INFORMATION TO USERS

This manuscript has been reproduced from the microfilm master. UMI films the text directly from the original or copy submitted. Thus, some thesis and dissertation copies are in typewriter face, while others may be from any type of computer printer.

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleedthrough, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps. Each original is also photographed in one exposure and is included in reduced form at the back of the book.

Photographs included in the original manuscript have been reproduced xerographically in this copy. Higher quality 6" x 9" black and white photographic prints are available for any photographs or illustrations appearing in this copy for an additional charge. Contact UMI directly to order.

UMI®

Bell & Howell Information and Learning
300 North Zeeb Road, Ann Arbor, MI 48106-1346 USA
800-521-0600

University of Alberta

Teenagers and Sun Protection

by

Ruby Lo Man Tsang 

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of Master of Science

in

Textiles and Clothing

Department of Human Ecology

Edmonton, Alberta

Spring, 1999

University of Alberta

Library Release Form

Name of Author: Ruby Lo Man Tsang

Title of Thesis: Teenagers and Sun Protection

Degree: Master of Science

Year this Degree Granted: 1999

Ruby Tsang

Permanent Address:
621 Ting Tak Hall
Ex Ting Estate
Tuen Mun, N.T. Hong Kong

Date: April 12, 99

University of Alberta

Faculty of Graduate Studies and Research

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled Teenagers and Sun Protection submitted by Ruby Lo Man Tsang in partial fulfillment of the requirements for the degree of Master of Science in Textiles and Clothing.

Dr. Elizabeth M. Crown
(Supervisor)

Prof. Linda Capjack

Dr. Kerry S. Courneya

Date: April 1, 1999

ABSTRACT

The purposes of this study were: (1) to determine the intentions of adolescents relative to the use of wide brimmed hats and long sleeved shirts as protection from ultraviolet radiation, as well as the antecedents to their use, and (2) to investigate the feasibility of the internet as a survey tool for such research.

A questionnaire was developed to measure the constructs of the Theory of Planned Behavior, as well as external variables. Data were collected from 101 in-school and 11 internet respondents. Most analyses were performed for the in-school population only.

For both behaviors, results indicated that not all constructs of the model directly determined intention. Past behavior, external to the model, had the largest influence on intention for wearing long sleeved shirts.

There were notable differences in the significance of constructs in the two sample populations. Conduct of such surveys on the internet may require modification of the instrument.

ACKNOWLEDGMENTS

The author wishes to express sincere appreciation to Dr. Betty Crown for her continual guidance; especially for her assistance, encouragement, and interest in the study. I would also like to take this opportunity to extend my gratitude and appreciation to my committee members, Prof. Linda Capjack and Dr. Kerry Courneya for their involvement and valuable comments on the research.

A special thanks is due to people at ASPEN health services for their interest and help in the sample recruitment process of this study.

Appreciation is also extended to my family for their endless love and support.

Finally, special thanks to my fellow students and staff members in the Department of Human Ecology for providing many memorable moments over that past two years. I would like to especially thank Linda Mirans for her administrative assistance and friendship.

Table of Contents

CHAPTER	PAGE
CHAPTER 1	**1**
INTRODUCTION	**1**
PROBLEM STATEMENT	4
OBJECTIVES	4
JUSTIFICATION	5
NULL HYPOTHESES	6
DEFINITIONS	6
General Definitions	*6*
Definitions Related to the Theory of Planned Behavior	*6*
CHAPTER 2	**9**
LITERATURE REVIEW	**9**
SKIN CANCER	9
Skin Cancer Preventive Behavior	*12*
FABRICS AND ULTRAVIOLET RADIATION PROTECTION	13
Ultraviolet Protection Factor (UPF)	*14*
Factors that Influence UPF	*15*
ADOLESCENT BELIEFS, ATTITUDES AND BEHAVIOR TOWARDS SKIN CANCER	17
Adolescents and Sun Exposure Behavior	*18*
Adolescent Psychology	*20*
Purchasing Power of Adolescents	*21*
Marketing and Clothing Acquisition by Adolescents	*22*
HEALTH-RELATED SOCIO-PSYCHOLOGICAL THEORIES	23
The Health Belief Model	*24*
The Theory of Planned Behavior	*27*
The Health Belief Model vs. the Theory of Planned Behavior	*30*
SUMMARY	32
CHAPTER 3	**34**
METHODS AND PROCEDURES	**34**
CONCEPTUAL FRAMEWORK	34
FOCUS GROUPS	37
DESCRIPTION OF INSTRUMENTS	38

CHAPTER	PAGE
SELECTION OF SURVEY PARTICIPANTS	39
Probability Sampling	*39*
Non-probability Sampling	*39*
DATA COLLECTION PROCEDURES	40
METHOD OF DATA ANALYSIS	41
LIMITATIONS	42
CHAPTER 4	**43**
FINDINGS	**43**
PROFILE OF THE RESPONDENTS	43
THEORY OF PLANNED BEHAVIOR CONSTRUCTS	48
Descriptive Statistics for Constructs of the Theory of Planned Behavior	*49*
TESTING OF NULL HYPOTHESES	58
Analyses for Testing Null Hypothesis I	*58*
Analysis for Testing Null Hypothesis II	*77*
CHAPTER 5	**79**
DISCUSSION	**79**
THE SURVEY PROCESS	79
TYPICAL SUN PROTECTION BEHAVIOR	80
THE THEORY OF PLANNED BEHAVIOR	82
IN-SCHOOL VS. INTERNET SURVEYS	90
CHAPTER 6	**92**
SUMMARY, CONCLUSIONS & RECOMMENDATIONS	**92**
SUMMARY	92
CONCLUSIONS	94
IMPLICATIONS FOR HEALTH PROMOTION	96
RECOMMENDATIONS FOR FUTURE RESEARCH	96
REFERENCES	**98**
APPENDIX A	**108**
APPENDIX B	**113**

CHAPTER	PAGE
APPENDIX C	115
APPENDIX D	117
APPENDIX E	123
APPENDIX F	138
APPENDIX G	141

LIST OF TABLES

TABLE	PAGE
1. Information Sources by Grade of Respondent	44
2. Respondents' Skin Type	45
3. Typical Sun Protection Behavior of Respondents	45
4. Constructs of the Theory of Planned Behavior: Wearing Wide Brimmed Hat When Outdoors in the Summer Sun	51
5. Constructs of the Theory of Planned Behavior: Wearing Long Sleeved Shirt When Outdoors in the Summer Sun	55
6. Pearson Correlation (R) Among Constructs (means) in the Theory of Planned Behavior for Wearing Hat	59
7. Pearson Correlation (R) Between Intention and Measured Attitude, Subjective Norm, and Perceived Behavioral Control for Wearing Hat	60
8. Pearson Correlation (R) Between Intention and Behavioral Beliefs, Normative Beliefs, and Control Beliefs for Wearing Hat	61
9. Pearson Correlation (R) of Underlying Beliefs with Direct Measures for Wearing Hat	63
10. Regression of Attitude, Subjective Norm, and Perceived Behavioral Control on Intention for Wearing Hat	64
11. Regression of Behavioral Beliefs, Normative Beliefs, and Control Beliefs on Intention for Wearing Hat	66
12. Pearson Correlation (R) Among Constructs (means) in the Theory of Planned Behavior and Past Behavior for Wearing Shirt	68

TABLE **PAGE**

13. Pearson Correlation (R) Between Intention Measures, and Attitude, Subjective Norm, and Perceived Behavioral Control for Wearing Shirt 69

14. Pearson Correlation (R) Between Intention Measures, and Behavioral Beliefs, Normative Beliefs, and Control Beliefs for Wearing Shirt 70

15. Pearson Correlation (R) of Underlying Beliefs with Direct Measures and Past Behavior for Wearing Shirt 72

16. Regression of Attitude, Subjective Norm, Perceived Behavioral Control, and Past Behavior on Intention for Wearing Shirt 74

17. Regression of Behavioral Beliefs, Normative Beliefs, and Control Beliefs on Intention for Wearing Shirt 76

18. Regression of Underlying Beliefs and Past Behavior on Intention for Wearing Shirt 77

LIST OF FIGURES

FIGURE	PAGE
1. The Health Belief Model	24
2. The Theory of Planned Behavior	28
3. Schematic Diagram of Conceptual Framework	36
4. Association Between Gender and Use of Sun Protection	46

Chapter 1

Introduction

Recent statistics indicate that skin cancer is increasing rapidly among North American adults (Gallagher, Hill, Bajdik, Fincham, Coldman, McLean & Threlfall., 1995; Rivers, 1996; Liu & Soong, 1996). The number of new cases of skin cancer has been increasing at an alarming rate, having more than doubled in the past 15 years (National Cancer Institute of Canada, 1993). Ultraviolet radiation exposure is the major cause of both malignant and non-melanoma skin cancer (Urbach, 1978). In addition to the potential risk of developing skin cancer, ultraviolet radiation (UVR) exposure is associated with other long term and short term health problems such as cataracts, sunburns, and photo-aging.

There are many products that protect against ultraviolet radiation exposure from the sun. These items include sunglasses, sunscreens, wide brimmed hats, long sleeved shirts, long pants, and certain cosmetics. Studies have determined that clothing is the most effective means of providing skin protection against ultraviolet radiation exposure (Reinert, Fuso, Hilfiker, & Schmidt, 1997). Throughout human history, clothing has been adopted by humans for modesty, adornment, and protection (Kaiser, 1997). People who live in the Earth's sunbelt countries already have learned from experience that suitable clothing can protect them against the sun. People who live in places with less intense sunlight generally have more positive attitudes toward sunlight (Reinert et al., 1997), and therefore usually do not take precautions against the sun. In recent years, specialized sun protective garments have become available in North America and other

countries, and are mostly sold via mail order. Other than these specialized garments, various studies have also indicated that normal fabrics with certain characteristics can provide sufficient protection against the harmful effect the ultraviolet radiation.

Sun exposure is both environmental and behavioral in nature. Skin cancer is preventable to a degree. ".... The challenge, however, lies in changing the attitudes and behaviors that increase a person's risk of developing skin cancer." (David Satcher, as cited in The National Skin Cancer Prevention Education Program, 1998). With careful and consistent use of sunscreens and protective clothing items such as wide brimmed hats, long sleeved shirts, and long pants, the incidence of skin cancer can be reduced drastically. Sunlight, humans, and clothing constantly inter-react and inter-relate to each other. Sunlight (UVR) from the natural environment has direct effects on the health of humans. The attitude and behavior of humans towards sunlight exposure is responsible for their likelihood of acquiring sun-related diseases. Clothing acts as a moderator between the natural environment and the human behavioral environment. As a result of interactions between humans and sunlight, the incidence of skin cancer will likely continue to rise unless behavioral changes regarding sun exposure occur, especially in childhood and adolescent years. In order to increase the use of sun protection, it is important to first reduce the barriers to its use. Compared to other age groups, adolescents are the least likely to change their behavior (Carmel, Shami, & Rosenberg, 1994). However, adolescents are also the group that should be targeted for behavioral change, because adolescence is the time of highest risk in the acquisition of skin cancer (Cockburn, Hennrikus, Scott, & Sanson-Fisher, 1989).

According to Johnson and Lookingbill (1984), sun exposure is more likely for children and adolescents. On average, adolescents spend more time in the sun compared to other age groups. Exposure to sunlight before the age of 20 is strongly associated with the development of adult malignant melanoma (Weinstock, Colditz, Willet et al., 1989). It is believed that 50% of lifetime sun damage to the skin occurs by age 20 (Rossi, 1989). Most adolescents do not protect themselves against the harmful effect of ultraviolet radiation. They may even use products and services such as commercial tanning sunbooths to expose themselves to dangerous ultraviolet radiation. Psychological barriers, social barriers, and misconceptions that adolescents have towards sunlight exposure and sun protection also contribute to the prevalence of skin cancer.

Adolescents tend to conform to their reference groups or subculture (Kaiser, 1997). During adolescence, conformity to peer referents is a major determining factor for sun exposure (Grob, Guglielmina, Gouverner, Zarour, Noe, & Bonerandi, 1993). Suntans are closely related to self-image and social culture (Keesling & Friedman, 1987). Adolescents may not take precautions against the sun because they believe that tans look healthy and attractive. On the other hand, some adolescents are just not well informed. In addition to the lack of knowledge about the dangers of sun exposure and preventive methods, other barriers to the employment of preventive practices exist. For example, people perceive having a suntan as being both healthy and attractive, and it is not 'cool' to cover-up (Heidorn, 1996).

Recent research has examined the beliefs, attitudes, and behavior of high-risk populations regarding sun protection. Groups examined include dairy farmers, the elderly, and people who live near the sunbelt. However, few studies focused on the

adolescent population, especially in relation to their use of clothing as sun protection. There is a marked difference in health beliefs, behavior, and choice of sun protection among groups segregated by occupation, age, and gender, and such differences are important to consider when designing education campaigns (Heidorn, 1996). Also, for better targeting educational and promotional programs to adolescents to alter their sun protection behavior, especially the use of sun protective clothing items, it is important to first understand their beliefs, attitudes, and behavior in relation to sun protection and the use of sun protective clothing.

