in many

countries continue to expose themselves to the sun and to take inadequate sun protection measures. One reason may be that the risk of mortality seems low, and is perceived as occurring in the distant future. A second reason appears to be that physical attractiveness and concern for appearance are important motivating factors for seeking a tan and ignoring skin cancer warnings (Rossi et al., 1995). In addition, it is the author's belief that insufficient emphasis has been placed on researching attitudes and beliefs that form the basis of sun-related behaviors. Without these data, well-intentioned new programs may be based on insufficient or overly general assumptions about the intended populations, as well as their motivation for change.

As mentioned previously, sun-related attitudes, beliefs, knowledge, and behaviors have been the focus of research in several countries. However, further baseline data should be useful, both in developing primary prevention interventions and monitoring public response to them (Melia & Bulman, 1995). In addition, Campbell and Birdsell (1994) suggest that additional knowledge of individuals' attitudes about different sun-protective measures would assist in addressing cognitive barriers to behavior change. Furthermore, only one study comparing sun-related attitudes, beliefs, and knowledge in different cultures has been identified. Additional data on

different cultures' sun-related attitudes, beliefs, and knowledge may add to health professionals' understanding of which predisposing and reinforcing factors seem universal, and which more culturally situated.

Finally, none of the survey instruments used in the previously mentioned research studies included items asking who influences respondents' sun-related behavior, or exploring the behavior and potential influence of family and friends. Such data might aid in identifying the segments of a surveyed population which would most likely benefit from health education interventions.

In this study, the author compared sun-related attitudes, beliefs, knowledge, and behaviors of South African and Californian students. In addition, she compared respondents' families' and friends' sun-related behavior, and attempted to identify who influences respondents' behavior in both groups. South Africa and California are uniquely suited for this kind of research. Both have white populations with high skin cancer rates, as well as similar sun-exposure habits. On the other hand, they display vast historical and geographical differences. Furthermore, a substantial amount of health promotion regarding sun-behavior has taken place in California, but not in South Africa. Thus, these differences and similarities in the two

cultures should contribute to similar, as well as unique sun-related attitudes, beliefs, knowledge, and behaviors.

CHAPTER 3

Methodology

Research Question and Objectives

This thesis was designed to address the following research question:

What are the similarities and differences regarding sun-related knowledge, attitudes, beliefs, and behaviors between white Californian and South African university students?

The study was designed to meet the following objectives:

1. To systematically describe sun-related knowledge, attitudes, beliefs, and behaviors of white university students in Richards Bay, KwaZulu/Natal, South Africa, and San Jose, California.
2. To explore the similarities and differences between sun-related knowledge, attitudes, beliefs, and behaviors of South African and Californian university students.
3. To identify predisposing factors with the potential to affect sun-related behavior in these students.
4. To identify reinforcing factors with the potential to affect sun-related behavior in these students.
5. To use these data to develop recommendations with which to assist health professionals in developing effective sun-

related interventions in South Africa and California.

6. To contribute to the existing body of literature on sun-related knowledge, attitudes, beliefs, and behaviors.

Conceptual Framework

Within the sun-related attitudes and beliefs literature reviewed for this research, most authors utilized the Health Belief Model (HBM) as the conceptual framework of their research (Cockburn, Hennrikus, Scott, & Sanson-Fisher, 1989; Cody & Lee, 1990; Mermelstein & Riesenberg, 1992; Carmel, Shani, & Rosenberg, 1994). Although no studies were identified using Green and Kreuter's PRECEDE/ PROCEED Model, the author chose this latter model as her conceptual framework.

The PRECEDE/ PROCEED Model facilitates planning of health education programs through systematically diagnosing health related factors and consequences, and then working back to causes. The model consists of nine phases. Phases one to five are diagnostic; phases six to nine are implementation and evaluation stages.

The model's fourth phase, the Educational and Organizational Diagnosis, includes the assessment of predisposing factors (including a person's knowledge, attitudes, and beliefs), that have the potential to affect health behavior. In addition, the fourth phase includes the assessment of

reinforcing factors. These comprise the different types of feedback that those in the target population receive. Reinforcing factors either encourage or discourage their behavior change (McKenzie & Jurs, 1993).

In consequence, it made more sense for the author to frame her research in the broader context of this model, rather than the more narrow focus of the Health Belief Model. PRECEDE/ PROCEED allowed identification of participants' predisposing factors (sun-related attitudes, beliefs, knowledge), and reinforcing factors (individuals influencing respondents' sun-related behavior), within the explicitly applied focus of effective health education programs.

Research Design

The design of this study was cross-sectional, using a written questionnaire as a method to explore participants' attitudes, beliefs, knowledge, and behavior. The study was carried out in two stages; the first in South Africa, and the second in California.

Survey Instrument

An original questionnaire was developed for this study. Although most questions were developed by the author, specific questions were based, in part, on the survey instruments

developed by:

1. Karen Vail-Smith, M.S., and Dr. Michael Felts, East Carolina University, North Carolina, (1993);

2. Dr. Theresa Theobald et al., Anti-Cancer Council, Victoria, Australia, (1991);

3. Dr. John Lowe et al., University of Queensland, Australia, 1993;

4. Dr. Sharon Campbell and Judith Birdsell, M.Sc., Alberta, Canada, 1994). Written permissions to utilize these questions were obtained October, 1995 (see Appendix C).

The anonymous questionnaire consisted of 50 quantitative questions, and five open ended questions (see Appendix B). The quantitative questions were divided into five sections:

1. Demographic characteristics such as age, gender, ethnicity, and skin response to the sun (based on Fitzpatrick's skin typology [1975]).

2. Sun protection measures, i.e., application of sunscreens, wearing of protective clothing/hat, and staying out of the sun during highest radiation intensity.

3. Attitudes and beliefs towards skin protection and tanning of participants.

4. Knowledge about risks of sun exposure and increasing incidence of skin cancer.

5. Self-reported sun-related behavior of participants, as well as

participants' parents, friends, and siblings.

The last five questions in the survey were qualitative in nature. The first two attempted to identify those individuals most strongly influencing participants' sun-related behavior. The last three questions explored the reasons for participants' initiation of sun-protective behavior (i.e., I would use sunscreen/hat more often if...).

Instrument Review

In South Africa, the questionnaire was assessed for content validity and cultural appropriateness by Professor J. P. Jordaan, M.D., Faculty of Medicine, University of Natal, Durban (see Appendix D). In addition, the survey was assessed for cultural appropriateness by Deputy Principal J. Kruger, Richards Bay Technical College (RBTC), and Headmaster P. J. H. Terry-Lloyd, John Ross College (JRC), both in Richards Bay. Furthermore, the questionnaire was pilot tested with ten students at Richards Bay Technical College.

In California, the questionnaire was pilot tested in a randomly selected class at the College of Business, San Jose State University (SJSU). Neither pilot test revealed the necessity for questionnaire modification.

A complete research protocol, consisting of the study purpose, methodology, and questionnaire, was submitted to the

Human Subjects-Institutional Review Board (HS-IRB) at San Jose State University (SJSU). The research protocol was approved by HS-IRB on March 7, 1996 (see Appendix E). No HS-IRB existed at the two South African colleges. Permits to conduct the research were granted by Principal P. L. Van Schalkwyk of Richards Bay Technical College (RBTC), and Headmaster P. J. H. Terry-Lloyd of John Ross College (JRC) (see Appendix F).

Validity and Reliability

Face and content validity of the instrument were established through an extensive literature review, as well as pilot testing in both countries. In addition, the instrument was assessed for content validity by Professor J. P. Jordaan, Faculty of Medicine, University of Natal, Durban, as well as Deputy Principal J. Kruger, RBTC, and Headmaster P. J. H. Terry-Lloyd, JRC, both in Richards Bay. The validity of the instrument was enhanced through the utilization of questions from previously validated instruments (Lowe et al., 1993; Vail-Smith & Felts, 1993).

Neither test-retest assessments nor intra-observer reliability testing were possible due to time and resource constraints. However, reliability was enhanced through having the researcher directly administer the survey in each setting.

Sample Selection/Data Collection Stage 1

In Stage 1 of the study, subjects were recruited from Richards Bay Technical College (RBTC) and John Ross College (JRC), Richards Bay, South Africa. The initial South African sampling goal was 200 white, English speaking students. However, RBTC proved to be ethnically quite diverse. Therefore, the researcher was unable to recruit large numbers of white students. As JRC is a junior college, the oldest students are only between 17 and 19 years. Thus, to ensure similar participant ages as in RBTC (which has students ages 18 and older) only the oldest students at JRC were sampled. In consequence, the researcher had to modify the sampling goal to 160 white respondents, the maximum number of eligible participants.

The principal at RBTC, as well as the headmaster at JRC, were initially contacted in person. After the research had been explained to them, both gave their approval for the research to be conducted at their respective colleges. At RBTC, the researcher selected a pilot class, as well as ten sample classes, through random sampling from a class list supplied by the Principal's office staff. At JRC, on the other hand, the four classes with the oldest students were selected.

The researcher's original intention had been to distribute and collect questionnaires during a single class session. However, as class times in both colleges were shorter than

anticipated (40 minutes), this was not feasible. Instead, she received permission to distribute the questionnaires to all students in the selected classes one day, and collect them the next day.

Before distribution of questionnaires, the researcher explained the purpose of the study. Students were advised that participation was completely voluntary, and that non-participation would not affect their relationship with the College in any way. In addition, each potential participant was given an informed participation form, previously signed by the researcher (see Appendix G). Following this introduction, questionnaires were distributed to participants in each classroom.

The following day, after collection of completed questionnaires, the researcher answered questions about the research, as well as the topic in general. Completed questionnaires were kept in a locked file cabinet in the researcher's home office.

Although all students in the selected classes were invited to participate in the survey, only responses from white, English speaking students were eligible for inclusion in the formal sample. The survey instrument included data on ethnicity; non-white students' surveys were excluded prior to analysis. Only white students' surveys were analyzed, as both non-melanoma

and melanoma skin cancer incidence is considerably higher in white populations of both South Africa and the United States (Rippey & Rippey, 1984; Hudson & Krige, 1995).

Sample Selection/Data Collection Stage 2

Subjects in Stage 2 of the study were recruited from the Colleges of Business and Humanities/Arts, San Jose State University (SJSU), San Jose, California. Based on the number of questionnaires collected in South Africa, the Californian sample goal was 160 white, English speaking students.

The Dean of the College of Business, as well as the professor coordinating freshmen English classes, were contacted in person. After approval for the sampling was secured from both administrators, 13 English classes and seven business classes were randomly selected from the class lists provided. English classes were selected as they are given to all freshmen students, thus being comparable to the South African participants from Stage 1 with regard to age. Classes from the College of Business were included in order to expand the sample beyond freshmen.

Professors teaching the selected classes were contacted in person. The research was explained, and after approval was obtained, specific times for data collection were established. Before distribution of questionnaires to all students in each

selected class, the researcher explained the purpose of the study, as well as advising that participation was completely voluntary, and that non-response would not affect students' relationship with SJSU or their professor. In addition, each participant was given an informed participation form, previously signed by the researcher (see Appendix G). Following this, questionnaires were distributed to participants in each classroom with the professor present. After collection of the questionnaires, the researcher answered questions about the research, as well as the topic in general. Completed questionnaires were kept in a locked file cabinet in the researcher's home office.