Problem Statement

The primary purpose of this study, therefore was to determine the sun protection behavior of the adolescent population, especially the intentions of adolescents relative to the use of clothing items such as wide brimmed hats and long sleeved shirts as protection from ultraviolet radiation, as well as the antecedents to their use. A secondary purpose was to investigate the feasibility of the internet as a survey tool for such research.

Objectives

The objectives of this study are as follows:

1. To determine adolescents' reported behavior regarding sun protection in general.
2. To determine adolescents' beliefs, attitudes, and intended behavior toward the use of clothing such as wide brimmed hats and long sleeved shirts as sun protection agents.
3. To identify and measure relationships among the elements of the Theory of Planned Behavior (behavioral beliefs, normative beliefs, control beliefs, attitudes, subjective

norm, perceived behavioral control, and intention) relative to clothing as protection from ultraviolet radiation.

4. To determine the predictive power of the constructs of the Theory of Planned Behavior through regression analyses.
5. To compare the results of traditional in-school and internet surveys.

Justification

In Canada, there has been a major increase in the incidence of morbidity and mortality from cutaneous malignant melanomas over the past 20 to 30 years, and the incidence of other non-melanoma skin cancers are also increasing (Mills Trouton, & Gibbons, 1997). It is believed that the causes of skin cancers are both environmental (UVR) and behavioral (sun exposure and the beliefs, attitudes, and behavior towards UV exposure) in nature. Recent research has shown that clothing is the best means of providing sun protection. To date, although much research has suggested that teenagers are at the highest risk in the acquisition of skin cancer, there has been a paucity of research in Canada on the topic of sun protection and teenagers. Therefore, there is a need to understand the beliefs, attitudes, and behavior of teenagers toward sun protection, especially the use of sun protective clothing. This can lead to the development of appropriate educational and intervention programs to target this population.

The Theory of Planned Behavior has commonly been used in health-related research, but has not been used in research related to skin cancer and sun protection. This study will add to the growing body of health-related research using the Theory of Planned Behavior as a conceptual framework.

Null Hypotheses

Ho_1: There are no significant relationships among past behavior and constructs of the Theory of Planned Behavior, namely: behavioral beliefs, normative beliefs, control beliefs, attitude toward the behavior, subjective norm, perceived behavioral control, and intention.

Ho_2: There are no significant differences in the Theory of Planned Behavior constructs between students from the Aspen area and respondents on the internet.

Definitions

General Definitions

1. Adolescents: people aged 13 to 19.
2. Ultraviolet radiation (sun) protective clothing: for this study, includes wide brimmed hats (a hat with a brim of 5 cm or more all the way around) and long sleeved shirts.
3. Summer sun: a sunny summer day with a temperature of 20°C or higher.
4. Beliefs: refer to a person's conviction or acceptance that certain things are true or real; opinions, expectations, or judgements (Webster's New World Dictionary, 1974, New York: world Publishing).

Definitions Related to the Theory of Planned Behavior

1. Behavioral beliefs (b_i): refer to the beliefs that underlie a person's attitude toward a behavior (i.e., beliefs about the outcome of performing or not performing a particular behavior). The behavioral beliefs function together with the individual's evaluation of those outcomes (Ajzen, 1985, p. 13-14). In this study, beliefs about the outcome of

wearing sun protective clothing items were measured by questions 21-22 in Appendix E.

2. Normative beliefs (nb_j): refer to the beliefs that underlie subjective norms (i.e., beliefs about reference groups and individuals). The normative beliefs function together with the individual's motivation to comply with those referents (Ajzen, 1985, p.14). In this study, normative beliefs about best friends, peers, parents, health care providers, media, and celebrities and fashion models regarding the wearing of sun protective clothing items were measured by questions 24-29 in Appendix E.
3. Evaluation of outcomes (e_i): refer to the degree to which a person has a positive or negative evaluation or appraisal of the outcome or result of the behavior in question (Ajzen, 1985, p.12). In this study, evaluations of the outcomes associated with wearing sun protective clothing were measured by questions 18-20 in Appendix E.
4. Motivation to comply (mc_j): refers to a person's desire to comply with the expectations of his or her referent or group of referents (Ajzen & Fishbein, 1980, p.75). In this study, motivation to comply with best friends, peers, parents, health care providers, media, and celebrities and fashion models regarding the wearing of sun protective clothing items were measured by question 23 in Appendix E.
5. Control beliefs (c_k): refer to the beliefs that underlie perceived behavioral control, which are assumed to reflect past experience as well as anticipated impediments and obstacles (Ajzen, 1991, p.196). In this study, control beliefs regarding the wearing of sun protective clothing items were measured by questions 30-31 in Appendix E.
6. Attitude toward a behavior (Att): An individual's judgement that performing the behavior is good or bad, and the degree to which the individual is in favor of or

against performing the behavior (Ajzen & Fishbein, 1980, p.56). In this study, attitude toward wearing sun protective clothing items was measured by questions 3-4 in Appendix E.

7. Subjective norm (SN): is a social factor and is defined as the perceived social pressure to perform or not to perform the behavior (Ajzen, 1985, p.12). In this study, subjective norm regarding the wearing of sun protective clothing items was measured by questions 5-7 in Appendix E.
8. Perceived behavioral control (PBC): refers to an individual's perception of the ease or difficulty of succeeding in enacting the behavior of interest (Ajzen, 1991, p.196). In this study, perceived behavioral control regarding the wearing of sun protective clothing items was measured by questions 8-17 in Appendix E.
9. Behavioral intention (BI): a measure of the likelihood that a person will engage in a behavior under consideration (Ajzen & Fishbein, 1980, p.42). In this study, behavioral intention toward wearing of sun protective clothing items was measured by questions 1-2 in Appendix E.

Chapter 2

Literature Review

This review of literature includes four sections. The first section describes the prevalence of skin cancer, as well as skin cancer preventive behavior in the general population. The second section summarizes research on the ultraviolet radiation protection factors of fabrics. The third section outlines adolescents' beliefs and attitudes towards skin cancer, sun exposure, and clothing acquisition. The fourth section describes and compares two health-related socio-psychological theories.

Skin Cancer

Skin cancer is the most common form of cancer in many industrialized countries. Its incidence is increasing faster than all other cancers except for lung cancer among women (National Cancer Institute, 1990, as cited in Carmel, Shami, & Rosenberg, 1996). Approximately one out of every seven persons in the United States will develop some form of skin cancer during his or her lifetime (American Academy of Dermatology, 1990, as cited in Carmel et al., 1994). In Canada, the incidence of morbidity and mortality from cutaneous malignant melanomas has been increasing over the past 20 to 30 years, as has the incidence of non-melanoma skin cancers (Mills et al., 1997). The estimated age-adjusted incidence of malignant melanomas is 9 per 100,000 among females and 11 per 100,000 among males. The number of new cases of non-melanoma skin cancers in Canada in 1998 was estimated to be 64,000 (National Cancer Institute of Canada, 1998, p.11). The three most common types of skin cancer are: (1) basal cell

carcinoma, (2) squamous cell carcinoma, and (3) malignant melanoma. Basal cell carcinoma and squamous cell carcinoma are often classified together as non-melanomas, and are much more curable than melanomas. Basal cell carcinomas comprise approximately 90% of all skin cancers, but rarely cause death (Marlenga, 1995). Although they are highly curable, basal cell carcinomas may still result in high emotional, social, and health care costs. Malignant melanoma is the most serious form of skin cancer. It has been estimated that melanomas contributed to approximately 73% of all skin cancer deaths (Gilmore, 1989). These statistics demonstrate the epidemiological importance of skin cancer. Fortunately, early detection and treatment are highly effective for all skin cancers in decreasing both morbidity and mortality (Friedman, Weinberg, Webb, Cooper & Bruce, 1995). However, the most effective modality is prevention, especially from ultraviolet radiation.

Warnings related to "sunlight cancer" were published in popular magazines as early as the 1940s (Ewing, 1941 as cited in Keesling & Friedman, 1987). Recently, UV Index programs have been adopted by the United States, Canada, and other nations to enhance public awareness of the harmful effects of overexposure to the sun's ultraviolet rays (McNeely, 1994). The UV Index program also provides the public with specific actions they can take to reduce the likelihood of these harmful effects. The amount of ultraviolet radiation (UVR) in a particular area is determined by: (1) the thickness of the ozone layer, (2) intensity of ultraviolet radiation or characteristics of ultraviolet radiation, (3) geographical location, (4) time of the year and day, (5) cloud cover, and (6) reflection (Mills & Jackson, 1995).

Diseases related to ultraviolet radiation may have a long latency. Ultraviolet radiation exposure can cause both short-term and long-term damage leading to diseases of the skin. These diseases include erythema (sunburn), photo-aging, actinic keratosis, solar lentigo, telangiectasia, excessive wrinkling, and skin cancer. Research suggested that the cause of skin cancer is both environmental and behavioral in nature. It is believed that UVR exposure is the major environmental cause of both melanoma and non-melanoma skin cancers (Gallagher et al., 1995; Rivers, 1996), while the positive perceptions of sunlight exposure and the negative perceptions of practicing sun protective methods are the major behavioral cause of skin cancer.

The UVR band consists of three regions: UVA, UVB, and UVC. UVB is of the greatest concern to the health of individuals. Exposure to UVB leads to tanning of the skin, sunburns, and possibly the development of skin cancer. Truhan (1991) suggested that non-melanoma skin cancers were associated with cumulative sun exposure, whereas melanomas were associated with short, intense sun exposures. Some researchers hypothesize that 90% of non-melanoma skin cancers and two-thirds of melanomas may be attributed to excessive sunlight exposure (Armstong & Kricker, 1993; LARC, 1992). The major risk factors for skin cancer are: (1) light skin complexion, (2) blond or red hair, or (3) blue eyes, (4) family history of skin cancer, (5) personal history of skin cancer, (6) chronic exposure to the sun (squamous cell carcinoma), (7) history of severe sunburns early in life (basal cell carcinoma and malignant melanoma), (8) certain types and/or large numbers of moles (malignant melanoma), and (9) freckles as an indicator of sun sensitivity and sun damage (malignant melanoma) (The National Skin Cancer Prevention Education Program, 1998). Skin cancer can be prevented with adequate

change in people's attitudes and behaviors regarding the appropriate use of sun protection. This is especially important in light of the increasing incidence and risk of skin cancers.

Skin Cancer Preventive Behavior

Skin cancers are potentially preventable with proper sun protection during occupational and recreational exposure to ultraviolet radiation (Koh and Lew, 1994). Although it has been demonstrated that various sun protective behaviors decrease the risk of skin cancer, most people still do not perform them. Studies have shown that many people have a high knowledge level. However, this knowledge does not translate into healthful sun-related behavior (Lovato, Shoveller, Peters, & Rivers., 1998).

People can prevent or decrease the risk of skin cancer by performing preventive behaviors such as: (1) avoiding tanning by either natural or artificial light (tanning booths), (2) limiting sun exposure during peak sun hours, generally between 10 a.m. and 4 p.m., (3) using broad-spectrum sunscreens with a sun protective factor (SPF) of 30 or higher regularly, (4) wearing protective headgear such as a broad-brimmed hats, (5) using UV rated sunglasses, (6) wearing protective clothing such as tightly woven, loose-fitting clothes, and (7) having regular skin cancer screening.

Adequate sun protection by teenagers is essential to reduce their lifetime risk of developing skin cancers. Mermelstein and Riesenberg (1992) indicated that the lifetime risk of basal cell and squamous cell carcinomas can be reduced by consistent use of sunscreens with SPF 15 or higher throughout childhood and teenage years. Cockburn et al., (1989) found that the consistent use of sunscreens with SPF 15 or higher would reduce the lifetime occurrence of basal cell and squamous cell carcinomas by 78%. The

American Cancer Society recommends (1) monthly skin self-examinations, (2) practices intended to prevent skin cancer, and (3) clinical skin examination in asymptomatic individuals at average risk every three years for persons 20 to 39 years of age and every year for persons 40 years of age and older (Fink, 1991).

In addition to the use of sun protective methods, personal behavioral changes are essential to reduce ultraviolet radiation exposure of the population. The desire to be tanned remains a barrier to the use of sun protection, especially among boys and older teens (Fritishi, Green, & Solomon, 1992; Lowe, Balanda, Gillespie, Del Mar, & Gentle, 1993). Keesling and Friedman (1987) identified major psychological barriers and misperceptions that prevent adolescents from performing sun protective behavior. They include: (1) the perception of sunbathing as an enjoyable and relaxing activity, (2) the perception of suntans as attractive, desirable, and healthy, (3) the perception of unfashionablility of sun protective clothing, and (4) inconvenience and high cost of sunscreens. Another factor that works against sun protection is the double standard in this society with regard to suntans. Advertisements for various sun protection products available on the market appear in media such as fashion magazines. However, the same magazines may also convey the message that tans are attractive, desirable, and "healthy".

Fabrics and Ultraviolet Radiation Protection

Products for sun protection include sunscreens, hats, and sunglasses. In addition to these products, clothing fabrics are also effective for protection against both long-term and short-term skin damage from various wavelengths, including long-wave UVR and visible light (Berne & Fischer, 1979; Menter, Hollins, Sayre, Etemadi, Willis, & Huhes, 1994; Reinert et al., 1997). However, careful selection of fabrics is necessary in order to

achieve a SPF of at least 15 (Davis, Capjack, Kerr, & Fedosejevs, 1997). Clothing is commonly recommended by physicians and medical experts as one of the primary means of protecting the skin (Hurwitz, 1988; Hacker, Browder, & Ramos-Caro, 1993). They usually suggest that clothing should cover as much of the body as possible in order to provide sufficient protection against the UVR.

Clothing has been adopted by humans for body protection against the external environment since prehistoric times (Kaiser, 1997). However, people may not recognize the possibility of protecting themselves from the hazardous sun with clothing. Alternatively, people may know the benefits of covering their body while being exposed to the sun, but other factors such as thermal discomfort and restricted movement may weigh against these benefits (Capjack et al., 1994). Although specialized sun protective fabrics and garments are constantly being developed, designed, and used to provide better protection against harmful UVR, choices regarding purchasing and using sun protective clothing are likely influenced as much by marketing efforts and fashion as by practical consideration (Threlfall, 1992).

Ultraviolet Protection Factor (UPF)

A workshop was conducted in 1994 in response to the recommendation of the national Symposium on Ultraviolet Radiation-Related Diseases in 1992. This workshop suggested that some consideration should be given to the idea of developing Canadian standards for testing and labeling clothing for the amount of protection they provide against UVR (Mills & Jackson, 1995). Clothing made from different types of fibres and fabrics provides different amounts of protection. The characteristics of fabrics that have been identified as contributing to a higher UPF rating are: (1) polyester content, (2) tight

weave with no visible holes, (3) heaviness, (4) multiple layers, (5) darker colors, and (6) dryness (Pailthorpe, 1993).

The amount of protection provided by a fabric against solar ultraviolet radiation may be indicated by an ultraviolet protection factor (UPF) rating system, akin to the sun protection factor (SPF) used for sunscreens (Proceedings of the textiles and sun protection mini-conference, 1993). An example of a standard for determining UVR protection is that adopted in Australia since May of 1994. This "unified UPF Rating scheme" designed by Gies and Pailthorpe in 1994, correlates the UPF values to various protection categories, and to the erythemally effective UVR transmitted by fabrics rated in these categories (Pailthorpe, 1994).

Factors that Influence UPF

Studies have tested the UVR protective factor of various fabrics in terms of fabric construction, fabric color, fabric weight, number of layers, fibre type, and moisture content (Gies, Roy, Elliott, & Wang, 1994). According to the Proceedings of the textiles and sun protection mini-conference (1993), it is important to know which wavelengths are transmitted by a fabric, because UVB is estimated to be a thousand times more damaging than UVA. Protection factors take into account the differing biological affects of UVB and UVA. In some cases, the transmittance can vary markedly at different wavelengths. Hanke, Hoffmann, Altmeyer, Bibhringer, Schindler, Schon, & Klotz (1997) found that fabrics made with bright yarns in the weft had the highest UVR transmittance, while pigmented yarns reduce UV transmittance.

Pailthorpe (1993) found that many other factors influence UPF of a fabric. Some fibres provide intrinsically low UPFs. Davis et al. (1997) also found that different fibre

types had specific patterns of UVR transmission over the wavelengths tested in their study. They found that all white cotton, linen, acetate, and rayon samples tested had SPFs of less than 15, and that polyester fabrics had higher SPF values than other fibre types in comparably constructed fabrics. However, the amount of UVR protection of fibres can be altered by the manufacturing processes (Pailthorpe, 1993). For example, 'natural' cotton provides higher UPF than bleached cotton.

Pailthorpe (1993) found that tightly woven materials provided greater light absorption than loosely woven materials. He also found that tighter fabric construction led to greater UPF ratings. Woven fabrics generally afforded higher protection than knitted fabrics. For woven fabric of same weight, plain weave design fabrics provided the highest protection. "Holes" from stitches decreased the protective effect considerably, as UVR could penetrate through the holes and reach the skin beneath them. The holes are measured by the cover factor, with higher cover factor indicating higher UPF. The cover factor of a textile must be greater than 93% in order to achieve a minimum UPF rating of 15. The UPF rating increases little once the cover factor exceeds 95%. The cover factor can be altered by applying different dry finishing processes and by changing dimensional stability.

Berne and Fischer (1979) proposed that ultraviolet radiation protection varied less with the weight of a fabric than with the structure of the fabric. Although heavier fabrics generally transmit less UVR (Gies et al., 1994; Davis et al., 1997), light-weight tightly woven fabrics or knits with small spaces between yarns often provided higher UVR protection than heavy-weight loosely woven fabrics or knits

Fabrics often transmitted significantly more ultraviolet radiation and provided a lower protection factor when wet (Gies et al., 1994). In general, cellulosic fibres such as cotton absorbed more water. Cottons also exhibited a greater change on wetting than fabrics made of polyester, nylon, or lycra. Thus, cottons have lower protection factor ratings.

Color also affects the protection factor of fabrics. The fabric UPF is influenced by the dyes used to color the fabric because some dyes absorb more UVR (Pailthorpe, 1993). Fabrics dyed a dark color contribute increased protection compared with light-colored fabrics (Davis et al., 1997). For the same fabric material, a dark color protected almost three times as well as a light color. Dark colors and multiple layers of fabric increased the protective effect.

Adolescent Beliefs, Attitudes and Behavior Towards Skin Cancer

Although ultraviolet radiation exposure is the major cause of skin cancer, it is difficult to modify the beliefs and behaviors related to sun exposure, especially in adolescents. Adolescents with high sun exposure are at the highest risk of acquiring skin cancer in later years, but they are most unlikely to change their behavior (Cockburn et al., 1989; Carmel et al., 1994). One possible reason is that tanned skin may have positive psychological value by creating an enhanced image of personal worth (Council on Scientific Affairs, 1989). In addition to psychological barriers, cost of sunscreens was found to be one of the major barriers to the use of sun protection (Cockburn et al., 1989).

Mermelstein and Riesenberg (1992) found that perceived susceptibility to skin cancer and sun damage was the strongest predictor of adolescents' intentions to take precautions. They also found that perceived benefits of sun exposure were a significant

predictor of behavioral intentions to take precautions. Subjects at high risks perceived themselves as more susceptible to skin cancer, yet they also reported more perceived benefits of being in the sun.

Research has shown an association between sun exposure protective behavior and gender in the adolescent population. Cody and Lee (1990) and Carmel et al. (1994) found that females scored significantly higher than males on perceived susceptibility and perceived benefits. In Cody and Lee's study females scored significantly lower than males on perceived barriers. They reported more positive intentions regarding regular use of sunscreen. This gender-related difference in sun exposure protective behavior decreases with age (Carmel et al., 1994).

Adolescents and Sun Exposure Behavior

The use of sun protective measures such as sunscreen, hats, protective clothing, and sun avoidance is low among adolescents (Commentaries, 1989; Banks, Silverman, Schwartz, & Tunnesen, 1992; Fisher, Lowe, Gillespie, Balanda, Baade, & Stanton, 1996; Cockburn et al., 1989; Gillespie, Lowe, Balanda, & Del Mar, 1993), and the rate of sun exposure is high among them (Jarnett, Sharp, McClelland, 1993; Banks et al., 1993; Grob et al., 1993; Gillespie et al., 1993). Children and adolescents spend a greater number of hours exposed to the sun in the summer (Truhan, 1991) and receive three times the dose of UVB radiation yearly compared to adults (Commentaries, 1989). Stern, Weinstein, & Baker (1996) indicated that, on average, Americans obtained most of their lifetime exposure to the sun prior to age 21. Blistering sunburns received between the ages of 15 and 20 years increase the relative risk for melanoma, and the risk of developing basal cell

carcinoma as an adult, is related to sun exposure during the first 19 years of life (Weinstock et al., 1989; Gallagher et al., 1995)

Research studies suggest that intention and the likelihood of performing sun protection behavior were associated with: (1) beliefs about the image projected to peers, (2) perceived benefits of the use of sun protection, (3) perceived susceptibility to skin cancer, and (4) perceived barriers to the use of sun protection (Cockburn et al., 1989; Cody & Lee, 1990; Girgis, Sansan-Fisher, & Tripodi, 1993). During adolescence, peer pressure is a major determinant factor of sun exposure (Grob et al., 1993). Suntans are closely associated with self-image and social culture (Keesling & Friedman, 1987). The use of sun protection is significantly related to similar behavior of peers toward the use of sun protection (Banks et al., 1992; Gillespie et al., 1993; Lowe et al., 1993). Adolescents tend to conform to their reference groups or subcultures (Kaiser, 1997). Youths tend to be more concerned with the effects of immediate peer pressure, body image, and self-esteem than the long-term effects of sun exposure (Lovato et al., 1998).

Studies showed that youth culture emphasizes the importance of a "healthy tan" (Cockburn et al., 1989). The main reason for adolescents to sunbathe is embellishment, and this is one of two variables predictive of overexposure in adolescents (Grob et al., 1993). A glowing suntan is often subjectively associated with a healthy, youthful appearance (Hurwitz, 1988). Teenagers have become preoccupied with suntanning and the outdoor-oriented society (Hurwitz, 1988). Mermelstein and Riesenberg (1992) found that the majority of adolescents are either ignorant of the dangers of sun exposure or have attitudes that work against their taking precautions in the sun. They also reported that most adolescents work on tans intentionally, believing that tans look healthy. Only about

one-third of adolescents used sunscreens, and one-third (not necessarily the same group) knew that sun exposure would cause skin cancer. Banks, et al. (1992) suggested that changes in sun-related behavior will require changes in society's perception of the attractiveness of a tan.

Adolescent Psychology

Conformity, physical attractiveness, and peer acceptance are main concepts in adolescent development. Conformity or social influence is a change of attitudes and behavior to follow the beliefs and standards of particular groups or individuals (Feldman, 1995). Conformity and physical attractiveness can enhance acceptance by others. Individuals conform in clothing behavior to particular groups as a means of seeking acceptance into these groups (Davis, 1984). Personal attractiveness in high school students has been found to be related to the clothes they wear (Creekmore, 1980). Tanning behavior is more strongly related to physical attractiveness than to knowledge about the negative consequences associated with UVR exposure (Leary & Jones, 1993).

Deutsch and Gerard (1955, as cited in Burnkrant & Cousineau, 1975) suggested that social influences can be divided into informational and normative varieties. Socialization is a process where a person learns knowledge and skills through teachings of others (Francis & Burns, 1992). Parents, peers, media, and schools are the most important socialization agents for children and adolescents. In the socialization process, individuals learn attitudes, values, and motives to conform to societal expectations through interaction with others (Sproles & Burns, 1989). As children enter the adolescence stage, peers become more important as socializing agents compared to family members (Sproles & Burns, 1989). Friends were the most common sources of

clothing product information as well as shopping companionship for teens (Tootelian & Gaedeke, 1992). This confirmed the conclusions by Gilkison (1973), who found that friends have replaced parents as teenagers' primary frame of reference when buying personal clothing. Mascharenhas and Higby (1993) pointed out that values and attitudes of adolescents are frequently influenced by their peers, family, and significant others through interpersonal interactions. Teenagers conform to their peer group to reduce anxiety and gain social acceptance by expressing the ability to identify with other people (Kaiser, 1997). They may show their ability to identify through adopting the same fashion as their peers (Stern, 1985).

Purchasing Power of Adolescents

Between 1980s and 1990s, the adolescent population has dropped significantly. At the same time, the number of dual-income families has increased, while family size has decreased. As early as 1985, Stern reported that such changes were leading to more discretionary income to spend on fewer teens. Tootelian and Windeshausen (1976) found that teenagers were receiving more money from their parents. Sellers (1989) suggested that dual-income families were more busy and therefore felt more guilty, leading to more spending decisions by teenagers.