Although all students in the selected classes were invited to participate in the survey, only responses from white students were eligible for inclusion in the formal sample. The survey instrument included data on ethnicity; non-white students' surveys were excluded prior to analysis. Only white students' surveys were analyzed, as both non-melanoma and melanoma skin cancer incidence is considerably higher in white populations of the United States, as well as South Africa (Rippey & Rippey, 1984; Hudson & Krige, 1995).

Analysis

Answers to quantitative questions were coded directly, using pre-assigned values (i.e., 1 = true, 2 = false). Analysis of qualitative questions focused on recurring themes, which were identified and categorized after careful reading and comparison of all responses. Thereafter, these categories were coded as well. Coded data from both quantitative and qualitative questions were analyzed using the statistical program EPI-INFO, version 6.

Initially, during both stages of the study, frequency measures were calculated for both categorical and ordinal variables. The final part of the analysis focused on looking for statistically significant similarities and differences across the two cultural groups. An alpha-level of .05 was used for all statistical tests.

Assumptions

Thesis research conducted in two countries and cultures is a complex undertaking. The following assumptions guided the planning, design, and implementation of this study:

Topic:

1. Belonging to different cultures may contribute to different predisposing and reinforcing factors, with the potential to affect sun-related behavior.

2. Increased understanding of these predisposing and reinforcing factors would contribute to the development of both professionally effective and culturally sensitive sun-related interventions.

3. The results of this study would contribute to an increased understanding of these predisposing and reinforcing factors.

4. There would be both similarities and important differences in the sun-related attitudes, beliefs, knowledge, and behaviors of young adults in two countries on different continents.

Survey Instrument:

1. An anonymous questionnaire was an appropriate tool to collect data on students' sun-related attitudes, beliefs, behaviors, and knowledge.

2. The questions on the survey instrument were both valid and reliable.

3. It would be possible to design a questionnaire in California that would be relevant and useful in South Africa.

Data Collection:

1. The selected colleges would be willing and interested in participating in the study.

2. The researcher would be able to personally distribute and collect the questionnaires within the time frames available

in each country.

3. There would be an adequate number of white students in the selected college classes to meet the sampling goals.

4. There would be no objection to collecting data from a large group with the intention of analyzing only a subset.

Sample Population:

1. Students in the selected classes would participate in the study.

2. The participants would answer questions honestly.

3. The participants would have enough proficiency in English to both understand and answer questions accurately.

4. English speaking participants in both South Africa and California would adequately represent the demographically similar student populations of their respective universities, and the demographically similar young adult populations of their countries.

CHAPTER 4

Results

Data for this study were collected in two stages. Stage 1 took place at John Ross College (JRC) and Richards Bay Technical College (RBTC), both in Richards Bay, South Africa. Stage 2 took place at San Jose State University (SJSU), in San Jose, California.

Sampling at both sites in South Africa was conducted during March 1996. A total of 353 questionnaires were distributed. At JRC, 125 questionnaires were distributed to students in the four classes containing the oldest students. At RBTC, 228 questionnaires were distributed in a pilot class, as well as ten randomly selected classes. The pilot data were included in the final sample. Sampling at SJSU, California, occurred between September and October, 1996. At SJSU, a total of 523 questionnaires were distributed to 20 randomly selected classes.

South African Sample

A total of 102 questionnaires were returned from the John Ross College (JRC) sample, representing an 81.6% response rate. At Richards Bay Technical College (RBTC), a total of 138 questionnaires were returned, representing a 60.5% response rate. The majority of South African respondents were of European origin (see Table1).

Table 1

Ethnicity of South African respondents

Ethnicity	Percent of respondents		
	JRC[a]	RBTC[b]	Total SA sample[c]
European origin	90	49	67
African origin	8	46	30
Mixed racial origin	2	3	2
Asian origin	0	2	1

[a] n = 102

[b] n = 138

[c] n = 240

Although all students in the selected classes were invited to participate in the survey, only responses from white students were eligible for inclusion in the final sample. Thus, the final sample consisted of 160 white South African students. Of those, 84 (52.5%) were female and 76 (47.5%) were male. The majority of the final South African sample (87.5%) was less than 20 years of age. Fourteen (8.8%) were 20-25 years old, and only six respondents (3.8%) were more than 25 years old. Sixteen (10.0%)

reported that their skin's response to the sun is that they always burn, and are unable to tan. Almost one quarter (23.8%) reported that they burn, but tan if they work on it. Nearly half of the respondents (79 [49.4%]) reported that they burn, then tan easily, and 27 (16.9%) indicated that they tan easily and never burn.

Californian Sample

At San Jose State University (SJSU), all but one questionnaire were returned, representing a response rate of 99.8%. Of those, 163 were of Caucasian ethnicity, 30 African American, 213 Asian (Chinese, Vietnamese, Filipino, Korean, Indian, Indonesian, and Japanese), 70 Latino/Hispanic, 1 Native American, as well as 45 that were of ethnicities labeled "Other" (including Palestinian, Pakistani, Kuwaiti, and Afghani).

As only responses from white students were eligible for inclusion in the formal sample, the final sample consisted of 163 white San Jose State University students. Of those, 85 (52.1%) were female, and 78 (47.9%) were male. The largest proportion (42.9%) were 20-25 years of age, and two-third (33.7%) were younger than 20 years. Nineteen (11.7%) reported that they are unable to tan, and always burn. Almost one quarter (23.3%) reported that they burn, then tan if they work on it. Finally, over half (52.8%) reported that they burn, then tan easily, and 18

(11.0%) that they tan easily and never burn.

Sun protection measures

Among South African female respondents, 36 (42.9%) reported spending less than two hours in the sun between ten in the morning and three in the afternoon every week, and 43 (51.2%) reported spending two to five hours in the sun during those hours (see Table 2). Considerably fewer (6.0%) spent more than five hours in the sun every week. Of the male students, 17 (22.4%) spent less than two hours in the sun every week. Many more, however, spent two to five hours and more than five hours in the sun (31 [40.8%] and 28 [36.8%], respectively).

Of the Californian female respondents, 48 (56.5%) reported spending less than two hours in the sun every week, and 27 (31.8%) reported spending two to five hours in the sun. Far fewer (10.6%) spent more than five hours in the sun. Among Californian male students, 34 (43.6%) spent less than two hours in the sun every week. Almost as many, 31 (39.7%), spent two to five hours in the sun. However, only 12 (15.4%) spent more than five hours in the sun per week.

Table 2

Sun exposure among South African and Californian students by gender

	South Africa N = 160		California N = 163	
Weekly sun exposure	females	males	females	males
<2 hours	42.9	22.4*	56.5	43.6
2-5 hours	51.2*	40.8	31.8	39.7
>5 hours	6.0	36.8*	10.6	15.4

Note. The values represent percentages.
*$p < .05$.

A comparison of Californian and South African female students shows that significantly fewer Californians reported spending two to five hours in the sun ($p = .01$). Male students, on the other hand, showed significant differences both with regard to spending less than two hours in the sun, and spending more than five hours in the sun weekly. More Californian male students spent less than two hours in the sun ($p = .005$), and more South African males spent more than five hours in the sun weekly ($p = .002$).

Table 3

Sun protection measures among South African and Californian students by gender

	South Africa N = 160		California N = 163	
Sun protection	mostly	rarely	mostly	rarely
Females				
Use sunscreen	27.4*	46.4*	42.4	25.9
Cover up	9.5	70.2	11.7	69.4
Put on a hat	16.6	55.9	15.3	69.5
Avoid sun	17.9	58.4	11.8	64.7
Males				
Use sunscreen	17.1	53.9*	28.2	30.8
Cover up	6.6	71.0	14.1	61.5
Put on a hat	27.6	51.3	26.9	56.4
Avoid sun	9.2	73.7	10.3	71.8

Note. "Mostly" is summarizing the questionnaire answers always and most of the time. "Rarely" is summarizing rarely and never. Sometimes is not included. The values represent percentages.

*$p < .05$.

As shown in Table 3, the use of sunscreen with a sun protection factor (SPF) of at least 15 was significantly higher ($p = .04$), and the non-usage significantly lower ($p = .005$), among Californian female students. Other sun protection measures

(covering arms and legs with clothing when in the sun, putting on a hat in the sun, and avoiding the sun between ten in the morning and three in the afternoon) were similar in both female student groups. Among male students, the only significant difference was that more South Africans reported that they rarely use sunscreen (p = .004).

The respondents were also asked under which circumstances they would use sunscreen, protective clothing, and a hat more often. Twenty two (26.2%) of the South African female respondents, but only 7 (8.2%) of the female Californians, would use sunscreen more often if it was less expensive. Similarly, 20 (26.3%) of the male South Africans, and 10 (12.8%) of the Californians, mentioned the sunscreen expense as a reason for non-usage (see Table 4).

When asked about circumstances under which they would use protective clothing, 21 (25.0%) of the South African females, and 41 (48.2%) of the female Californians, answered "if it was less hot." Twenty (26.3%) of the South African males and 24 (30.8%) of the Californian males agreed. Furthermore, the students were asked under which conditions they would wear a hat more often. Twenty three (27.4%) of the South African and 25 (29.4%) of the Californian females, as well as 11 (14.5%) of the South African and 6 (7.7%) of the Californian males, would wear a hat if it was more fashionable (see Table 4).

Table 4

Factors reinforcing sun-protective behavior of South African and Californian students

Factors reinforcing sun-protective behavior	South Africa N = 160		California N = 163	
	Females	Males	Females	Males
Would use sunscreen more often if				
Less expensive	26.2*	26.3*	8.2	12.8
More time in sun	14.3	15.8	7.1	19.2
Less greasy/messy	14.3	3.9	11.8	7.7
Remembered	13.1	9.2*	15.3	20.5
Other reason	21.4*	40.8	48.2	32.1
No response	10.7	3.9	9.4	7.7
Would use clothing more often if				
Less hot	25.0*	26.3	48.2	30.8
Appearance/fashion	15.5*	7.9	5.9	6.4
More time in sun	8.3	5.3	3.5	11.5
Other reason	33.4	50.0	24.7	37.2
No response	17.9	10.5	17.6	14.1
Would use hat more often if				
Appearance/fashion	27.4	14.5	29.4	7.7
More time in sun	8.3	2.6	1.2	7.7
Use one already	7.1	10.5	9.4	12.8
Other reason	38.1	57.9	38.8	56.5
No response	19.0	14.5	21.2	15.4

Note. The values represent percentages. Other reason in these questions includes answers too diverse for categorization.
*$p < .05$.

Statistical comparison shows that significantly more South African female and male students would use sunscreen if it was less expensive (p = .002 and p = .03, respectively). In addition, significantly more Californian males would use it if they remembered, as compared to South African males (p = .049). With regard to protective clothes, significantly more Californian females would wear them if they were less hot (p = .002). In addition, significantly more South African females would wear them if they were more fashionable (p = .04).

Sun-related Knowledge and Beliefs

Eighty one (96.4%) of the South African female students, and 78 (91.8%) of the female Californians, believed that they need to protect themselves from the sun due to the diminishing ozone layer (see Table 5). Seventy one (93.4%) of the South African males, but only 52 (66.7%) of the Californian males, believed the same. Twenty six (31.0%) of the South African female students, as compared to only 8 (9.4%) of the Californian females, as well as 24 (31.0%) of the South African males, and 13 (16.7%) of the male Californians, indicated a belief that getting sunburnt occasionally does no harm. A similar difference (14.3% of the South African females and 28.9% of the males vs. 4.7% of the Californian females and 16.7% of the males) was found regarding the belief that only sunburn causes damage, and a tan

actually protects the skin.