Teenagers were major spenders on "a myriad of products", and also influenced family purchase decisions (Stern, 1985). According to Sellers (1989), a typical adolescent of that time spent $2,331 per year. Although the teenaged population declined by 15.5% in the 1980s, their total spending increased nearly 43% (Tootelian and Gaedeke, 1992). Teenagers are also financially independent. According to Stern (1985), more than 67% of teenagers in the thirteen-to-nineteen age group worked for pay. The Interep report projected that the

income of teenagers would reach $119 billion in 1998 and $136 billion by 2001 (Klein, 1998). Stern also stated that, although teens in the United States do not earn much money, they spend a higher percentage of their income compared to other age groups. Teen spending grew from $39.1 billion to 55.9 billion during the 1980s (The Wall Street Journal, May, 3, 1990). Stern (1985) reported that teenagers do not believe it is important to save, even during the height of the recession. They spend their money as soon as they get it (Dortch, 1994). Despite that, Tootelian and Gaedeke (1992) found that teenagers saved more than $10 billion per year, with most of the money from self earnings, and minor contributions from parents. They also found that about 20% of teens had access to credit cards.

Marketing and Clothing Acquisition by Adolescents

In 1996, teenagers spent more than one-third of their money on clothing (Stoneman, 1998). Clearly, as teens spend more of both their own and their parents' money, clothing companies are right to target this burgeoning market. Companies are beginning to "sow the seeds of brand loyalty" in teenagers rather than the college population (Stern, 1993), because more than 30% of women in the 20-to-34 age group still used products they started as teens (Yankelovich, Skelley & White, as cited by Stern, 1993). About 73.3% of teenagers liked shopping for clothes and accessories and the majority of teenagers shopped four or more stores for clothes (Tootelian & Gaedeke, 1992).

However, firms have problems in reaching teens because of their different habits. Teenage boys in particular do not tend to read magazines or watch prime-time television. One way to reach them is through music, both through channels such as MTV and by sponsoring rock concerts. Another way is through the internet, by making web sites that interest teenagers through their contents, links, or contests (Tootelian & Gaekeke, 1992).

Tootelian and Gaedeke also suggested that, because of the role of friends as information sources, marketers should target opinion leaders, and use adolescent employees as promoters.

Media are most powerful influences on the fashion market (Easey, 1995). They influence how individuals perceive appearances in social interactions (Kaiser, 1997, p. 560). A variety of media interact with perceivers, shaping their perceptions of social reality (Kaiser, 1997). Teens follow media to keep abreast with the newest trends of the marketplace. Power (1991) reported that teens "figure out what's hot and what's not" from TV-watching. Approximately 6 out of 10 teens say that advertising helps them decide what to buy (Brightman, 1994). Mascarenhas and Higby (1993) further determined that informative media messages impact teenagers more than normative media messages..

On-line services are booming. Cohen (1996) reported that youths love the internet, and spend more time with their computers than with television. The internet brings the newest international information faster and easier than before. An estimated 46% of teens say it is very important to them to be the first to try something new (Brightman, 1994). This may be why teens love to access the internet, making it a new and important marketing tool.

Health-Related Socio-psychological Theories

Over the years, social and behavioral scientists have developed various theories to explain and predict human behavior. Each theory has its own merit and limitations. It is not unusual for researchers to combine different theories to increase their explanatory power. Two theories, the Health Belief Model and the Theory of Planned Behavior were selected for examination and comparison in this research.

The Health Belief Model

The Health Belief Model (Figure 1) was developed in the 1950s in the United States. It attempts to explain and predict health behavior by focusing on the attitudes and beliefs of individuals. Initially, it was developed to explain preventive health behavior at the level of the individual decision-maker. It evolved after unsatisfactory results of Hochbaum's survey in the 1950s. Over the years, it has been expanded, clarified, and extended to include preventive action, illness-behavior, and sick-role behavior (Rosenstock, 1990).

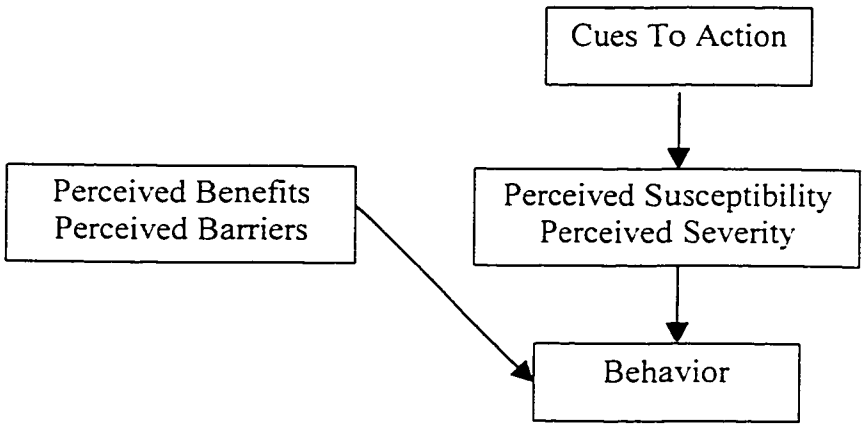

Figure 1. The Health Belief Model

The Health Belief Model focuses on lifestyle behavior. It is concerned with the individual orientation or subjective perception of the individual. This model assumes that behavior is determined by the subjective perception of the perceiver rather than by the objective environment (Mikbail, 1981). The Health Belief Model suggests that the likelihood of an individual making a particular action is determined by the perceived benefits of the action weighed against the perceived barriers (Mikbail, 1981).

The four main components of the Health Belief Model as applied to a disease are perceived susceptibility of acquiring the disease, perceived severity of the disease, perceived benefits of specified action, and perceived barriers to taking that action. ***Perceived susceptibility*** refers to the individual's subjective perception of the likelihood of contracting a specific disease within a specified time period. ***Perceived severity*** refers to a subjective perception of the seriousness of the disease in terms of contraction or non-treatment. The term ***perceived benefits*** refers to the effectiveness of the various available actions in reducing the disease threat, or the perceived benefits of taking health action. ***Perceived barriers*** are the potential negative effects of an anticipated health action.

Perceived susceptibility and perceived severity represent the threat components of the Health Belief Model. They are sometimes combined and labeled as perceived threat. The perceived benefits and perceived barriers together represent the outcome expectation components of the Health Belief Model. They represent more or less a cost-benefit analysis of a particular course of action.

In addition to the variables listed above, "cues to action" is another variable often associated with the Health Belief Model. The term cues to action refers to cues such as information or advice that focus the attention of the individual on the disease to trigger an appropriate preventive action. "Salience" is another variable that is sometimes used in the Health Belief Model. Salience refers to awareness of general health matters that results in positive health activities and willingness to seek and comply with orders that are believed to decrease disease (Champion, 1984).

Researchers often expand the original Health Belief Model to increase its explanatory power. For example, the concept of efficacy as described by Bandura

(1977a, 1977b, 1986) focuses on the confidence of one's ability to accomplish the recommended action (Rosenstock, 1990). Other studies also include modifying variables such as demographics, socio-psychological, and other structural variables that influence health-related behavior. Other measures such as "value of health" and "health locus of control" have been added in some studies to increase the predictive power of the Health Belief Model.

The limitations of the Health Belief Model derive mainly from the fact that three of its underlying assumptions are culturally bound (Carmel et al., 1996). The first assumption is that people place a high value on their health and are motivated to protect it. The second assumption is that people believe that they have control over their own health. The third assumption is that people engage in health behaviors on the basis of rational cost/benefit calculations. These assumptions are not always valid for cultures other than North American. For example, none of these assumptions hold true for most native American populations living on reserves with guaranteed health care.

The Health Belief Model serves as a useful framework for the understanding of preventive health behavior (Erakerm, Kirscht, & Becker, 1984, as cited in Cockburn et al., 1989). "The model suggests that an individual's decision to use sun protection measures is a function of the individual's beliefs along three subjective dimensions: perception of susceptibility to and severity of skin cancer; the perceived benefits that are associated with the use of sun protection; and the perceived barriers that are associated with such use" (Cockburn et al., 1989, p.136).

Janz and Becker (1984 as cited in Cody & Lee, 1990) found that substantial empirical studies published before 1984 support the Health Belief Model dimensions as

important contributors to the prediction of an individual's health preventive intention and behaviors. From 1984 onwards, studies have continued to support the view that some of the Health Belief Model dimensions are significant predictors of health intention and behaviors (Cody & Lee, 1990). However, not all of its components have proven useful in predicting variance in preventive health behavior (Cody & Lee, 1990). Carmel et al. (1994) indicated that the predictive power of the Health Belief Model for skin cancer was statistically significant, but relatively low, with the constructs of perceived barriers and cues for action contributing most to the explained variance.

The Theory of Planned Behavior

The Theory of Planned Behavior (Figure 2) is an extension of Fishbein and Ajzen's theory of reasoned action (Ajzen, 1988). The Theory of Reasoned Action, which has been one of the most popular social psychological models, provides a conceptual framework that permits prediction and understanding of particular health-related behaviors in specified contexts. Salazar (1991) stated that, compared to other social psychological theories, the Theory of Reasoned Action is the ultimate measurement of behavioral changes. It considers a much wider range of consequences of continuing the current behavior and a wider range of consequences of the alternative behavior under consideration (Courneya and McAuley, 1993). Throughout different applications, however, researchers found that the Theory of Reasoned Action appeared to perform poorly with behaviors over which individuals have incomplete volitional control (Godin & Kok, 1996). In order to take into account the limitations of the original Theory of Reasoned Action; Ajzen (1991) added a third element into the model, resulting in the creation of the Theory of Planned Behavior. The third element is the concept of

behavioral control, which takes into consideration the fact that most behaviors are located at some point along a continuum that extends from total control to complete lack of control.

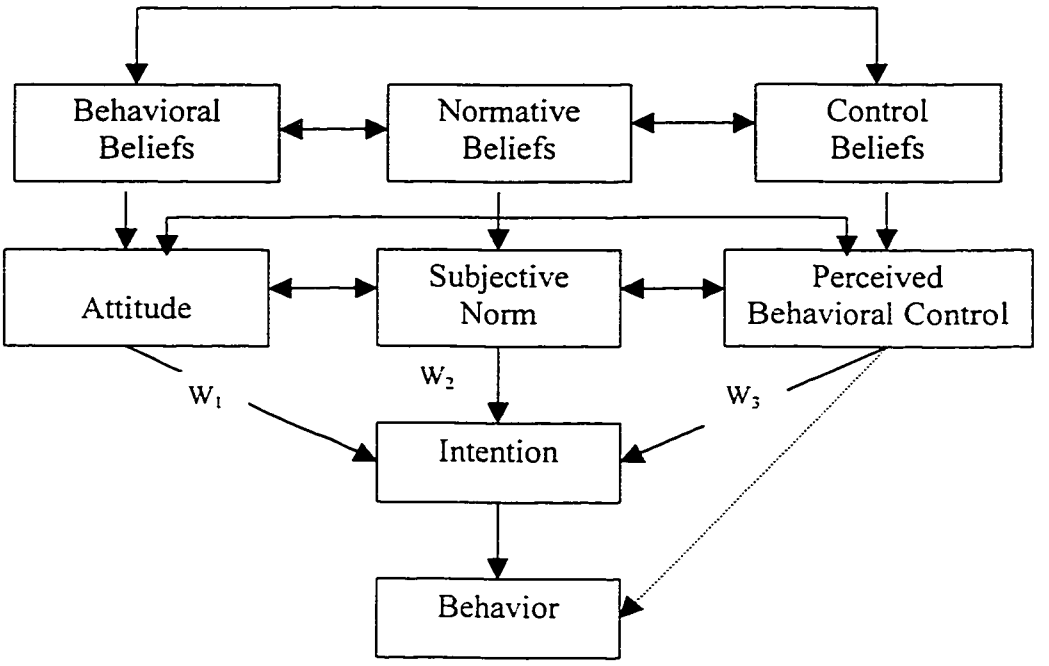

Figure 2. The Theory of Planned Behavior

The intention of an individual is the central factor in the Theory of Planned Behavior, and three conceptually independent antecedents of intention are assumed. These determinants are attitude toward the behavior, subjective norm, and perceived behavioral control. ***Attitude toward the behavior*** is defined as the degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question. The beliefs that underlie a person's attitude toward the behavior are termed *behavioral beliefs*. ***Subjective norm*** is a social factor and is defined as the perceived social pressure to perform or not to perform the behavior. The beliefs that underlie a person's subjective norm are termed *normative beliefs*. ***The perceived behavioral control*** is defined as an individual's perception of the ease or difficulty of succeeding in enacting the behavior of

interest. The beliefs that underlie a person's perceived behavioral control are termed *control beliefs*, and are assumed to reflect past experience as well as anticipated impediments and obstacles.

The Theory of Planned Behavior views an individual's intention to perform a behavior as the immediate determinant of the overt behavior. Intentions are postulated to capture the motivational factors that influence a behavior in question. Intentions are indications of how hard and how much effort a person is willing to perform a behavior. In general, the stronger the intention that a person has to engage in a behavior, the more likely a person is to perform that behavior. However, this is true only when a person has volitional control of the behavior in question. It is assumed that behavioral achievement depends jointly on intention and behavioral control. They require the availability of requisite opportunities, resources, and ability.