When the South African and Californian groups were compared, several important results emerged. Significantly more South African males believed that they need to protect themselves from the sun due to the disappearing ozone layer (p = .00004), but no significant difference was found between the female students. When asked about occasional sunburn, significantly more South Africans of both sexes (females p = .0005 and males p = .03) felt that getting sunburnt occasionally does no harm. In addition, significantly more South African females (p = .03) indicated that a tan protects the skin.

Finally, 24 (28.6%) of the South African and 11 (12.9%) of the Californian female students, as well as 18 (23.7%) of the South African and 17 (21.8%) of the Californian males, believed that sunscreens with an SPF of less than 15 are enough to protect them. The difference between the male groups was insignificant, but among the females, significantly fewer Californians (p = .01) believed that an SPF of less than 15 is enough protection.

Table 5

Sun-related knowledge and beliefs of South African and Californian students by gender

Sun-related knowledge and beliefs	South Africa N = 160		California N = 163	
	females	males	females	males
Sun exposure can cause skin cancer	97.6	100.0	100.0	100.0
Skin cancers are increasingly common	98.8	98.7	98.8	98.7
Sun exposure can cause my skin to age too early	97.6	92.1	98.8	91.0
I need to protect myself from the sun due to the hole in the ozone layer	96.4	93.4*	91.8	66.7
The less I expose my skin to the sun, the less likely I am to develop skin cancer	91.7	93.4	98.8	88.5
Getting sunburnt occasionally does no harm	31.0*	31.6*	9.4	16.7
Only sunburn causes skin damage, a tan protects it	14.3*	28.9	4.7	16.7
It is necessary to sunburn before tanning	7.1	10.5	4.7	3.8
Sunscreens are not necessary if one does not burn	3.6	17.1	1.2	7.7
Sunscreens with a SPF<15 are enough to protect me	28.6*	23.7	12.9	21.8

Note. The values represent percentages of respondents answering True on the questionnaire.
*$p < .05$.

Table 6
Sun-related beliefs of South African and Californian students by gender

Sun-related beliefs	South Africa N = 160		California N = 163	
	agree	disagree	agree	disagree
Females				
Sunscreens are too messy to use regularly	39.3*	47.6	23.5	60.0
Sunscreens are too expensive to use regularly	35.7*	47.7*	14.1	72.9
Sunscreens worsen acne	37.0	42.9	31.8	36.4
I will not get a good tan if I use sunscreen	25.0	63.1	22.4	60.0
Males				
Sunscreens are too messy to use regularly	32.9	52.6	35.9	48.7
Sunscreens are too expensive to use regularly	46.1*	38.2	23.0	52.6
Sunscreens worsen acne	26.4	44.7*	24.4	16.7
I will not get a good tan if I use sunscreen	21.0	64.5	21.8	53.9

Note. "Agree" summarizes the questionnaire answers strongly agree and agree. "Disagree" summarizes strongly disagree and disagree. Neither is not included. The values represent percentages.
*$p < .05$.

As described in Table 6, significantly more South African females agreed that sunscreens are too messy to use regularly (p = .03), while no significant difference was found between the male groups. When asked about sunscreen expense, significantly more South African females agreed that sunscreens are too expensive to use regularly (p = .001), and significantly more Californian females disagreed (p = .0008). In addition, significantly more South African males agreed with the same statement (p = .003). Finally, significantly more South African male students agreed that sunscreens worsen acne (p = .0002), however, no significant difference was discovered between the female groups.

Sun-related Attitudes

As noted in Table 7, there were no significant differences between the South African and Californian groups with regard to feeling more attractive with a sun tan. However, significantly more South African females agreed that they look healthier with a sun tan (p = .004), and significantly more Californian female respondents disagreed with the same statement (p = .009). In addition, significantly more male South Africans agreed that they look healthier with a tan (p = .001).

When asked about the statement "I am not worried about

getting skin cancer because I am still young," there were no significant differences between the female groups. However, significantly more Californian males agreed with the statement (p = .04), and significantly more South African males disagreed (p = .00002). With regard to worrying about their skin aging due to sun exposure, there were no differences between the female groups. Once again, significantly more South African males disagreed with this, as compared to Californian males (p = .02).

Significantly more Californian females agreed that using a protective hat makes them feel unattractive (p = .03). On the other hand, significantly more Californian males disagreed with the same statement (p = .04). Finally, significantly more South African males agreed that they feel unattractive when they cover arms and legs in the sun, as compared to Californian males (p = .008).

Table 7
Sun-related attitudes of South African and Californian students by gender

Sun-related attitudes	South Africa N = 160		California N = 163	
	agree	disagree	agree	disagree
Females				
I feel more attractive with a tan	75.0	8.3	67.0	13.0
I look healthy with a tan	83.4*	3.6*	63.5	15.3
I am not worried about skin cancer	3.6	79.8	4.7	77.7
I am not worried about my skin aging	3.6	82.1	3.5	81.2
I feel unattractive in a hat	19.0*	46.4	34.1	40.0
I feel unattractive in protective clothing	27.4	32.1	23.5	40.0
Males				
I feel more attractive with a tan	71.1	9.2	61.6	9.0
I look healthy with a tan	85.6*	3.9	62.8	7.7
I am not worried about skin cancer	11.8*	81.5*	24.4	48.9
I am not worried about my skin aging	17.1	61.8*	23.1	43.6
I feel unattractive in a hat	21.1	42.1*	16.6	58.9
I feel unattractive in protective clothing	35.5*	31.6	16.6	38.5

Note. "Agree" summarizes the questionnaire answers strongly agree and agree. "Disagree" summarizes strongly disagree and disagree. Neither is not included. The values represent percentages.
*$p < .05$.

Sun-related behavior of respondents' families and friends

Forty nine (58.3%) of the South African females reported that their mothers liked to have a suntan, as compared to only 33 (38.8%) of the Californian females' mothers. This difference was significant ($p = .01$). Similar results were found among South African males (42 [55.3%] of mothers) and Californian males (28 [35.9%]). Among these groups, as well, the difference was significant ($p = .02$). However, considerably fewer fathers in the South African female group (33 [39.3%]) liked to have a suntan, as compared to 28 (32.9%) of the fathers of the Californian female students. Thirty eight (50.0%) of the South African males' fathers, but only 16 (20.5%) of the Californian males' fathers, liked a tan. The difference between the female groups was insignificant. However, significantly more South African males' fathers liked a tan ($p = .0001$).

Fifty six (66.7%) of the South African and 50 (58.8%) of the Californian female respondents' siblings liked to have a tan. Similarly, 47 (61.8%) of the South African and 42 (53.8%) of the Californian males' siblings liked a tan. Eighty (95.2%) of the South African females' friends and 70 (82.4%) of the Californian females' friends liked a sun tan. Among the South African male students' friends, 67 (88.2%) liked a tan compared to only 55 (70.5%) of the Californians' friends. Finally, 44 (52.4%) of the

South African female respondents, but only 29 (34.1%) of the Californians, used to tan with their parents when they were younger. However, only 28 (36.8%) of the South African males, and 20 (25.6%) of the Californian males, used to tan with their parents.

The differences between siblings' reported desire for a tan were insignificant. However, significantly more South African female respondents' friends liked to have a tan (p = .008). Similarly, significantly more South African males' friends liked a tan (p = .007). Finally, significantly more South African females used to tan with their parents when they were younger (p = .02).

As described in Table 8, there were several more significant differences in the sun-related behavior of the respondents' families and friends. Significantly more South African males reported that their mothers wore a hat in the sun (p = .01). On the other hand, the differences between fathers' and friends' usage of hats were insignificant. However, female and male South Africans reported significantly more hat use by their siblings (p = .004 and p = .049, respectively).

With regard to covering their arms and legs with clothing in the sun, the differences between the groups' fathers, mothers, and friends were insignificant. However, significantly more South African males had siblings that covered up in the sun (p = .02). There were no significant differences in the mothers',

fathers', and friends' usage of sunscreen with an SPF of at least 15. On the other hand, significantly more South African females had siblings that used sunscreen (p = .02). Finally, there were no significant differences with regard to having family or friends that stay out of the sun.

Table 8
Sun-related behavior of South African and Californian students' families and friends

Sun-related behavior of families and friends	South Africa N = 160		California N = 163	
	Females	Males	Females	Males
Mother				
Wears a hat	60.7	68.4*	54.1	48.7
Covers up	23.8	34.2	31.8	37.2
Uses sunscreen	60.7	68.4	55.3	61.5
Stays out of sun	47.6	56.6	38.8	44.9
Father				
Wears a hat	60.7	65.8	63.5	55.1
Covers up	15.5	18.4	23.5	20.5
Uses sunscreen	46.4	53.9	37.6	46.2
Stays out of sun	27.4	38.2	38.8	38.5
Siblings				
Wear a hat	50.0*	43.4*	28.2	28.2
Cover up	10.7	14.5*	10.6	3.8
Use sunscreen	53.6*	56.6	35.3	48.7
Stay out of sun	19.0	27.6	22.4	19.2
Friends				
Wear a hat	27.4	39.5	17.6	30.8
Cover up	6.0	5.3	3.5	5.1
Use sunscreen	46.4	52.6	34.1	38.5
Stay out of sun	15.5	17.1	14.1	17.9

Note. The values represent percentages of respondents answering True on the questionnaire.
*$p < .05$.

Factors reinforcing respondents' sun-related behavior

The last questions dealt with which person had taught the respondents most about sun protection, as well as who has the greatest influence on their sun exposure (see Table 9). Among the South Africans, 44 (52.4%) of the females and 22 (28.9%) of the males had been taught mostly by their mother. Far fewer of the Californian females (22 [25.9%]), and 23 (29.5%) of the males, reported being taught about sun protection by their mother. Four (4.8%) of the South African females, and 8 (10.5%) of the males, were taught about sun protection by their father. Similarly, 3 (3.5%) of the Californian females and 4 (5.1%) of the males were taught by their father. Media (TV, advertisements, and magazines) taught 13 (15.5%) of the South African females, and 22 (28.9%) of the males. Among the Californians, 19 (22.4%) of the females and 8 (10.3%) of the males reported being taught about sun protection from the media.

Significantly more South African females had been taught about sun protection by their mothers ($p = .0004$), but the difference between the male groups was insignificant. There were no significant differences between the groups that had indicated that they had taught themselves sun protection, or had been taught by their parents or teachers. However, significantly more Californian females had been taught by other family members ($p = .01$), and significantly more South African

males had been taught by the media (p = .003). Furthermore, significantly more Californian males had been taught by others (p = .01) or did not respond (p = .02).

Thirty (35.7%) of the South African females, but only 8 (9.4%) of the Californian females, were mostly influenced by their mother with regard to sun exposure. Similarly, 29 (38.2%) of the South African males, and 7 (9.0%) of the Californian males, were influenced by their mother. However, only 4 (4.8%) of the South African and 1 (1.2%) of the Californian females, as well as 7 (9.2%) of the South African and 3 (3.8%) of the Californian males, were mostly influenced by their father. Nineteen (22.6%) of the South African females, and 34 (40.0%) of the Californian females, reported that they themselves were the greatest influence on their sun exposure. Similarly, 18 (23.7%) of the South African males, and 29 (37.2%) of the Californian males, influenced themselves (see Table 9).

Significantly more South African females (p = .00004), as well as males (p = .00002), reported being influenced by their mother with regard to sun exposure. There were no significant differences regarding fathers' or friends' sun exposure influence. However, significantly more Californian females influenced themselves (p = .01), or were influenced by others (i.e., doctors, employers, other family members, coaches) (p =

.049), as compared to South African females. Finally, significantly more Californian females and males did not respond (p = .01 and p = .01, respectively).

Table 9
Factors reinforcing sun-related behavior of South African and Californian students

Factors reinforcing sun-related behavior	South Africa N = 160		California N = 163	
	Females	Males	Females	Males
Who primarily taught students sun protection				
Mother	52.4*	28.9	25.9	29.5
Father	4.8	10.5	3.5	5.1
Parents	10.7	5.3	7.1	11.5
Other family	1.2*	3.9	10.6	5.1
Media	15.5	28.9*	22.4	10.3
Myself	1.2	11.8	7.1	5.1
Teacher/School	4.8	6.6	10.6	7.7
Others	7.1	2.6*	9.4	14.1
No response	2.4	1.3*	3.5	11.5
Who mostly influences students' sun exposure				
Mother	35.7*	38.2*	9.4	9.0
Father	4.8	9.2	1.2	3.8
Myself	22.6*	23.7	40.0	37.2
Friends	16.7	7.9	10.6	5.1
Boy/Girlfriend	7.1	5.3	3.5	9.0
Others	6.0*	6.6	15.3	11.5
No response	7.1*	9.2*	20.0	24.4

Note. Other family in question one includes husband/wife, siblings, grandmother/father, child, and aunt. Others in question one include doctor, swim coach, make-up consultant, and friends. Others in question two include doctor, swim coach, employer, and other family members. The values represent percentages.
*$p < .05$.

CHAPTER 5

Discussion

Summary of results

The analysis was based on a sample of 160 white South African and 163 white Californian students. In the South African group 52.5% were female and 47.5% male, and the majority (87.5%) were less than 20 years old. Similarly, the Californian group consisted of 52.1% females and 47.9% males. However, here the largest proportion (42.9%) were 20 to 25 years old.

Most of the South African females (51.2%) spent two to five hours in the sun weekly, while the majority of the Californian females (56.5%) spent less than two hours. Among males, 36.8% of the South Africans and 15.4% of the Californians spent more than five hours in the sun weekly. In addition, 45% of both female and male South Africans, and over 30% of the Californians, used to tan with their parents when they were young.

Significantly more Californian females used sunscreen most of the time. Conversely, significantly more South African females rarely used sunscreen. Among the males, significantly more South Africans rarely used sunscreen. Over 20% of the South Africans reported that they would use sunscreen if it was less expensive. Significantly fewer Californians of both sexes, however, indicated sunscreen expense as a reason for non-

usage.

Significantly more Californian than South African females would wear protective clothing if, as many respondents put it, "the clothes were less hot." On the other hand, significantly more South African females would wear them "if they were more fashionable." In addition, most students in both groups would use a hat "if it was more fashionable," or if they "spent more time in the sun."

Most respondents had very good knowledge of the increasing skin cancer incidence, and the general danger of sun exposure. Notwithstanding, a substantial number of students indicated beliefs such as "occasional sun burn does no harm," or "a tan actually protects the skin." The majority of respondents from both countries also indicated that they felt more attractive with a sun tan. In addition, significantly more South African students felt that they look healthier with a sun tan.

The most common sun-protection measures taken by mothers and fathers in both groups were sunscreen use and wearing a hat. Similarly, sunscreen was most commonly used by respondents' friends and siblings. Finally, most students in both countries (but significantly more South African than Californian females) had been taught about sun protection by their mothers. Interestingly, while most South Africans reported that

they had been influenced by their mothers regarding sun exposure, most Californians reported that they influenced themselves.

Finally, the researcher feels that two specific findings were the most important in this study. The first was that the similarities between the sun-related behaviors, attitudes, knowledge, and beliefs of these two groups far outnumbered the differences. The second was that when differences were identified it was the South African students that reported poorer sun-protective behavior, more frequent sun exposure, and seemed less knowledgeable about sun-related topics than the Californian students.

Limitations of the study

As discussed in Chapter 1, two limitations to this research were acknowledged before data collection. One limitation concerned the possibility of demand characteristics, i.e., the tendency of respondents to give "socially desirable" answers. The second limitation was the utilization of university students as the study's sample, thus decreasing the study's generalizability. Additional limitations to the study's instrument, samples, data collection design, as well as analysis, were discovered during the course of the research. These can, however, be attributed to the particular challenges of cross-

cultural research, the unique experience of researching in post-apartheid South Africa, as well as thesis research far from the author's home university.

Survey instrument

The planning stage of this thesis research took place in California. Although the researcher had visited South Africa, received extensive written and verbal information about the country through the Counsel of International Exchange of Scholars, and is married to a nationally known African scholar, she nonetheless experienced at least one unanticipated cultural barrier with regard to her instrument worth discussing.

Upon arrival in South Africa the survey instrument was tested for cultural appropriateness, both by a medical professional and two college faculty members (see Appendix D). The questionnaire was also pilot tested with a sample of 10 students. Neither of these pretests revealed a need to modify items on the questionnaire. However, once all of the surveys were collected from the 160 South African respondents, a surprising pattern was revealed. One item was systematically ignored by 65% of the respondents. This item was a question on parents' income level (see Appendix A). The question had been included in the survey tool as epidemiological studies have shown that melanoma rates are higher in populations at the highest socioeconomic levels (Geller, Miller, Lew, Clapp,

Wenneker, & Koh, 1996). However, since the majority of South African respondents had refused to answer this question, it was subsequently omitted from the analysis and further data collection.

In hindsight, it was both surprising and disappointing that potential sensitivity to this question was not revealed during the professional review for cultural appropriateness. This review had been requested of South African educational and health professionals specifically to identify any concepts or questions that might not translate or be appropriate across the two cultures. However, these reviewers may have been unintentionally biased due to their own gender, age, or income. Clearly, when reviewing for cultural appropriateness, a more diverse set of reviewers (particularly regarding age, gender, and profession) is needed.

One possible reason for the inappropriateness of the income question failing to appear in the pilot test may be that the pilot sample group were student representatives (the researcher belatedly learned this). These are usually students with good grades, who are interested in representing other students' issues and concerns. Thus, they may be of higher socioeconomic status than the rest of students in the two colleges. It is possible that these particular students had no objections to answering income questions. In consequence,

more extensive pilot testing, and careful attention to who the pilot subjects are, is recommended for future research with an original instrument.

Samples

The South African and Californian samples differed with regard to their ages, which may have heightened the differences between the two groups. Most of the South African students were less than 20 years old, while the largest proportion of the Californians were 20 to 25 years old. This difference was due to the fact that one of the South African data collection sites was a junior college, in which the oldest students were only between 17 and 19 years. In California, on the other hand, data collection took place mainly in freshmen classes at a public university.

The researcher had initially planned to conduct her South African research at the University of Natal (UND), Durban, which was similar to San Jose State University (SJSU) regarding potential participant ages. However, two socio-political factors, each based in the dynamics and history of current South African society, forced her to abandon previous plans and conduct the research at colleges in Richards Bay.

The first factor was the escalating crime rate that South Africa, and predominantly KwaZulu/Natal, was experiencing during her South African stay. During the researcher's seven months visit, for example, all of her neighbors were burglarized

at least once, some twice. Furthermore, several motorists were robbed, assaulted, and murdered on the roads of KwaZulu/Natal during the first month of the researcher's visit.

As UND was 85 miles away from her place of residence, the researcher would have had to travel for two hours by car, alone, to reach the campus. In addition, returning home would have meant driving in darkness, as her research took place during South Africa's fall and winter seasons. For a single female motorist this presented the additional danger of rape, which also was fairly common. Based on these facts, she therefore decided not to take the risk of driving to Durban alone on a regular basis.

In consequence, the researcher investigated which educational institutions located closer to her home would be interested in participating in the study. Within a few weeks, she had established her research at Richards Bay Technical College (RBTC) and John Ross College (JRC), only 20 miles away. However, these colleges differed from the University of Natal (UND) on at least two points. Their student populations were smaller, with a total of only 1,100 students, compared to more than 15,000 at UND. In addition, JRC was a junior college, with the oldest students only between 17 and 19 years. In consequence, the researcher only surveyed specific classes at JRC, rather than randomly sampling classes as had been the case at RBTC. This

adjustment was made to ensure that the South African student sample was as comparable as possible to the sample expected in California.

The other reason for relocating the research to Richards Bay was an unexpected incident at the University of Natal (UND). Prior to leaving for South Africa, the researcher had extensive correspondence with faculty at UND about her study. On arriving in South Africa, she was invited to present her research proposal to the Deputy Vice-Chancellor, UND, as well as faculty of the Sociology Department. However, on completing her presentation, she was informed that submitting a questionnaire to all students, but excluding Non-whites prior to analysis, was "deceptive and unethical." Furthermore, she was told that she must change not only her methodology, but also basic research question, in order to pursue the research at UND.

In hindsight, the researcher realized that excluding non-white students was a sensitive and highly charged political issue in post-apartheid South Africa. What in Europe and the United States is common research practice (broad data collection with subsequent analysis of subsets of particular interest), was in South Africa seen as yet another tool of white supremacy. However, despite offering to analyze the responses from all ethnic groups and make the results available to UND faculty, she was still asked to change her data collection method, even in the

U.S. As this would have been impossible with regard to her thesis goal and objectives, she reluctantly decided not to pursue her research further at UND.

Data collection

Another limitation, occurring during data collection in South Africa, was the possibility of non-response bias. Students at both South African colleges received the questionnaire during a class session, and were asked to return it to the researcher during class the next day. This represented another change from the original data collection protocol, as the researcher had originally proposed both distribution and collection of survey instruments during one single class session. However, due to time constraints (classes only lasted 40 minutes in both South African colleges), the data collection protocol was modified. In consequence, the South African response rate was 68%. The 32% non-response rate raises the possibility that those students who completed the South African survey may have had a greater interest in sun-related issues, as well as better command of the English language, than their non-responding peers.

However, upon return to California, the researcher decided to keep the original data collection protocol for two reasons. The first reason was that San Jose State University (SJSU) was unexpectedly ethnically diverse. Allowing participants to take the questionnaires home and return them during the next class

session would have increased the possibility of a low response rate. Given the comparatively low number of white students at SJSU, it would have been more difficult for the researcher to reach the sample goal of 160 white students.

The second reason was that classes in the South African colleges were given daily, while those at SJSU were only given once to three times weekly. Thus, for the participants to have the questionnaires in their homes for several days before returning them to the researcher further increased the possibility of a low response rate. In consequence, the response rate in California was 99.8%, most likely due to both distribution and collection of questionnaires during a single class session.

Analysis

Two limitations related to data analysis were discovered during the course of the research. One was the high degree of non-response in the open-ended questions, especially among Californian students. These were the last questions in the survey instrument. In South Africa, where the students took the surveys home, most returned them completely filled out. In California, where the questionnaires were distributed and collected during the same class session, 7 to 22% of participants skipped one or several of the last questions.

During SJSU data collection, the researcher observed two possible reasons for this non-response. The first was that some

students did not seem to have enough time to properly fill out their questionnaires. Although their professors had allocated 10-15 minutes for the survey at the beginning of classes, some students worked quite slowly. In consequence, they visibly started to hurry when everybody else was done, and may have skipped the last questions.

In addition, the researcher observed several students, who identified themselves as Whites, having difficulties understanding the survey instrument. Some of them asked her about the meaning of several questions; others seemed to "give up" before finishing the survey. As a result, analysis of several questions had to be performed on less than the final sample.