An individual's intention to perform a specific behavior in a given context, and hence his actual performance of the behavior, is a function of his: (1) attitude toward performing that behavior (attitudinal beliefs), (2) beliefs about what others expect him to do in this situation (normative beliefs), and (3) beliefs of the likelihood of succeeding in performing the behavior (control beliefs). The more behavioral control a person possesses, the more likely an individual's intentions will influence performance. This likelihood will increase further with increased motivation. The normative beliefs function together with the individual's motivation to comply with reference groups or individuals. The relative importance of the normative, attitudinal, and control belief components depends in part on the behavioral intention under investigation, conditions under which the behavior is to be performed, and individual differences among subjects.

The three components are assigned weights (w_1, w_2, and w_3) to determine the relative importance of each. The Theory of Planned Behavior appears to be more appropriate for predicting single instances of behavior such as voting in an election and donating blood, rather than for multiple or repeated instances of behavior.

The Health Belief Model vs. the Theory of Planned Behavior

The Health Belief Model and the Theory of Planned Behavior are both social psychological models formulated to help explain and predict the behavior of individuals and groups. They both provide frameworks to help researchers and professionals understand health-related behavior and promote behavioral change. The Health Belief Model has been widely used in health-related research, especially studies related to cancer. The Theory of Planned Behavior has been adopted as an extension of the Theory of Reasoned Action, which has been a commonly used framework in different kinds of health concerns research. Both of these theories assume that anticipation of a negative health consequence and the desire to avoid such consequence or reduce its impact creates motivation for performing preventive action.

Although both the Health Belief Model and the Theory of Planned Behavior use different labels or terms to represent their components, some components share similar underlying meanings. Generally speaking, the Theory of Planned Behavior contained most of the variables in the Health Belief Model. Perceived severity in the Health Belief Model has the same underlying meaning as negative evaluation in the Theory of Planned Behavior. These terms represent the expected aversiveness of the outcome. Both models suggest that the impact of a negative outcome on the motivation to act depend on individual's beliefs about the likelihood that this outcome would occur. The motivation

to perform a certain preventive or protective behavior comes from the expectation that action can reduce the likelihood or seriousness of negative outcome. Likelihood is usually referred to as perceived susceptibility in the Health Belief Model and expectancy in the Theory of Planned Behavior. The concept subjective norm in the Theory of Planned Behavior is similar to the socio-psychological variables in the Health Belief Model, which are concerned with social influence such as peer and reference groups. In some studies, self-efficacy is added in the Health Belief Model in order to increase its explanatory power. This is also true for the Theory of Planned Behavior, where perceived behavioral control equates to the concept of self-efficacy.

In the Theory of Planned Behavior, the expected benefit can be evaluated from the difference between: (1) beliefs about the magnitude and likelihood of negative outcome assuming behavior is constant and (2) beliefs about these same concerns assuming the adoption of a protective measure. Theory of Planned- Behavior can measure all outcomes in terms of changes, whereas, the Health Belief Model presents this concept in terms of the likelihood and seriousness of consequences if current behavior does not change. A separate variable is used to indicate the perceived efficacy of the precaution. In the Health Belief Model, perceived benefits of performing a behavior are weighed against the expected cost or perceived barriers of acting to predict changes in behavior. It asks subjects directly about the effectiveness of the precaution in reducing risk (Weinstein, 1993). The Theory of Planned Behavior is concerned with a much wider range of consequences of continuing the current behavior and of the alternative behavior under consideration. It asks subjects about the probability and severity of negative outcomes under the current behavior and under alternative (Weinstein, 1993). The

Theory of Planned Behavior is designed in terms of behavioral intentions, not behavior. It actually is concerned with the prediction of individual's intentions. However, the Health Belief Model does not take into consideration of additional testable predictions about the process that leads to behavioral change (Weinstein, 1993).

Summary

In summary, literature has elucidated: (1) the harmful effects of ultraviolet radiation exposure, (2) the protective power of clothing, (3) the beliefs, attitudes, and behavior of adolescents toward skin cancer, (4) the influences on adolescent apparel buying, (5) the spending power of adolescents, and (6) marketing strategies appropriate for adolescents. The causative factors of skin cancer are both environmental and behavioral in nature. Ultraviolet radiation comes from our natural environment. Humans, especially adolescents in this research, interact with this natural environment. Both external factors and internal factors determine their beliefs, which in turn influence their attitudes, intentions, and behavior regarding the use of sun protective clothing items, which can act to moderate between the harmful effect of sun exposure and the human body.

Studies have consistently shown the importance of preventing skin cancer by using a combination of sun protection measures such as wearing sunscreens, sunglasses, hats, and sun protective clothing; as well as avoiding sun exposure during mid-day hours. Various educational and intervention programs related to skin cancer have taken place. However, these programs have not been very successful. Although research has shown the effectiveness of sun protective garments, adolescents still usually do not wear sun protective clothing or take precaution in the sun. Evidence suggests that there are many

barriers to using sun protection measures among adolescents, especially when it comes to buying and wearing sun protective garments. Physical attractiveness, body image, and conformity play important roles among adolescents in their non-adoption of sun protection measures. These factors have major influences on the beliefs, attitudes, and behavior of adolescents regarding clothing purchase and their misconception of "healthy tan".

Chapter 3

Methods and Procedures

This chapter describes the conceptual framework, focus group interviews, the development of the survey instruments, selection of survey subjects, data collection procedures, method of data analysis, and limitations of the research methods for this study.

Conceptual Framework

The conceptual framework for this study is the Theory of Planned Behavior (Ajzen, 1991). The dependent variables are intentions to wear clothing such as wide brimmed hats and long sleeved shirts as sun protection agents when outdoors in the summer sun. According to the Theory of Planned Behavior, intention is the immediate determinant of behavior. Thus we can predict an individual's likelihood to perform a behavior if an appropriate measure of intention is obtained. The Theory of Planned Behavior suggests that an individual's intention is related to one's attitude, subjective norm, and perceived behavioral control. An overview of the Theory of Planned Behavior is provided in Chapter 2. The theory is represented by the following equation:

$$B \approx BI = w_1(Att) + w_2(SN) + w_3(PBC)$$

Where:

B	=	behavior
BI	=	behavioral intention
Att	=	attitude toward the outcome of performing the behavior
SN	=	subjective norm
PBC	=	perceived behavioral control
w_1, w_2, and w_3	=	empirically determined weights

Attitude toward the outcome (Att) can be measured directly and/or broken down into two components for an additional measure:

$$Att \alpha \sum_{i=1}^{n} b_i e_i$$

where:

b_i = belief that the behavior will lead to consequence $_i$
e_i = evaluation of consequence $_i$
i = number of behavioral beliefs

Subjective norm can be measured directly and/or broken down into components for an additional measure:

$$SN \alpha \sum_{j=1}^{n} nb_j mc_j$$

Where:

Nb_j = normative belief (a person's belief that reference group $_j$ or individual $_j$ thinks he should or should not perform that behavior)
mc_j = motivation to comply with referent $_j$
$_j$ = the number of relevant reference groups or individuals

Perceived behavior control can also be measured directly and/or broken down into components for an additional measure:

$$PBC \alpha \sum_{k=1}^{n} c_k p_k$$

Where:

c_k = control beliefs
p_k = perceived power of the particular control factor to facilitate or inhibit performance of the behavior
$_k$ = number of control beliefs or control factor

In the above formulation, an individual's attitude (Att) towards the use of wide brimmed hats and long sleeved shirts as sun protection can be derived from the sum of products of beliefs about each outcome of performing the behavior (b_i) weighted by the evaluation of each respective outcome (e_i). The subjective norm (SN) can be derived from the sum of products of each normative belief that a particular referent expects the individual to perform the behavior (nb_j) weighted by the individual's motivation to comply with the expectation of each respective referent (mc_j). An individual's perceived behavioral control (PBC) can be derived from the sum of products of each control belief (c_k) weighted by the perceived power (p_k) of the particular control factor to facilitate or inhibit performance of the behavior.

Variables external to the model (Figure 3) will be examined for their effect on normative beliefs, behavioral beliefs, and control beliefs. One of the external variables, "sun protection practice" can also be conceptualized as current and past behavior.

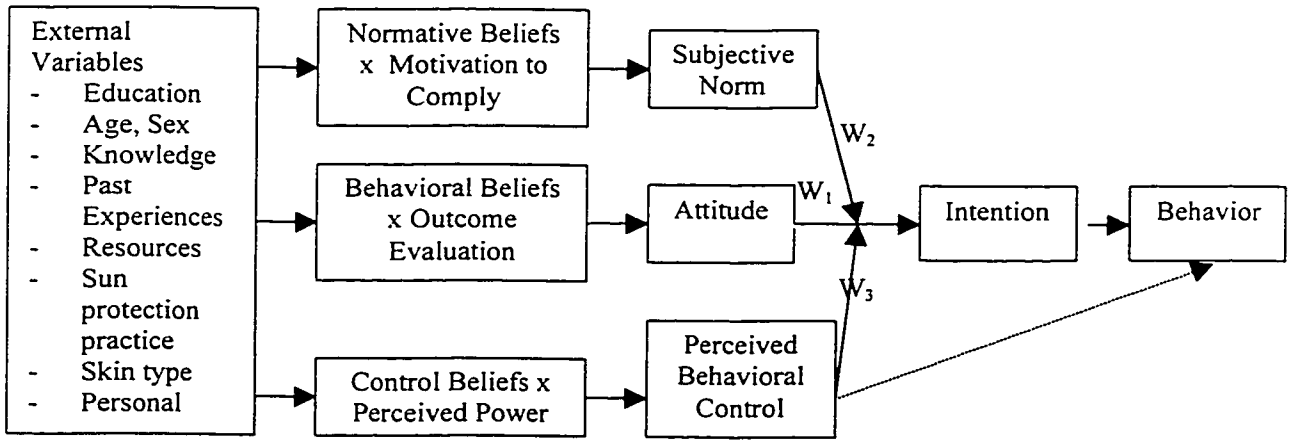

Figure 3. Schematic Diagram of Conceptual Framework (Adapted from Ajzen, 1991).

Focus Groups

Focus group interviews were conducted in the preliminary stage of this study to elicit information needed to construct questionnaire items concerning the underlying beliefs of the three independent antecedents of intention in the Theory of Planned Behavior. Questions regarding behavioral beliefs, normative beliefs, control beliefs, past experiences, knowledge, and other background information were addressed (Appendix A).

Five focus group interviews were conducted. One group consisted of female teenagers of members of a soccer team. Three groups consisted of younger female teenagers from courses in the Summer Youth University. The only male group consisted of friends of a single teenager. All focus group discussions were held in Edmonton, Alberta. Potential participants were given letters addressed to their parents explaining the goals and other details of the study. Parental consent forms (Appendix B) were attached to the letters. Parents were asked to sign the consent forms if they agreed to have their children participate in the study. Additional consent forms (Appendix C) including the goals of the study and other necessary information were given to participants to sign before the discussions. The fact that participation in the focus group study was voluntary was stressed as was the confidentiality of results. To preserve anonymity, respondents were identified only by numerical codes in the data file. Audio recordings were used to record group discussions. Tapes were destroyed upon the completion of the research.

Description of Instruments

The constructs of the Theory of Planned Behavior were operationalized as responses to items on a self-administered questionnaire. Portions of the questionnaire based on the Theory of Planned Behavior were constructed following the general format proposed by Ajzen (1988) and Ajzen and Madden (1986). Questionnaire items were developed based on both the literature reviewed and the results of the focus group discussions (Appendix D).

The questionnaire included both direct and belief-based measures of attitudes, subjective norms, and perceived behavioral control, as well as external variables. Questionnaire items relating to direct measures and belief-based measures comprised seven-point Likert-type scales.

Ajzen and Fishbein (1980; Fishbein & Ajzen, 1975) contended that external variables such as demographics, situational, and structural variables do not directly enter into the causal structure of the Theory of Planned Behavior. However, questions regarding external variables such as age, gender, grade, prior knowledge of disease, and other background information were measured with a combination of multiple choice and open-ended questions. Responses to these questions were used for descriptive purposes, as well as segmenting the population relative to beliefs.

For the school portion of the survey, printed questionnaires (Appendix E) were distributed in selected health and CALM classes. For the internet portion, the questionnaire was converted into HTML format and posted on a selected website. Internet respondents were given a choice of answering either Part I or both parts of the questionnaire. Part I of the questionnaire included only items related to intention, direct

measures of attitudes, subjective norms, and perceived behavioral control, and external variables. The second part of the questionnaire covered all of the items related to all underlying beliefs (behavioral beliefs, outcome evaluations, normative beliefs, motivation to comply, and control beliefs). The responses were recorded by 'point' and 'click' method instead of traditional pen and paper method. Appropriate links associated with skin cancer were incorporated into the survey.