Although this non-response does not challenge the core findings of South African and Californian sun-related commonalities and differences, it does not give the researcher the full insight she expected into reinforcing factors. Future researchers using English survey instruments in ethnically diverse groups should consider allocating longer time frames for data collection. Furthermore, pilot testing of survey instruments in ethnically diverse populations should always explore linguistic understanding.

The second limitation to data analysis was the relatively small sample sizes (N = 160 in South Africa and N = 163 in California). The initial sampling goal had been 200 white students

in each country. However, due to the above mentioned unanticipated difficulties, as well as ethnically diverse colleges, the sampling goal was modified by the researcher to 160 participants. Nonetheless, although the modest sample sizes may limit generalizability of the findings, the results are mostly consistent with previous research in the field.

Discussion of sun-exposure habits

The results of this research suggest that young South African men are more likely to spend time in the sun than are Californian students of both sexes. Specifically, 36.8% of South African males reported more than five hours in the sun weekly, on the average, compared to 15.4% of Californian males and 10.6% of Californian females. One reason for the difference between both sets of respondents may be that South African data collection occurred during South Africa's early fall (March), when the weather was still very hot. Therefore, the likelihood of spending time outdoors, and in the sun, may have been greater than in California, where data collection took place during late fall (October). A second explanation for this difference may be that urban San Jose lacks a beach front, while Richards Bay has several popular beaches. Thus, spending time in the sun may be easier for those who live adjacent to a beach than for others residing in a city.

The researcher found that in both the South African and Californian samples, males reported more time in the sun than did females. Other studies have shown the same gender difference (Mermelstein & Riesenberg, 1992; Campbell & Birdsell, 1994). The higher proportion of men spending time in the sun probably reflects a greater emphasis on male-oriented outdoor recreational activities in both cultures. Nonetheless, this seems especially true among South African males. In Richards Bay, for example, it was far more common to see young men on the beach, surfing and swimming, than to see young women. In addition, many more males than females took part in other outdoor activities (e.g., fishing, running, hiking) (personal observations, spring 1996). In consequence, educational efforts which specifically target males seem warranted both in California and South Africa, but seem more urgent in the latter country.

It is interesting to note that these results suggest that young adults in Richards Bay spend less time in the sun than do their counterparts in Cape Town, South Africa. Research by Schirnding et al. (1991/2) found that 67% of Cape Town respondents had spent more than 10 days sunbathing in direct sunlight the past summer. In Richards Bay, on the other hand, only 6% of the female respondents and 37% of the males reported spending more than five hours in the sun weekly. There

may be two reasons for these differences.

First, Schirnding et al. conducted cluster sampling at several beaches. Thus, their sample consisted of individuals likely to sunbathe more often than the general population. Second, their data collection took place five years earlier, as well as in another province. These differences point to the need for further sun-related research in South Africa to explore variations by population and region before effective educational interventions can be designed.

Discussion of sunscreen usage

The results of this research suggest a higher sunscreen usage in both groups (36% of Californians and 23% of South Africans), than found among respondents in several other studies (Schirnding et al., 1991/2; Banks et al., 1992; Mermelstein & Riesenberg, 1992; Vail-Smith & Felts, 1993). There are two possible reasons for this difference. One may be the possibility of "demand characteristics," i.e., the tendency of respondents to give socially desirable answers. This may be particularly true in California, where a substantial amount of health promotion regarding sun protection has taken place. Thus, respondents may have indicated a higher than actual use of sunscreen.

Another reason may be that these two groups' sunscreen

usage may, in fact, be higher than that of previous studies' respondents. This may be due to the previously mentioned health education efforts, especially in California. Furthermore, in recent years, skin cancer and sun-protective measures have received increased publicity through the general media in both countries, but, once again, more in California. In consequence, these findings suggest the importance of further exploration of sun-protection practices in different populations, as well as how their patterns change over time.

The results of this research further suggest that Californian students use sunscreens more frequently than do South Africans. As South Africans have not been exposed to the same amount of health education regarding sun protection, this was not an unexpected finding. When respondents were asked the circumstances under which they would use sunscreen more often, significantly more South African males and females answered "if it was less expensive." This perception of sunscreen as too expensive for consistent use, however, was unexpected.

The researcher did not, however, find that sunscreens in Richards Bay were significantly more expensive than in California. Furthermore, the variety of brands and products was comparable with those in California, and sunscreens were available in most stores. Finally, personal observations suggest

that the living standards of South African Whites either equal or exceed those of Californians. Thus, the perceived expense may be due to cultural factors beyond the scope of this research. Clearly, further research investigating barriers to sunscreen usage in South Africa is warranted.

Finally, this research indicates that females in both the Californian and South African groups were more likely to use sunscreen than were the males in either sample. This gender difference, with regard to sunscreen usage, has also been described by other researchers (Banks et al., 1992; Vail-Smith & Felts, 1993; Campbell & Birdsell, 1994). One explanation for this may be that many skin care products, both in South Africa and California, have for several years had an SPF of at least 15 added to them. Thus, many females in both countries have had the advantage of using sun protection when taking care of their skin.

Another explanation may be that females have traditionally used creams and lotions on their bodies, thus, using a sunscreen is similar behavior. Males, on the other hand, do not use skin care products as often. In consequence, education targeting men, using male role-models, may focus on themes that reinforce skin care as a means for both male attractiveness and protection against skin cancer. In addition, collaboration

between health professionals and sunscreen manufacturers should focus on the development of sunscreens that are easily applied, appropriately scented, and appealing to both sexes.

Discussion of additional sun-protection measures

The results of this research suggest that sun-protection measures such as covering arms and legs with clothing in the sun, putting on a hat, or avoiding the sun between 10 am and 3 pm, were similarly rare in both the South African and Californian groups. Of significance is that they were even more rare than in the sample described by Campbell and Birdsell (1994).

Some explanations for these poor sun-protection habits emerged when the students were asked under which circumstances they would use these measures. Many indicated that they would use clothing and/or a hat more often if they were less hot. Others would use them if they were more fashionable or attractive. Still others would wear hats if they would not "flatten their hair" or they would not "sweat under it."

Unfortunately, wearing clothing and hats in high temperatures can be uncomfortable. Both in California and South Africa, temperatures are high during most of the year (e.g., summer temperatures in San Jose range 85-100° and Richards Bay 90-105°). Therefore, health professionals may wish to work

with clothing manufacturers to eliminate this specific concern. The development of lightweight clothes with built in sun protection may be one answer.

One example of clothing already available is Solumbra. This fabric is both lightweight and has a built in SPF of more than 30. The clothes are manufactured and sold in the United States, but can be ordered from other countries. There have, however, been no customers from South Africa as of yet (personal communication, February 1997). In consequence, incorporating information about this clothing alternative, as well as others to be developed, into health promotion programs geared for both South Africa and California would seem a logical first step.

The results of this research further suggest that concern with appearance is a major obstacle in motivating young adults to increase sun-protective behavior. As mentioned in other studies (Hill et al., 1993; Vail-Smith & Felts, 1993), the value that white populations place on suntan can not be overestimated. One reason this value is so ingrained in Western societies is that the media continues to promote tanned models. Thus, both female beauty and male attractiveness is continuously equated with a tanned complexion.

Significantly, a substantial number of both South African and Californian students indicated that they had been taught sun protection primarily through the media. In consequence,

role modeling of appropriate sun-protective behavior by opinion leaders in fashion and media seems an effective way to disseminate this message to young individuals. Another may be to promote a "pale" look on fashion models. A third may be to utilize the previously mentioned concern with appearance in promoting sun protection as a means to prevent skin aging, and thus wrinkles.

Predisposing factors: Discussion of sun-related attitudes, knowledge, and beliefs

The results of this research further indicate that respondents in both groups were quite knowledgeable regarding the etiology of skin cancer and skin aging, as well as increasing skin cancer incidence. Notwithstanding, translating this knowledge into appropriate behavior is not easy. One reason for this is that deeply ingrained values and habits make up barriers to any change. Similarly, knowledge alone may be a necessary, but insufficient part of the process of behavioral change (Hill et al., 1993; Kubar, Rodrigue, & Hoffman III, 1995). In consequence, future health promotional efforts must operate on two distinct levels. One level should raise awareness and knowledge of the risks of sun exposure, the second should make sun-protection measures both practical and "user friendly."

A substantial number of students from both countries (but

significantly more in South Africa), displayed the dangerous misconceptions that "occasional sunburn does no harm," and "a tan actually protects the skin." Unfortunately, these beliefs have been reported in other studies as well (Vail-Smith & Felts, 1993). Clearly, educational programs should emphasize the fact that no tan is safe, and that intentional, unprotected sun exposure is never healthy.

Reinforcing factors: Discussion of parents' role regarding sun-related behavior

Finally, the results of this research suggest that almost half of the South African respondents used to tan with their parents when they were younger, as compared to only about a third of the Californian respondents. Furthermore, over half of the South African females and almost a third of the males, as well as almost a third of the Californian students, indicated that it was primarily their mothers who taught them sun protection. Yet, over 36% of the South Africans, but only 9% of the Californians, indicated that their mother is the one who mostly influences their sun exposure.

One reason that South African mothers seemed to play a greater role with regard to the sun-related behavior of their children may be that the South African students were younger than the Californians, thus perhaps more likely to still

live with their parents. Another reason may be that the core family in South Africa seems to be much stronger than in California (personal observations, spring 1996). A third reason may relate to the fact that white South African women often become homemakers during the time their children grow up (personal observations, spring 1996). Thus, they spend more time with their children than many Californian mothers, who tend to work outside the home, and may therefore influence their children's behavior more directly.

Although these results suggest the larger role of South African mothers, they also indicate that all parents provide important reinforcement of their children's behavior. This has been demonstrated in earlier research as well (Lowe et al., 1993). In consequence, a greater emphasis on sun-related health education of parents in both countries is needed. Parents and caregivers should be encouraged to modify their own sun-related behavior, as parents' role modeling seems to be integral in children's acquisition of behavior patterns. In addition, they should be encouraged to improve sun protection for their children. Parents could do this by making sunscreen easily available in the home, as many students mentioned sunscreen expense as a reason for non-usage. Another strategy may be to schedule outdoor family activities in the morning or late afternoon, thus avoiding the hottest part of the day.

In conclusion, the results of this study suggest that young South Africans are more likely to spend time in the sun than are Californians. They also indicate that Californian students use sunscreens more frequently, and that females of both countries are more likely to use sunscreens than are males. Furthermore, these results indicate that South African mothers play a larger role in influencing their children's sun-related behavior than mothers in California. Finally, although these differences between the South African and Californian samples were significant, the similarities between these groups far outnumbered the differences.

Although several limitations to this study were identified, most of these can be attributed to the particular challenges of conducting research across two cultures. Based on both these limitations, and the previously mentioned study results, implications for health education practice, future research, and policy were developed. Let us consider them.

CHAPTER 6

Recommendations

The purpose of this thesis was to explore the similarities and differences between sun-related behaviors, attitudes, knowledge, and beliefs of South African and Californian university students, as well as to identify those factors most strongly influencing participating students' sun-related behavior. Based on the study's findings, the researcher identified implications for health education practice, future research, and policy.

Implications for Health Education Practice

General Implications for Health Education Practice

1. Educate males. The results of this study indicated that male respondents in both the South African and Californian groups spent more time in the sun than the females. In addition, fewer males than females in both groups reported frequent sunscreen usage. In consequence, selected health education programs in both countries should specifically target males, as they seem to be at greater risk for the sun's detrimental effects.

One way to accomplish this would be to make use of male

peer educators, as many respondents in both groups indicated that their friends are the ones who mostly influence their sun exposure. These young men could be trained by health professionals to educate their peers in schools, high schools, and sporting clubs on how to enjoy the outdoors without excessive sun exposure. Further, they could focus on sun protection as a way to prevent skin aging and sun damaged skin, as many young individuals in both groups expressed concern with their appearance.

2. Educate parents. The study also suggests that over half of the South African females and almost a third of the males, as well as almost a third of the Californian students, identified their mothers as the individual who had primarily taught them sun protection. Although the father's role was more limited, a number of respondents reported their fathers as primary teachers of sun protection, as well. Therefore, selected health education programs should specifically focus on the parents of young children. Health educators could, for example, approach parents-to-be during prenatal care, or new parents in conjunction with well-child visits. Such programs might initially emphasize how to modify parents' own sun-related behavior. Thereafter, the programs could extend their message to teach parents how to protect their children from the sun.

3. Utilize media in health education. Many respondents in both groups reported that they had been taught sun protection through the media. Thus, educational strategies should include enlisting opinion-leaders in the fashion industry, movie industry, and sports to act as role-models for sun-protective behavior. Their sun-protection message could, for example, be disseminated through advertisements, similar to the "drink more milk" ads currently seen in magazines. Other ways of reaching target audiences with sun-protection messages could be through television commercials, featuring the same opinion-leaders demonstrating sun-protective measures.

4. Collaborate with sunscreen manufacturers. Many respondents, from both South Africa and California, indicated that they would use sunscreen more often if it was less messy, oily, and/or less greasy. These concerns have also been voiced by respondents in previous studies (Banks et al., 1992; Vail-Smith & Felts, 1993). Thus, health professionals should collaborate with sunscreen manufacturers in developing sunscreens that are easily applied, non-greasy, as well as appropriately scented to appeal to both sexes. One important part of this collaboration should include qualitative interviews with representatives from specific segments of the general population, to ensure that concerns of potential target populations are considered in the development of these

products. For marketing, samples of appropriate sunscreens could be distributed in schools, sporting clubs, and other locations where young people congregate.

5. Collaborate with clothing manufacturers. A substantial number of students from both countries reported that they would use hat and/or protective clothing more often if the clothes were less hot. Unfortunately, to the researcher's knowledge, only one firm in California (Sun Precautions Inc.) currently manufactures lightweight clothing with built-in sun protection. Neither this product, nor one like it, is available in South Africa. In consequence, collaboration between health professionals and clothing manufacturers, in both South Africa and California, is essential in developing further types of sun-protective clothing.

To implement this collaboration, qualitative research (for example, focus groups) should first be used to determine the preferences of specific target groups in both countries. Thereafter, these preferences should be incorporated into the development of clothes suitable for different populations. South African teenagers, for example, would probably have different clothing preferences than teens in California. The clothes could thereafter be promoted through health education programs in health care settings, schools, workplaces, as well as through mail-order catalogues. Another way to promote clothes for sun

protection, as has been done in Australia, could be to establish fashion/design awards for the most attractive, practical, and sun-protective clothing (Marks, 1992).

Health Education Practice in South Africa

1. Educate South African health professionals about sun-related behavior. Students in the South African sample reported less frequent sunscreen usage, and a more frequent sun exposure, than the Californians. This was not surprising, as only one sun-related educational program has taken place nationally in South Africa. One reason for this may be that health care in developing countries traditionally has focused on infectious and nutritional diseases, assuming that chronic diseases, such as cancer, affect only the oldest segment of the community. Another reason may be that skin cancer, (a disease mainly affecting Whites), may not be considered to be a significant public health problem in a predominantly non-white country.

In consequence, to increase sun protection among South Africans, education of not only health professionals but political leaders is necessary, regarding both skin cancer incidence and prevention. This can be done in cooperation with the Cancer Association of South Africa, which has launched the sole previously mentioned educational program. To minimize these barriers, such education should emphasize that, although

affecting only a minority of the population, skin cancer is nonetheless associated with substantial morbidity and mortality, and associated costs. In addition, it is in large part preventable. Once sun-related awareness and knowledge have been increased among health professionals, effective health education programs can be developed in South Africa, with the goal to increase sun-protective measures.

2. Educate South African mothers. Over half of the South African females and almost a third of the males indicated that it was their mothers who had primarily taught them sun protection. In addition, over a third of the South Africans reported that their mothers had the greatest influence on their sun exposure. In addition to the previously recommended general approaches in educating parents, South African mothers represent a distinct target group for sun-related health education. While living in South Africa, the researcher identified three ways to reach this group.

First, white South African mothers in KwaZulu/Natal virtually always accompany their children to health care visits (personal observations, spring 1996). Thus, physicians and nurses can be trained to provide sun-protection counseling during routine appointments. Second, white South African mothers are generally very active in their children's school activities

(personal observations, spring 1996). Thus, health educators can provide sun-protection education during parent-teacher meetings, or other school based parent activities. Third, white South African mothers are generally very active observers of their children's sports activities (personal observations, spring 1996). Thus, sun-protection education can be provided to the mothers during their children's sports activities. In conclusion, as South African mothers represent such an important influence on their children's sun-related behavior, reaching this group with health education seems both urgent and necessary.

Health Education Practice in California

1. Modify Californian sun-related health education. In this study, almost 50% of the Californian respondents reported spending more than two hours in the sun weekly during the hottest part of the day. These results are discouraging, as a substantial amount of health education has taken place in California. Clearly, future health education efforts should be modified to focus more on the predisposing and reinforcing factors identified in previous research. One predisposing factor, identified in this and other research (Vail-Smith & Felts, 1993), is a concern with attractiveness. This concern appears to be a major motivator in sun-exposure behavior. In consequence,

educational strategies emphasizing only health outcomes will most likely be less effective than those that also focus on the sun's detrimental effects on appearance.

Furthermore, over one third of the Californian respondents reported that regarding sun exposure, they mostly influence themselves, rather than being influenced by an outside source. Therefore, selected health education programs in California should focus specifically on adolescents' and young adults' sun-related behavior, highlighting the importance of self-responsibility and self-care. Educational strategies may include peer education, role-modeling by opinion-leaders, and sports events sponsored by, for example, the American Cancer Society.

Implications for Future Research

General Implications for Future Research

1. Pilot test extensively when conducting research in another culture. The researcher experienced an unexpected barrier when trying to collect data on respondents' socioeconomic status (SES), as the vast majority of South African respondents refused to submit this information. Unfortunately, this barrier was not revealed during pilot testing. Thus, when conducting research in another culture, a first step should be to

adequately acquaint oneself with both the research topic's specific cultural issues and research methodologies specifically suitable to this culture.

Second, reviewing other research that has been conducted in the other culture may facilitate one's own study, as well. If the researcher had identified literature stating that SES-questions may be culturally inappropriate in South Africa, she would have modified her survey instrument earlier. Finally, once in the other culture, ample time should be allotted for extensive pilot testing. This would allow for methodology modification due to unanticipated cultural barriers.

2. Research sun-related attitudes, beliefs, and knowledge. The results of this study indicate that the vast majority of respondents from both groups had good knowledge of both the increasing skin cancer incidence and the sun's detrimental effects. Nonetheless, a substantial number displayed "untrue" beliefs concerning the effects of tans and sunburns. In consequence, future research should further explore sun-related attitudes, beliefs, and knowledge in different populations, as a means of both addressing cognitive barriers to behavior change, and adding to health professionals' understanding which of these factors seem universal, and which more unique to specific populations. Furthermore, these data may assist in monitoring the response to health promotional programs.

Future Research in South Africa

1. Explore South African sun-exposure measures. South African male students reported a more frequent sun exposure than did Californian students of both sexes. In addition, these respondents reported a substantially higher sun exposure than reported in the study by Schirnding et al. (1991/2) from Cape Town. Unfortunately, no other studies describing South African sun-related behavior have been identified. Thus, future research should focus on exploring the sun-related behavior of groups in different regions, as well as of different ages. Once more data have been collected, health professionals will better be able to target specific high-risk groups with health education programs.

2. Investigate South African sunscreen usage. South Africans of both sexes reported sunscreen expense as a major reason for non-usage. However, as the researcher lived in South Africa, she is aware that sunscreens neither are significantly more expensive, nor more difficult to obtain. Therefore, the next research step should be to investigate knowledge of actual sunscreen expense among South Africans. If respondents demonstrate both price knowledge and continuous expense perception, cultural barriers to sunscreen use may be the underlying cause for non-usage. To investigate these barriers, qualitative data collection methods should be utilized in future research.

3. Research in Afrikaans. The researcher used an English language questionnaire in order to gather data from both white South African and Californian students. However, a large number of white South African students were Afrikaans speaking, and English was their second language. In consequence, many may have had difficulties understanding the English questions. Therefore, future sun-related research in South Africa should use either survey instruments translated from English, or original Afrikaans instruments, when collecting data from Afrikaans speaking respondents.

4. Explore sun-related behavior of Non-white South Africans. This research described the sun-related behavior of white South Africans, as both non-melanoma and melanoma skin cancer is considerably higher in South Africa's white population than among its Non-whites. Nonetheless, although not common, skin cancer does occur in non-white populations (Rippey & Rippey, 1984; Hudson & Krige, 1995). In addition, these groups' skin cancer incidence will most likely increase in the future as the ozone layer continues to be depleted. Thus, future research should collect data on Non-whites' sun-related behavior, as a first step in increasing these groups' sun-protective behavior. Finally, data collection among South Africa's non-white populations should utilize qualitative research methods, as the illiteracy rate in these groups is substantial.

Future Research in California

1. Identify effective health education strategies. Most Californians of both sexes reported that they feel more attractive with a sun tan. A majority also reported looking healthy with a tan. As coastal residents, Californians spend much of their leisure time on the beach. In addition, television movies like "Baywatch" re-enforce young individuals' perception that tan equals beauty. In consequence, future sun-related research in California should focus on identifying those health education strategies that are most useful in changing this perception that a tan equals attractiveness.

2. Explore sun-related behavior of Non-white Californians. As noted, both non-melanoma and melanoma skin cancer incidence is highest in white populations. Nonetheless, though not common, skin cancer does occur in non-white populations. A large proportion of California's current inhabitants are of non-white ethnicity, and future trends point to an increasing proportion of Non-whites in California. In consequence, although this study only described the sun-related behavior of Whites, future researchers need to focus more broadly than exploring only white Californians' sun-protective behavior. A first step might be to collect data on Asian Americans, as these are the fastest growing ethnic group in California.

Implications for Policy

1. Train health professionals in skin cancer counseling. Non-melanoma skin cancers are the most common cancers in the United States, as well as among white South Africans. Thus, professional educational programs emphasizing sun-protection education of patients should be included in nursing and medical school curricula, as well as in continuing medical education programs for physicians, physician assistants, and nurses. These professional groups should be encouraged to integrate sun-protection counseling whenever patients come for routine visits. In addition, well-child and other preventive health care visits present excellent opportunities for more in depth sun-related education.

2. Implement sun-protection measures in schools. The results of this research indicate that a substantial number of respondents in both countries were taught sun protection by their teachers in school. Thus, schools seem to represent a valuable source of health education information for young individuals. In consequence, school policies in both countries should emphasize curricula which include sun-protection education. In addition, school policies should set an example in trying to protect children from the sun.

In Australian schools, for example, policies set guidelines for all the ways in which a reduction in sunlight can be achieved

in a school, for both the children and the staff. These measures include, for example, changes in the structure of the school environment and schedules, e.g., providing shade in the playgrounds and rescheduling sporting and other outdoor activities away from the middle of the day (Marks, 1992e). Similar policies in Californian and South African schools seem both necessary and practically accomplishable.