Selection of Survey Participants

The survey subjects included both male and female teenagers (13 to 19 years of age). Subjects were recruited in two ways.

Probability Sampling

Grades 9 to 12 health and CALM (Career and Life Management) classes, with up to 200 students were selected randomly from all such classes in the English speaking junior and senior high schools within the area served by the Aspen Health Services. Only students with parental consent and within the age range 13 to 19 years, and attending the selected classes were given questionnaires.

Non-probability Sampling

The second method of recruitment was through a selected web-site on the internet. Subjects were solicited through both the snowball method and by a posting in a web-site called 'CyberIsle". Teenagers who logged onto the survey web-site, either by entering the URL of the survey web-site given by their friends, or by clicking the link of the survey web-site listed in the 'CyberIsle" web-site, were given the opportunity to respond to questions paralleling those on the paper-and-pencil questionnaire. Participants

had a choice to answer either Part I of the questionnaire or continue to answer the second part of the questionnaire. Only completed questionnaires from respondents within the age of 13 to 19 and living in Canada were used in the data analysis.

Data Collection Procedures

Data collection for the school portion of the survey was administered in the randomly selected classes in mid-November to early December, 1998. Teachers of the selected classes were contacted by the researcher regarding the purpose and goals of this study. It was stressed to the teachers that participation in the study was voluntary. Letters addressed to students' parents and forms for parental informed consents (Appendix F) were delivered to the schools and distributed to the students by their teachers at least one week prior to the data collection process. Student informed consent forms (Appendix G) and questionnaires were distributed, administered, and collected during the scheduled class periods by two of the researchers and the teacher of the class. Only those students with parental consent and within the age range of 13 to 19 were requested to participate. Debriefing took place after the completion of questionnaires. Informative brochures regarding sun protection and skin cancer were distributed after the students completed the questionnaires. Questions from the respondents about their beliefs, attitudes, and behavior were addressed following completion of the questionnaires. Participation in the survey was voluntary and this was stressed along with the confidentiality of results. Each respondent was identified in the data file only by a numerical code.

Data collection for the internet portion of the study was automated by database engines linked to the questionnaire web-page. Incidental data such as date and time of

completion, connection time, originating internet address, and use of informational links were included in each questionnaire session. Upon completion and submission of the questionnaire through the internet, respondents were directed to web-sites where they could access information about skin cancer prevention. After completion of the session, the data were added as a new record to the database.

Ethical reviews for focused group interviews, and both in-school and internet survey were approved by the Human Ethics Review Committee of the Faculty of Agriculture, Forestry, and Home Economics at the University of Alberta.

Method of Data Analysis

Data were coded and entered into a computer at the University of Alberta. Data analyses were performed using the Statistical Package for the Social Science (SPSS), Release 8.0. Background data and characteristics of the sample were described using frequencies and percentages. T-tests and Chi-Square tests were performed for some of the external variables.

Null hypothesis I: Measured values for the model's components were determined by responses to scale items and described using frequencies, means, standard deviations, and range. Relationships among these components were determined through Pearson Product-Moment Correlation analyses. Hierarchical Regression Analyses were performed to explain and predict behavioral intention.

Null hypothesis II: Differences among two sample populations were determined by using t-test.

Limitations

The validity of the study depended on a number of factors in the design and implementation process. Factors included selection of the sample, degree to which the questionnaire captures underlying beliefs of the Theory of Planned Behavior, development of the instruments and questionnaire, and the conduct of the survey.

For the school portion of this study, the sample was limited to students aged 13 to 19 attending health and CALM classes in Anglophone schools within the area served by the Aspen Health Services. Therefore, the results might not be generalizable to other populations; such as adolescents in other grades, other ages, other areas or Francophones.

For the internet portion of this study, the sample was restricted to teenagers who had internet access. The sample was not a random sample, and respondents were self-selected. Researchers had no control over when and where respondents answer the questions. Researchers also had no control over the number and characteristics of respondents who answered the questions. Therefore, the results might not be generalizable to non-internet users or to the general teenage population.

For both school portion and internet portion of the study, self-reported behavioral measures might introduce unknown sources of error. Some important external variables such as socio-economic status and the use of other sun protection items such as long pants would not be measured and captured in this present study. This limitation should not affect the validity of the model, however, because the influence of such variables should be captured in the model components.

CHAPTER 4

FINDINGS

This chapter includes descriptive data regarding respondents, and their responses to components of the Theory of Planned Behavior, analyses of the Theory of Planned Behavior constructs, and results of testing the null hypotheses. The level of significance was set at $p < .05$ for null hypotheses testing.

Profile of the Respondents

There were two samples in this study – internet and in-school. For the internet survey, there were over one hundred visitors to the survey web-site. However, only eleven teenagers living in Canada responded to the questionnaire, with approximately the same number of males and females participating. Because of the small number of internet respondents, most analyses were conducted only for the in-school sample. As part of the in-school sample, one hundred and one respondents completed questionnaires for this study. Just over half of the respondents (52%) were male. Their ages ranged from 13 to 19 years (2% aged 13, 19% aged 14, 27% aged 15, 35% aged 16, 12% aged 17, 5% aged 18, 1% aged 19). Thirty-four percent were grade 11 students, 28% were grade 9 students, 26% were grade 10 students, and 13% were grade 12 students. All respondents lived in Northern Alberta and attended school in either Westlock (43%), Riviere Qui Barre (28%), Barrhead (16%), or Neerlandia (14%). Most respondents (77%) used or had access to the internet.

The majority of respondents had neither family members (86%) nor friends (95%) who had had skin cancer. Among information sources, respondents reported that they received more information about the risks of excessive sun exposure from television (95%) and magazines (82%) than from radio (60%), school (60%), or doctors (46%). There was no significant difference between male and female respondents in the proportion who had seen, heard, or read information about the risks of excessive sun exposure from television, magazines, radio, school, and doctors. Respondents in grades 9 and 11 were more likely than those in grade 10 or 12 to receive information about the risks of excessive sun exposure (Table 1).

Table 1. Information Sources by Grade of Respondent

	Grade 9	Grade 10	Grade 11	Grade 12	Total
Television	27	24	32	12	95
Radio	14	15	21	11	61
Magazine	24	20	30	9	83
School	17	16	22	6	61
Doctor	14	11	14	7	46

Skin Type of respondents is given in Table 2. Most respondents had Type II, III, or IV skin, with smaller numbers being Type I, V or VI skin. More than half of the respondents (57%) had experienced at least one blistering sunburn. Among people who had experienced blistering sunburns in their lifetime, 27% experienced it once, 35% experienced it two to three times, and 32% experienced it more than three times. One-quarter of the respondents freckled easily, one-third of the respondents sunburned easily, more than half of the subjects had obtained suntans on purpose, and about one-tenth of the subjects had made use of suntanning booths.

Table 2. Respondents' Skin Type

		Frequency	Percent
Skin Type			
	Type I	11	10.9
	Type II	20	19.8
	Type III	39	38.6
	Type IV	14	13.9
	Type V	9	8.9
	Type VI	1	1.8
	Total	94	93.0

Typical sun protection behaviors of respondents are given in Table 3. Approximately two-thirds of respondents reported using sunscreen sometimes, often or always when out in the summer sun. About one-third of these respondents typically used sunscreen with SPF 15, another third used sunscreens with SPF 30, while about 19% did not know what SPF they typically used. Approximately 80% of the respondents reported wearing long sleeved shirts never or rarely when out in the summer sun. More reported using sunglasses or hats. Among respondents who wore hats when going out into the summer sun, almost all reported that they typically wore baseball caps.

Table 3. Typical Sun Protection Behavior of Respondents

Typically use:	Sunscreen		Sunglasses		Long Sleeved Shirt		Hat	
	n	%	n	%	n	%	n	%
Never	10	9.9	6	5.9	49	48.5	9	8.9
Rarely	26	25.7	18	17.8	35	34.7	22	21.8
Sometimes	30	29.7	26	25.7	13	12.9	27	26.7
Often	22	21.8	38	37.6	2	2	33	32.7
Always	11	10.9	13	12.9	2	2	10	9.9
Total	99	98.0	101	100	101	100	101	100

Female respondents were more likely than males to use sunscreen and wear sunglasses when out in the summer sun, whereas male respondents were more likely to wear hats (Figure 5a-d). However, such differences were not significant. Approximately

the same percentage of males and females reported typically wearing long sleeved shirts and sunglasses when out into the summer sun.

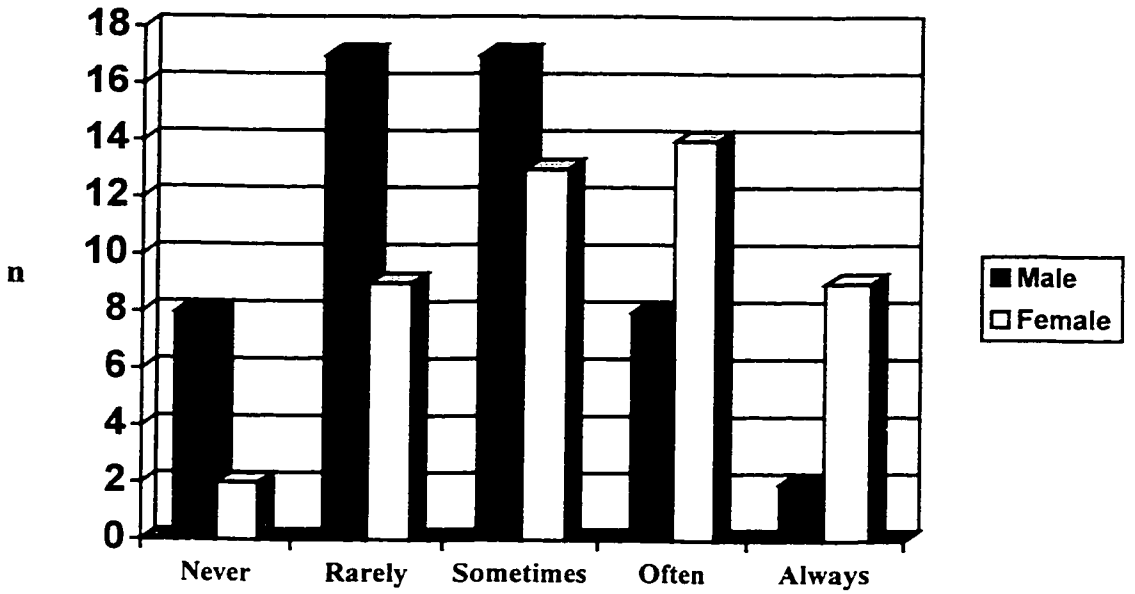

Figure 4a. Typically use sunscreen when out in the summer sun

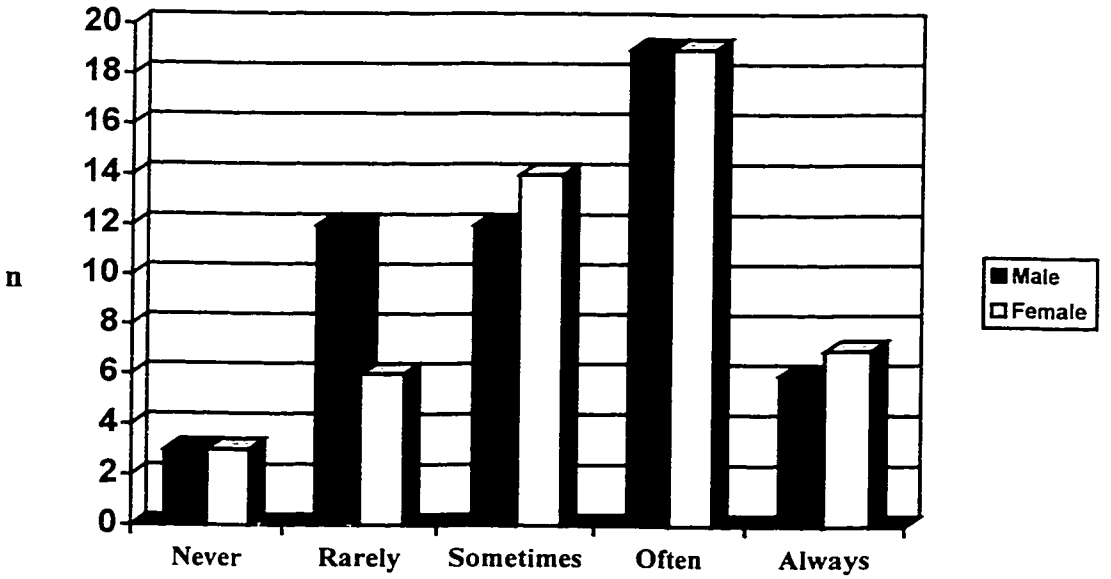

Figure 4b. Typically use sunglasses when out in the summer sun

Continued...