Conclusion

This thesis was both stimulating and challenging, due to the complexity and unpredictability of research in two cultures. Despite some limitations in methodology, the researcher feels this study is both unique and groundbreaking. There are three reasons for this belief. First, although skin cancer incidence in South African Whites is very high, only one sun-related study from South Africa has been identified. Thus, this research provides much needed insight into this growing public health concern. Furthermore, the results of this study may help to increase the awareness of both South African health professionals and policy makers regarding this widely ignored, yet almost entirely preventable medical problem in their white population.

The second reason is that only one other study has compared sun-related attitudes, beliefs, knowledge, and

behaviors within two cultures. Since behavior reflects both individual experience and cultural context, this study should add to health professionals' understanding of both the similarities and differences in different cultures' predisposing and reinforcing factors.

The third, and most important reason, is that the identified sun-related similarities between the South African and Californian groups significantly outnumbered the differences. This was unexpected, considering that data collection took place on two different continents. However, these results should help to unify sun-related health education efforts in different countries, but especially in South Africa and the U.S. Health professionals in different countries may cooperate in developing health education interventions based on commonalities in the antecedents of their populations' sun-related behavior. In addition, the identified differences should provide a base for culturally unique health education efforts, as well as future research. In consequence, these health education interventions should in the future hopefully lead to a reduction of the current skin cancer epidemic.

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APPENDIX A

Survey Instrument used in South Africa

SUN AND SKIN QUESTIONNAIRE

This questionnaire is designed to evaluate your knowledge, attitudes, beliefs, and behaviors related to "intentional" exposure to the sun. Your participation is voluntary; thus, you may withdraw any time while answering this questionnaire. Your answers are anonymous. DO NOT PLACE YOUR NAME ON THE QUESTIONNAIRE.

Please indicate only one answer for each question.

1. I am: ☐ female ☐ male
2. My ethnicity is: ☐ European origin
   ☐ African origin
   ☐ Asian origin
   ☐ Mixed racial origin
3. My age is: ☐ Less than 20 ☐ 20-25 ☐ More than 25
4. My parents' combined income is: _____
5. My skin's response to the sun is:
   ☐ I always burn, I am unable to tan.
   ☐ I burn, then tan if I work on it.
   ☐ I burn, then tan easily.
   ☐ I never burn, I tan easily.
6. I use sunscreen with a SPF of at least 15, when I plan to be exposed to the sun for at least one half hour:

☐ Always ☐ Most of the time ☐ Sometimes ☐ Rarely ☐ Never

7. When I plan on spending more than one half hour in the sun, I cover my arms and legs with clothing:

□ Always □ Most of the time □ Sometimes □ Rarely □ Never

8. When I plan on spending more than one half hour in the sun, I put on a hat:

□ Always □ Most of the time □ Sometimes □ Rarely □ Never

9. I deliberately avoid going out in strong sunshine between ten in the morning and three in the afternoon:

□ Always □ Most of the time □ Sometimes □ Rarely □ Never

10. On the average, I spend this many hours in the sun between ten in the morning and three in the afternoon every week:

□ Less than 2 □ 2-5 □ More than 5

11. Exposure to the sun's rays can cause skin cancer.

□ True □ False

12. Skin cancers are increasingly common in South Africa.

□ True □ False

13. Exposure to the sun's rays can cause my skin to age too early.

□ True □ False

14. I need to do more to protect myself from the sun because of the hole in the ozone layer.

□ True □ False

15. The less I expose my skin to the sun, the less likely I am to develop skin cancer and early aged skin.

□ True □ False

16. Getting sunburned occasionally does not do any harm.

□ True □ False

17. Only sunburn causes skin damage; a tan actually protects the skin from damage.

□ True □ False

18. It is necessary to sunburn before tanning.

□ True □ False

19. Sunscreens are not necessary if one does not burn.

□ True □ False

20. Sunscreens with a SPF less than 15 are enough to protect my skin.

□ True □ False

21. I feel more attractive with a sun tan.

□ Strongly agree □ Agree □ Neither □ Disagree

□ Strongly disagree

22. I look healthy with a sun tan.

□ Strongly agree □ Agree □ Neither □ Disagree

□ Strongly disagree

23. I am not worried about getting skin cancer because I am still young.

□ Strongly agree □ Agree □ Neither □ Disagree

□ Strongly disagree

24. I am not worried about the possibility of my skin aging too early due to sun exposure because I am still young.

□ Strongly agree □ Agree □ Neither □ Disagree □ Strongly disagree

25. Sunscreens are too messy to use on a regular basis.

□ Strongly agree □ Agree □ Neither □ Disagree □ Strongly disagree

26. Sunscreens are too expensive to use on a regular basis.

□ Strongly agree □ Agree □ Neither □ Disagree □ Strongly disagree

27. Sunscreens worsen acne.

□ Strongly agree □ Agree □ Neither □ Disagree □ Strongly disagree

28. I will not get a good tan if I use sunscreen.

□ Strongly agree □ Agree □ Neither □ Disagree □ Strongly disagree

29. Using a protective hat makes me feel unattractive.

□ Strongly agree □ Agree □ Neither □ Disagree □ Strongly disagree

30. Covering my arms and legs in the sun makes me feel unattractive.

□ Strongly agree □ Agree □ Neither □ Disagree □ Strongly disagree

31. My mother likes to have a suntan.

□ True □ False

32. My father likes to have a suntan.

□ True □ False

33. My siblings like to have suntans.

□ True □ False

34. I used to tan with my parents when I was younger.

□ True □ False

35. Most of my friends like to have suntans.

□ True □ False

36. Most of my friends wear a hat in the sun.

□ True □ False

37. My mother wears a hat in the sun.

□ True □ False

38. My father wears a hat in the sun.

□ True □ False

39. My siblings wear a hat in the sun.

□ True □ False

40. Most of my friends cover their arms and legs with clothing in the sun.

□ True □ False

41. My mother covers her arms and legs with clothing in the sun.

□ True □ False

42. My father covers his arms and legs with clothing in the sun.

□ True □ False

43. My siblings cover their arms and legs with clothing in the sun. □ True □ False

44. Most of my friends use sunscreen with a SPF of at least 15 in the sun. ☐ True ☐ False

45. My mother uses sunscreen with a SPF of at least 15 in the sun. ☐ True ☐ False

46. My father uses sunscreen with a SPF of at least 15 in the sun. ☐ True ☐ False

47. My siblings use sunscreen with a SPF of at least 15 in the sun. ☐ True ☐ False

48. Most of my friends stay out of the sun between ten in the morning and three in the afternoon.

☐ True ☐ False

49. My mother stays out of the sun between ten in the morning and three in the afternoon.

☐ True ☐ False

50. My father stays out of the sun between ten in the morning and three in the afternoon.

☐ True ☐ False

51. My siblings stay out of the sun between ten in the morning and three in the afternoon.

☐ True ☐ False

52. The person who taught me most about sun protection is:_____

53. The person who mostly influences if I get exposed to the sun is:_____

54. I would use sunscreen more often if:

_____

55. I would use protective clothing more often if:

_____

56. I would use a hat more often if: _____

Thank you for answering these questions. Questions regarding this research will be answered by the researcher after the questionnaire is collected. Questions or complaints about this research may be directed to Dr Kathleen Roe, USA-408-9242976, or Dr Serena Stanford, USA-408-9242480.

APPENDIX B

Survey Instrument used in California

SUN AND SKIN QUESTIONNAIRE

This questionnaire is designed to evaluate your knowledge, attitudes, beliefs, and behaviors related to "intentional" exposure to the sun. Your participation is voluntary; thus, you may withdraw any time while answering this questionnaire. Your answers are anonymous. DO NOT PLACE YOUR NAME ON THE QUESTIONNAIRE.

Please indicate only one answer for each question.

1. I am: □ female □ male
2. I am: □ Caucasian
   □ African American
   □ Asian
   □ Latino/Hispanic
   □ Native American
   □ Other
3. My age is: □ Less than 20 □ 20-25 □ More than 25
4. My skin's response to the sun is:
   □ I always burn, I am unable to tan.
   □ I burn, then tan if I work on it.
   □ I burn, then tan easily.
   □ I never burn, I tan easily.
5. I use sunscreen with a SPF of at least 15, when I plan to be exposed to the sun for at least one half hour:

□ Always □ Most of the time □ Sometimes □ Rarely □ Never

6. When I plan on spending more than one half hour in the sun, I cover my arms and legs with clothing:

□ Always □ Most of the time □ Sometimes □ Rarely □ Never

7. When I plan on spending more than one half hour in the sun, I put on a hat:

□ Always □ Most of the time □ Sometimes □ Rarely □ Never

8. I deliberately avoid going out in strong sunshine between ten in the morning and three in the afternoon:

□ Always □ Most of the time □ Sometimes □ Rarely □ Never

9. On the average, I spend this many hours in the sun between ten in the morning and three in the afternoon every week:

□ Less than 2 □ 2-5 □ More than 5

10. Exposure to the sun's rays can cause skin cancer.

□ True □ False

11. Skin cancers are increasingly common in the US.

□ True □ False

12. Exposure to the sun's rays can cause my skin to age too early.

□ True □ False

13. I need to do more to protect myself from the sun because of the hole in the ozone layer.

□ True □ False

14. The less I expose my skin to the sun, the less likely I am to develop skin cancer and early aged skin.

□ True □ False

15. Getting sunburned occasionally does not do any harm.

□ True □ False

16. Only sunburn causes skin damage; a tan actually protects the skin from damage.

□ True □ False

17. It is necessary to sunburn before tanning.

□ True □ False

18. Sunscreens are not necessary if one does not burn.

□ True □ False

19. Sunscreens with a SPF less than 15 are enough to protect my skin.

□ True □ False

20. I feel more attractive with a sun tan.

□ Strongly agree □ Agree □ Neither □ Disagree

□ Strongly disagree

21. I look healthy with a sun tan.

□ Strongly agree □ Agree □ Neither □ Disagree

□ Strongly disagree

22. I am not worried about getting skin cancer because I am still young.

□ Strongly agree □ Agree □ Neither □ Disagree

□ Strongly disagree

23. I am not worried about the possibility of my skin aging too early due to sun exposure because I am still young.

□ Strongly agree □ Agree □ Neither □ Disagree

□ Strongly disagree

24. Sunscreens are too messy to use on a regular basis.

□ Strongly agree □ Agree □ Neither □ Disagree

□ Strongly disagree

25. Sunscreens are too expensive to use on a regular basis.

□ Strongly agree □ Agree □ Neither □ Disagree

□ Strongly disagree

26. Sunscreens worsen acne.

□ Strongly agree □ Agree □ Neither □ Disagree

□ Strongly disagree

27. I will not get a good tan if I use sunscreen.

□ Strongly agree □ Agree □ Neither □ Disagree

□ Strongly disagree

28. Using a protective hat makes me feel unattractive.

□ Strongly agree □ Agree □ Neither □ Disagree

□ Strongly disagree

29. Covering my arms and legs in the sun makes me feel unattractive.

□ Strongly agree □ Agree □ Neither □ Disagree

□ Strongly disagree

30. My mother likes to have a suntan.

□ True □ False

31. My father likes to have a suntan.

□ True □ False

32. My siblings like to have suntans.

□ True □ False

33. I used to tan with my parents when I was younger.

□ True □ False

34. Most of my friends like to have suntans.

□ True □ False

35. Most of my friends wear a hat in the sun.

☐ True ☐ False

36. My mother wears a hat in the sun.

☐ True ☐ False

37. My father wears a hat in the sun.

☐ True ☐ False

38. My siblings wear a hat in the sun.

☐ True ☐ False

39. Most of my friends cover their arms and legs with clothing in the sun.

☐ True ☐ False

40. My mother covers her arms and legs with clothing in the sun.

☐ True ☐ False

41. My father covers his arms and legs with clothing in the sun.

☐ True ☐ False

42. My siblings cover their arms and legs with clothing in the sun. ☐ True ☐ False

43. Most of my friends use sunscreen with a SPF of at least 15 in the sun. ☐ True ☐ False

44. My mother uses sunscreen with a SPF of at least 15 in the sun. ☐ True ☐ False

45. My father uses sunscreen with a SPF of at least 15 in the sun. ☐ True ☐ False

46. My siblings use sunscreen with a SPF of at least 15 in the sun. ☐ True ☐ False

47. Most of my friends stay out of the sun between ten in the morning and three in the afternoon.

☐ True ☐ False

48. My mother stays out of the sun between ten in the morning and three in the afternoon.

☐ True ☐ False

49. My father stays out of the sun between ten in the morning and three in the afternoon.

☐ True ☐ False

50. My siblings stay out of the sun between ten in the morning and three in the afternoon.

☐ True ☐ False

51. The person who taught me most about sun protection is:_____

52. The person who mostly influences if I get exposed to the sun is:_____

53. I would use sunscreen more often if:

_____

54. I would use protective clothing more often if:

_____

55. I would use a hat more often if: _____

Thank you for answering these questions. Questions regarding this research will be answered by the researcher after the questionnaire is collected. Questions or complaints about this research may be directed to Dr Kathleen Roe, (408) 924-2976, or Dr Serena Stanford, (408) 924-2480.

APPENDIX C

Permissions to utilize other surveys

From d.hill@accv.org.au Thu Oct 26 21:35:15 1995
Received: from yarrina.connect.com.au (yarrina.connect.com.au [192.189.54.17]) by nom.hooked.net (8.6.10/8.6.5) with ESMTP id VAA27288 for <jefkata@hooked.net>; Thu, 26 Oct 1995 21:35:13 -0700
Received: (from root@localhost) by yarrina.connect.com.au with UUCP id OAA18931 (8.6.12/IDA-1.6 for jefkata@hooked.net); Fri, 27 Oct 1995 14:31:04 +1000
Received: from [192.9.200.144] (cbrc_adrienne_mac [192.9.200.144]) by accv.org.au 8.6.8/8.6.6) with SMTP id OAA03480 for <jefkata@hooked.net>; Fri, 27 Oct 1995 14:19:29 -1000
Date: Fri, 27 Oct 1995 14:19:29 +1000
X-Sender: d.hill@mailhost
Message-Id: <v01510101acb676ebd179@[192.9.200.144]>
Mime-Version: 1.0
Content-Type: text/plain; charset="us-ascii"
To: jefkata@hooked.net
From: d.hill@accv.org.au (Adrienne Anstee)
Subject: Goodbye Sunshine ...

Dear Ms Hollblad-Fadiman

Of course, I would be very glad for you to use the questions published in Table 1 of our article "Goodbye Sunshine: Effects of a television program about melanoma on beliefs, behaviour and melanoma thickness" published in the journal of the American Academy of Dermatology.

Good luck with your research.

Yours sincerely

David Hill

Adrienne Anstee
Executive Secretary to David Hill
Centre for Behavioural Research in Cancer
Anti-Cancer Council of Victoria
Rathdowne Street, Carlton South, Victoria, 3053, Australia

Tel: +61-3-92791181
Fax: +61-3-92791250

Karen Vail-Smith, MS, MPA
East Carolina University, North Carolina

February 4, 1997

Katerina Hollblad-Fadiman
310 El Granada Blvd
Half Moon Bay, CA 94019

Dear Ms Hollblad-Fadiman:

I am hereby giving you permission to use several attitude questions from the article "Sunbathing: College Students' Knowledge, Attitudes, and Perceptions of Risks", published in College Health, vol 42, in July of 1993. These questions will be used in your Master Thesis research in public health.

Sincerely,
Karen Vail-Smith

Karen Vail-Smith

om hscampbe@acs.ucalgary.ca Wed Oct 25 14:33:58 1995
eceived: from acs7.acs.ucalgary.ca (root@acs7.acs.ucalgary.ca [136.159.34.207]) by
om.hooked.net (8.6.10/8.6.5) with SMTP id OAA20366 for <jefkata@hooked.net>; Wed, 25
ct 1995 14:33:57 -0700
eceived: by acs3.acs.ucalgary.ca (AIX 4.1/UCB 5.64/4.03)
id AA95846; Wed, 25 Oct 1995 15:33:04 -0600
essage-Id: <9510252133.AA95846@acs3.acs.ucalgary.ca>
ıbject: Sun Survey
): jefkata@hooked.net
ıte: Wed, 25 Oct 95 15:33:03 MDT
om: "Sharon Campbell" <hscampbe@acs.ucalgary.ca>
Mailer: ELM [version 2.3 PL11D]
me-Version: 1.0
ıntent-Type: text/plain; charset=US-ASCII
ıntent-Transfer-Encoding: 7bit
ntent-Length: 505

terina

ase feel free to use any of the questions from our survey of
ertan's knowledge, beliefs and sun protection behaviours
icle in Preventive Medicine. You may also want to get in
ıch with Dr. David Hill's group in Australia - they were
olisshed in Preventive Medicien 1992.

o Dr. Chris Lovato is conducting a national survey of
ıadian's sun behaviours, etc. She can be reached at
ato@unixg.ubc.ca.
e is at the University of British Columbia.

od luck.
ıron Campbell PhD

CENTRE FOR HEALTH PROMOTION AND CANCER PREVENTION RESEARCH

DIRECTOR
JOHN B. LOWE DrPH

THE UNIVERSITY OF QUEENSLAND
Medical School
Herston Road
Herston Qld 4006 Australia
Telephone (07) 365 5505
International +61 7 365 5505
Facsimile (07) 365 5540

3 November, 1995

Dr. K. Hollblad-Fadiman
310 El Granada Boulevard
HALF MOON BAY CA 94019
U.S.A.

Dear Dr. Hollblad-Fadiman,

Thank you for your letter addressed to Dr. John Lowe of October 8, 1995. In your letter you have requested permission to use four attitude and "others" questions in your questionnaire, taken from the Sun-related attitudes article.

The authors of this article are happy for you to use these questions and we thank you for your enquiry.

Sincerely,

J. Owens.

Tina Owens.
(For Dr. J. B. Lowe)

APPENDIX D

Validity and cultural appropriateness

University of Natal

Faculty of Medicine
Radiotherapy & Oncology
Addington Hospital Box 977 Durban 4000 South Africa
Telephone (031) 373333/322111

Head of Department
Professor J P Jordaan
M.B. Ch.B. M.Med. F.F.R.T.

DR K HOLLBLAD-FADIMAN
PO BOX 245
3867 MTUNZINI

9 May 1996

Dear Dr Hollblad-Fadiman

MASTER THESIS IN PUBLIC HEALTH

I have checked your questionnaire for validity and counter appropriateness and find it valid for the above purpose.

Kind regards.

Yours sincerely

PROFESSOR JP JORDAAN
HEAD: DEPARTMENT OF ONCOLOGY
JPJ/mp

APPENDIX E

HS-IRB approval

SJSU SAN JOSE STATE UNIVERSITY

A campus of The California State University

Office of the Academic Vice President • Associate Academic Vice President • Graduate Studies and Research
One Washington Square • San José, California 95192-0025 • 408/924-2480

TO: Katerina Hollblad-Fadiman
Box 245
Mtunzini, 3867
Kwazulu/Nata, South Africa

FROM: Adrian Rodriguez, Ph.D.
Chairperson, Human Subjects-
Institutional Review Board

DATE: March 7, 1996

The Human Subjects-Institutional Review Board has approved your request to use human subjects in the study entitled:

"Similarities and Differences Between Sun-Related Knowledge, Attitudes, Beliefs, and Behaviors of South African And California University Students"

This approval is contingent upon the subjects participating in your research project being appropriately protected from risk. This includes the protection of the anonymity of the subjects' identity when they participate in your research project, and with regard to any and all data that may be collected from the subjects. The Board's approval includes continued monitoring of your research by the Board to assure that the subjects are being adequately and properly protected from such risks. If at any time a subject becomes injured or complains of injury, you must notify Serena Stanford, Ph.D., immediately. Injury includes but is not limited to bodily harm, psychological trauma and release of potentially damaging personal information.

Please also be advised that each subject needs to be fully informed and aware that their participation in your research project is voluntary, and that he or she may withdraw from the project at any time. Further, a subject's participation, refusal to participate, or withdrawal will not affect any services the subject is receiving or will receive at the institution in which the research is being conducted.

If you have any questions, please contact me at (408) 924-2480.

APPENDIX F

Permissions for research in South Africa

John Ross College

Saligna Road
Arboretum
Richards Bay

Private Bag X1021
Richards Bay
3900

Telephone:
(0351) 41561/2/3
Fax: (0351) 41746

Headmaster
P.J.H. Terry-Lloyd

13 May 1996

TO WHOM IT MAY CONCERN

This serves to confirm that I am aware of **DR KATERINA HOLLBLAD-FADIMAN'S** research and I am prepared to allow her to continue with her research for her thesis.

P J H TERRY-LLOYD
HEADMASTER

Tegniese Kollege Richardsbaai
Richards Bay Technical College

(Administrasie: Volksraad) *(Administration: House of Assembly)*

Privaatsak X5023 Private Bag
Richardsbaai 3900 Richards Bay
Tel: 0351-41101/2
Fax: 0351-42585

RICHTEK

VERW./REF.

05 March 1996

Mrs K Hollblad-Fadiman
310 El Granada Blvd.
Half Moon Bay, CA 94019

Dear mrs Hollblad-Fadiman

We hereby acknowledge our awareness of your research and give permission to proceed.

Yours faithfully

P.L. VAN SCHALKWYK
PRINCIPAL
PLVS/lm

APPENDIX G

Informed consent form

SJSU SAN JOSE STATE UNIVERSITY

A campus of The California State University

College of Applied Sciences and Arts • *Department of Health Science*
One Washington Square • San José, California 95192-0052 • 408/924-2970

AGREEMENT TO PARTICIPATE IN RESEARCH

Responsible Investigator: Katerina Hollblad-Fadiman

Title of Protocol: Similarities and differences between sun-related knowledge, attitudes, beliefs, and behaviors of South African and Californian university students.

1. You have been asked to participate in a research study investigating factors affecting sun-exposure and sun-protection.
2. You will be asked to indicate your answers on a completely anonymous questionnaire.
3. No foreseeable risks are anticipated, and no discernible benefits are expected from this study.
4. The results of this study may be published in a journal, but no information that could identify you will be included.
5. Your participation is voluntary. If you decide to participate in the study, you are free to withdraw at any time.
6. Questions about this study may be addressed to the researcher after the questionnaire is collected. Questions or complaints about this study may be addressed to Dr Kathleen Roe, (408) 924-2976, or Dr Serena Stanford, (408) 924-2480.

* The signature of the researcher on this document indicates agreement to include you in the research, and attestation that you have been fully informed of your rights.

Katerina Hollblad-Fadiman — Investigator's Signature

9/11/96 — Date