Figure 4 (Cont'd

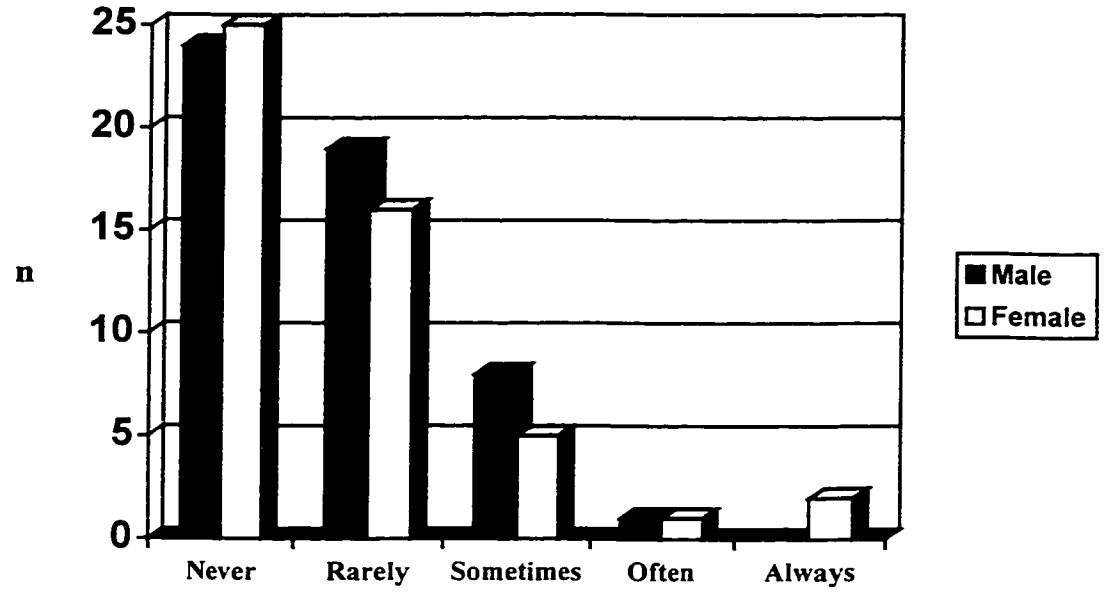

Figure 4c. Typically wear long sleeved shirts when out in the summer

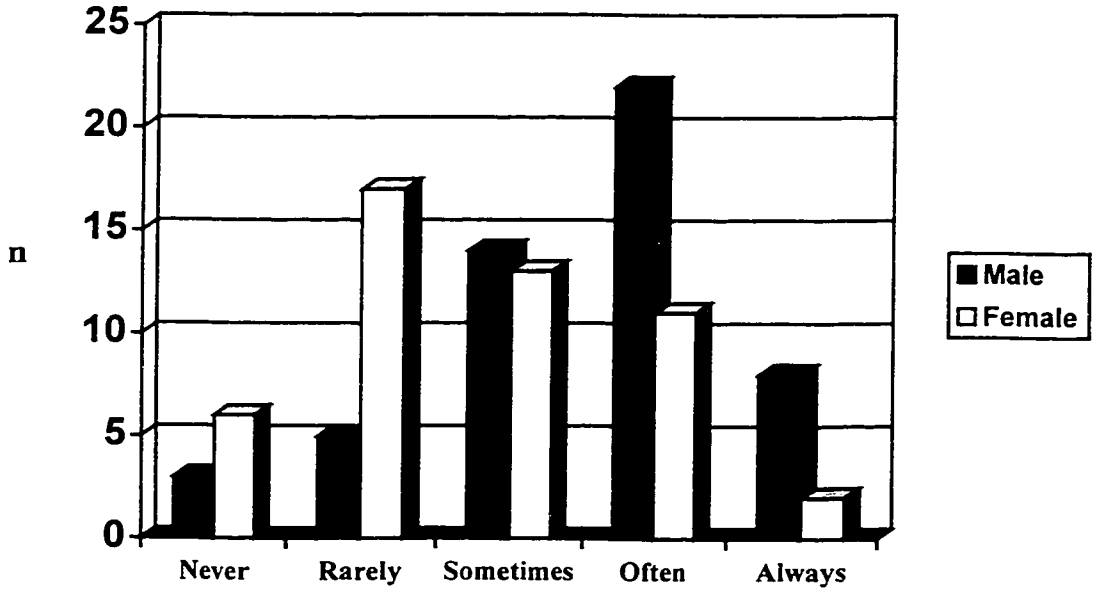

Figure 4d. Typically wear hats when out in the summer sun

Figure 4. Association Between Gender and Use of Sun Protection

Theory of Planned Behavior Constructs

The Theory of Planned Behavior was used in this study to predict the behavioral intentions of respondents toward wearing wide brimmed hats and long sleeved shirts as sun protection agents when outdoors in the summer sun. Constructs of the Theory of Planned Behavior were measured by responses to scale items on questionnaires (Appendix E). Subjects recorded their responses on seven-point, Likert-type scales. The responses were labeled with descriptive terms that corresponded to numbers on the scales. Although the scales ranged from 1 to 7, the scales were bipolar in nature. Variables external to the Theory of Planned Behavior were measured by a combination of multiple-choice and open-ended questions.

Behavioral Intention (BI), Attitude towards the Act (Att), Subjective Norm (SN), Perceived Behavioral Control (PBC) and Control Beliefs (CB) components were coded from 1 to 7, with 1 being least desirable and 7 most desirable. Labels used to indicate responses to the BI component ranged from extremely unlikely to extremely likely, or from none of the time to all of the time. Labels used to indicate responses to the Attitude component ranged from: (1) extremely dumb to extremely smart, (2) extremely bad to extremely good, (3) extremely unhealthy to extremely healthy, (4) extremely embarrassing to extremely "in", (5) extremely useless to extremely useful, (6) extremely unnecessary to extremely necessary, and (7) extremely unpleasant to extremely pleasant. Labels used to indicate responses to the SN component ranged from strongly disagree to strongly agree. Labels used to indicate responses to the PBC component ranged from: (1) extremely difficult to extremely easy, (2) strongly disagree to strongly agree, (3) very little control to complete control, and (4) not at all confident to completely confident.

Labels used to indicate responses to the CB component ranged from not at all confident to completely confident.

Items related to the behavioral beliefs (BB), outcome evaluation (OE), motivation to comply (MC) and normative beliefs (NB) were coded from –3 to +3, with -3 indicating an extremely negative response and +3 indicating an extremely positive response. Labels used to indicate responses to BB components ranged from extremely unlikely to extremely likely. Labels used to indicate responses to OE components ranged from: (1) extremely bad to extremely good, (2) extremely unhealthy to extremely healthy, and (3) extremely ghostly to extremely alive. Labels used to indicate responses to MC components ranged from extremely unlikely to extremely likely. Labels used to indicate responses to NB components ranged from strongly disagree to strongly agree.

Descriptive Statistics for Constructs of the Theory of Planned Behavior

Descriptive statistics for components of the Theory of Planned Behavior are given in Tables 4 and 5. ***For wearing wide brimmed hats*** (Table 4), mean responses were somewhat negative for all the intention items. A majority of respondents neither plan to nor intend to wear a wide brimmed hat in the sun. Overall, weakly positive responses were indicated for the attitude items. Respondents generally agreed that wearing wide brimmed hats is healthy, good, smart, useful, and necessary, but also slightly embarrassing and unpleasant. Weakly positive mean responses were indicated for the subjective norm items. Respondents agreed that generally the people who are important to them would approve, encourage, and think that they should wear wide brimmed hats in the summer sun. In general, respondents reported somewhat positive responses to the

perceived behavioral control items regarding wearing hats, however they tended to think that it is difficult for them to wear wide brimmed hats in the summer sun.

Respondents tended to agree with all the behavioral belief statements, but all the responses were close to neutral. The most positive responses were beliefs about prevention of heat stroke, skin cancer, sunburn, suntan, and wrinkled skin early in life. Although respondents generally had positive attitudes towards prevention of sun exposure and believed that wide brimmed hats can prevent sun exposure, they also evaluated having a suntan as making them "look good" and "alive" on the outcome evaluation scales. Mean responses to motivation to comply scales were all quite neutral. Among the normative belief scales, respondents tended to disagree that their friends and peers would think that they should or encourage them to wear wide brimmed hats in the summer sun. They also tended to lack confidence that they were capable of wearing wide brimmed hats in the summer sun.

T-tests were performed to determine the significance of any differences between male and female responses to the questionnaire items. For wearing hats, these tests showed that males were significantly less positive on the mean of subjective norm ($p = .001$), and tended to have less positive attitudes (($p = .062$) and normative beliefs ($p = .066$) than females.

Table 4. Constructs of the Theory of Planned Behavior: Wearing Wide Brimmed Hat When Outdoors in the Summer Sun

Component	N	Mean	Std. Dev.	Range[1]
Behavioral Intention				
• I plan to wear hat (unlikely/likely)	100	2.6	1.7	1 to 7
• I intend to wear hat (none of the time/all of the time)	99	2.5	1.5	1 to 7
• Mean BI	99	2.6	1.4	
Attitude Toward the Act				
• (dumb/smart)	100	5.4	1.5	1 to 7
• (bad/good)	96	5.7	1.1	3 to 7
• (unhealthy/healthy)	94	6.0	1.0	2 to 7
• (embarrassing/"in")	96	3.4	1.5	1 to 7
• (useless/useful)	96	5.2	1.2	1 to 7
• (unnecessary/necessary)	96	5.0	1.2	2 to 7
• (unpleasant/pleasant)	96	3.5	1.5	1 to 7
• Mean Att	94	4.9	0.8	
Subjective Norms				
• People approve (disagree/agree)	101	5.1	1.7	1 to 7
• People encourage (disagree/agree)	101	4.4	1.7	1 to 7
• People think (disagree/agree)	101	4.2	1.8	1 to 7
• Mean SN	101	4.6	1.5	
Perceived Control				
• For me to wear (difficult/easy)	101	3.8	2.0	1 to 7
• Completely up to me to wear (disagree/agree)	101	6.3	1.5	1 to 7
• How much control over wearing (very little control/complete control)	100	6.4	1.3	1 to 7
• If I want to I could easily wear (disagree/agree)	101	6.1	1.6	1 to 7
• Capable of wearing (not at all confident/ completely confident)	100	5.0	2.0	1 to 7
• Mean PBC	99	5.5	1.0	

Continued...

Table 4 (Cont'd)

Component	N	Mean	Std. Dev.	Range[1]
Behavioral Beliefs				
• Make me look different from other people around me (unlikely/likely)	101	1.0	1.9	-3 to 3
• Can prevent a suntan (unlikely/likely)	100	1.2	1.5	-3 to 3
• Can prevent rashes (unlikely/likely)	101	0.2	1.7	-3 to 3
• Can prevent a sunburn (unlikely/likely)	101	1.3	1.6	-3 to 3
• Can prevent wrinkled skin early in life (unlikely/likely)	101	1.2	1.4	-3 to 3
• Can prevent freckles (unlikely/likely)	101	0.4	1.6	-3 to 3
• Can prevent heat stroke (unlikely/likely)	101	1.7	1.5	-3 to 3
• Can prevent skin cancer (unlikely/likely)	101	1.5	1.3	-3 to 3
• Make me look silly (unlikely/likely)	101	1.1	1.7	-3 to 3
• Make me feel hot and sweaty (unlikely/likely)	101	1.0	1.6	-3 to 3
• Mean BB	100	1.1	0.8	
Outcome Evaluations				
• Preventing suntan (bad/good)	100	0.2	1.6	-3 to 3
• Preventing suntan (unhealthy/healthy)	99	1.0	1.4	-3 to 3
• Having suntan makes me look (bad/good)	101	1.8	1.0	-3 to 3
• Having a suntan makes me look (ghostly/alive)	97	1.8	1.1	-3 to 3
• Having freckles (bad/good)	100	-0.4	1.4	-3 to 3
• Having freckles (unhealthy/healthy)	98	0.1	1.3	-3 to 3
• Mean OE	97	0.8	0.7	
Motivation to Comply				
• best friend (unlikely/likely)	101	-0.4	1.6	-3 to 3
• other people my age (unlikely/likely)	101	-0.3	1.7	-3 to 3
• mother (unlikely/likely)	97	-0.2	1.6	-3 to 3
• father (unlikely/likely)	97	-0.4	1.6	-3 to 3
• other family members (unlikely/likely)	99	-0.6	1.5	-3 to 3
• health care providers (unlikely/likely)	96	0.4	1.5	-3 to 3
• advertisements on TV, radio, and newspaper (unlikely/likely)	100	-0.2	1.6	-3 to 3
• celebrities and fashion models (unlikely/likely)	100	-0.5	1.7	-3 to 3
• Mean MC	94	-0.3	1.1	

Continued...

Table 4 (Cont'd)

Component	N	Mean	Std. Dev.	Range[1]
Normative Beliefs				
• Best friend encourages (disagree/agree)	101	-1.0	1.5	-3 to 2
• Other people my age encourage (disagree/agree)	101	-1.1	1.4	-3 to 2
• Mother encourages (disagree/agree)	97	0.6	1.7	-3 to 3
• Father encourages (disagree/agree)	97	0.4	1.7	-3 to 3
• Other family members encourage (disagree/agree)	98	-0.2	1.6	-3 to 3
• Health care providers encourage (disagree/agree)	98	1.3	1.4	-3 to 3
• Best friend thinks (disagree/agree)	100	-1.0	1.6	-3 to 2
• Other people my age think (disagree/agree)	101	-0.8	1.4	-3 to 2
• Mother thinks (disagree/agree)	98	0.6	1.6	-3 to 3
• Father thinks (disagree/agree)	97	0.4	1.6	-3 to 3
• Other family members think (disagree/agree)	101	0.08	1.5	-3 to 3
• Health care providers think (disagree/agree)	97	1.1	1.5	-3 to 3
• Advertisements on TV, radio, and newspaper promote (disagree/agree)	101	-0.2	0.7	-3 to 3
• Celebrities and fashion models imply (disagree/agree)	101	-1.0	1.5	-3 to 3
• Best friend (mean)	100	-1.0	1.4	
• Other people my age (mean)	101	-1.0	1.3	
• Mother (mean)	97	0.6	1.5	
• Father (mean)	96	0.4	1.5	
• Other family members (mean)	98	-1.14	1.4	
• Health care providers (mean)	97	1.2	1.3	
• Mean NB	91	0.06	1.1	
Control Beliefs				
• Even parents not provide (not at all confident/completely confident)	101	4.3	2.1	1 to 7
• Even expensive (not at all confident/completely confident)	101	3.6	2.0	1 to 7
• even sweating (not at all confident/completely confident)	101	3.6	2.0	1 to 7
• even not convenient (not at all confident/completely confident)	101	2.3	1.7	1 to 7
• Mean CB	101	3.6	1.6	

[1] Possible range is either 1 to 7 (where 1 indicates a negative response and 7 indicates a positive response to the item) or –3 to +3 (where -3 indicates a negative response and +3 indicates a positive response to the item).

For wearing long sleeved shirts (Table 5), mean responses were negative for all the intention items. Similar to wearing hats, most of the respondents neither plan to nor intend to wear long sleeved shirts in the summer sun. Overall, positive but close to neutral responses were indicated for the attitude items. Respondents generally agreed that wearing long sleeved shirts in the sun summer is healthy, good, smart, useful, and necessary, but also slightly embarrassing and unpleasant. Slightly negative mean responses were indicated for the subjective norm items; respondents slightly disagreed that the people who are important to them would approve, encourage, and think that they should wear long sleeved shirts in the summer sun. Overall, respondents reported that they have control over wearing long sleeved shirts, but they also reported that it was quite difficult for them to wear long sleeved shirts in the summer sun.

Respondents tended to agree with all the behavioral belief statements. The most positive responses were about prevention of suntan, sunburn, and skin cancer, but they also believe that wearing long sleeved shirts in the summer sun would make them feel hot and sweaty, and look different and silly. However, on the outcome evaluation scales, respondents also indicated that having a suntan would make them look good and alive. Responses to motivation to comply scales were all quite neutral. Among the normative belief scales, friends, peers, and celebrities and fashion models tended to be negative influences to the respondents. They also tended to believe that they did not have much confidence to wear long sleeved shirts in the summer sun.

T-tests were performed to determine the significance of any differences between male and female responses to the questionnaire items. For wearing shirts, these tests showed significant differences ($p > 0.05$) between genders for mean of intention,

perceived behavioral control, behavioral beliefs, and control beliefs. Males were more positive on mean of intention, perceived behavioral control and control beliefs, and less positive on mean of behavioral beliefs than females.

Table 5. Constructs of the Theory of Planned Behavior: Wearing Long Sleeved Shirt When Outdoors in the Summer Sun

Component	N	Mean	Std. Dev.	Range[1]
Behavioral Intention				
• I plan to wear shirt (unlikely/likely)	101	2.2	1.5	1 to 7
• I intend to wear shirt (none of the time/all of the time)	100	2.3	1.3	1 to 6
• Mean BI.	100	2.2	1.3	
Attitude Toward the Act				
• (dumb/smart)	96	4.2	1.9	1 to 7
• (bad/good)	95	4.6	1.3	1 to 7
• (unhealthy/healthy)	96	5.0	1.4	1 to 7
• (embarrassing/"in")	95	3.6	1.3	1 to 7
• (useless/useful)	96	4.0	1.6	1 to 7
• (unnecessary/necessary)	95	4.0	1.5	1 to 7
• (unpleasant/pleasant)	99	2.5	1.4	1 to 7
• Mean Att	92	4.0	1.1	
Subjective Norms				
• People approve (disagree/agree)	101	3.8	1.7	1 to 7
• People encourage (disagree/agree)	101	3.2	1.8	1 to 7
• People think (disagree/agree)	101	3.0	1.5	1 to 7
• Mean SN	101	3.3	1.4	
Perceived Control				
• For me to wear (difficult/easy)	101	3.6	2.2	1 to 7
• Completely up to me to wear (disagree/agree)	101	6.5	1.3	1 to 7
• How much control over wearing (very little control/complete control)	101	6.5	1.2	1 to 7
• If I want to I could easily wear (disagree/agree)	101	5.6	2.0	1 to 7
• Capable of wearing (not at all confident/completely confident)	101	5.0	2.1	1 to 7
• Mean PBC	101	5.5	1.1	

Continued...

Table 5 (Cont'd)

Component	N	Mean	Std. Dev.	Range[1]
Behavioral Beliefs				
• Make me look different from other people around me (unlikely/likely)	101	1.5	1.5	-3 to 3
• Can prevent a suntan (unlikely/likely)	101	2.0	1.2	-3 to 3
• Can prevent rashes (unlikely/likely)	101	0.9	1.5	-3 to 3
• Can prevent a sunburn (unlikely/likely)	101	2.0	1.1	-3 to 3
• Can prevent skin cancer (unlikely/unlikely)	101	1.8	1.2	-3 to 3
• Make me look silly (unlikely/likely)	101	1.2	1.8	-3 to 3
• Make me feel hot and sweaty (unlikely/likely)	101	2.5	0.8	-1 to 3
• Mean BB	101	1.7	0.8	
Outcome Evaluations				
• Preventing suntan (bad/good)	100	0.2	1.6	-3 to 3
• Preventing suntan (unhealthy/healthy)	99	1.0	1.4	-3 to 3
• Having suntan makes me look (bad/good)	101	1.8	1.0	-3 to 3
• Having a suntan makes me look (ghostly/alive)	97	1.8	1.1	-3 to 3
• Mean OE	97	1.2	0.7	
Motivation to Comply				
• Best friend (unlikely/likely)	101	-0.4	1.6	-3 to 3
• other people my age (unlikely/likely)	101	-0.3	1.7	-3 to 3
• mother (unlikely/likely)	97	-0.2	1.6	-3 to 3
• father (unlikely/likely)	97	-0.4	1.6	-3 to 3
• other family members (unlikely/likely)	99	-0.6	1.5	-3 to 3
• health care providers (unlikely/likely)	96	0.4	1.5	-3 to 3
• advertisements on TV, radio, and newspaper (unlikely/likely)	100	-0.2	1.6	-3 to 3
• celebrities and fashion models (unlikely/likely)	100	-0.5	1.7	-3 to 3
• Mean MC	94	-0.3	1.1	

Continued...

Table 5 (Cont'd)

Component	N	Mean	Std. Dev.	Range[1]
Normative Beliefs				
• Best friend encourages (disagree/agree)	101	-1.4	1.4	-3 to 2
• Other people my age encourage (disagree/agree)	101	-1.5	1.4	-3 to 2
• Mother encourages (disagree/agree)	97	-0.6	1.8	-3 to 3
• Father encourages (disagree/agree)	97	-0.7	1.8	-3 to 3
• Other family members encourage (disagree/agree)	98	-0.9	1.6	-3 to 2
• Health care providers encourage (disagree/agree)	98	0.7	1.5	-3 to 3
• Best friend thinks (disagree/agree)	101	-1.3	1.5	-3 to 2
• Other people my age think (disagree/agree)	100	-1.4	1.5	-3 to 2
• Mother thinks (disagree/agree)	99	0.7	1.8	-3 to 3
• Father thinks (disagree/agree)	98	-0.7	1.7	-3 to 3
• Other family members think (disagree/agree)	99	-1.0	1.5	-3 to 2
• Health care providers think (disagree/agree)	98	0.6	1.6	-3 to 3
• Advertisements on TV, radio, and newspaper promote (disagree/agree)	101	-0.9	1.7	-3 to 3
• Celebrities and fashion models imply (disagree/agree)	101	-1.5	1.5	-3 to 3
• Best friend (mean)	101	-1.4	1.4	
• Other people my age (mean)	100	-1.4	0.3	
• Mother (mean)	97	-0.7	1.7	
• Father (mean)	97	-0.7	1.6	
• Other family members (mean)	98	-1.0	1.4	
• Health care providers (mean)	97	0.6	1.4	
• Mean NB	93	-0.8	1.2	
Control Beliefs				
• Even expensive (not at all confident/ completely confident)	100	3.4	2.1	1 to 7
• Even sweating (not at all confident/completely confident)	101	2.3	1.7	1 to 7
• even not convenient (not at all confident/ completely confident/)	101	2.4	1.7	1 to 7
• Mean CB	100	2.7	1.6	

[1] Possible range is either 1 to 7 (where 1 indicates a negative response and 7 indicates a positive response to the item) or –3 to +3 (where -3 indicates a negative response and +3 indicates a positive response to the item).

Testing of Null Hypotheses

The construct of perceived power in the Theory of Planned Behavior was not included in this study. Responses to items related to the outcome evaluation construct were not included in data analyses because there were not evaluation items corresponding to all behavioral beliefs items. Pearson correlations and hierarchical regression analyses were performed to test the null hypotheses of this study.

For wearing shirts, typical behavior was conceptualized as past behavior, and was tested as an independent variable. Past behavior was not included in the analyses for wearing hats because respondents were asked only to report if they typically wore hats rather than 'wide brimmed hats'.

Ho_1: There are no significant relationships among past behavior and constructs of the Theory of Planned Behavior, namely: behavioral beliefs, normative beliefs, control beliefs, attitude toward the behavior, subjective norm, perceived behavioral control, and intention.

Analyses for Testing Null Hypothesis I

Wearing Hat. Table 6 shows correlations among the main constructs of the Theory of Planned Behavior and their underlying beliefs. Intention was correlated with all components in the model, except motivation to comply. Each main construct was positively correlated with its underlying beliefs, except that behavioral beliefs mean obtained without re-coding had a low and negative correlation with attitude and subjective norm was not significantly correlated with motivation to comply. However,

the re-coded behavioral beliefs mean[1] obtained had significant positive correlation with attitude.

Table 6. Pearson Correlation (R) Among Constructs (means) in the Theory of Planned Behavior for Wearing Hat

	2	3	4	5	6	7	8
1. Intention	.540**	.399**	.370**	.257* (-.266**)	.507**	.036	.285**
2. Attitude	-	.603**	.369**	.325** (-.213*)	.435**	.067	.281**
3. Subjective Norm	-	-	.166	.194 (-.193)	.554**	.148	.198*
4. Perceived Control	-	-	-	.383** (-.014)	.205	-.178	.418**
5. Behavioral Beliefs[1]	-	-	-	-	.363** (-.115)	.095 (.223*)	.238* (-.249*)
6. Normative Beliefs	-	-	-	-	-	.249*	.257*
7. Motivation to Comply	-	-	-	-	-	-	-.220*
8. Control Beliefs	-	-	-	-	-	-	-

*$p < .05$, two-tailed. **$p < .01$, two-tailed.

Note. Numbers in ( ) represent correlations calculated without re-coding the 3 individual items on the behavioral beliefs scales

[1]Behavioral beliefs mean was obtained after re-coding 3 individual items on the behavioral beliefs scales regarding looking different, looking silly and feeling hot and sweaty. Coding for these items was changed from –3 to +3 (where -3 indicates a negative response and +3 indicates a positive response to the item) to +3 to –3.

Table 7 provides correlations between each element of the directly measured main constructs and each of three intention measures. The analyses showed that the mean of attitude measures had the strongest correlations with all three intention measures, and that the strongest of these was with the intention mean. Subjective norm measures were also significantly correlated with "intend to wear hat". Of the three subjective norm measures, "people encourage" had the strongest correlation with all three intention measures. Several perceived behavioral control measures were significantly correlated with "intend to wear hat", but several were not. Of all perceived behavioral control

[1]Behavioral beliefs mean was obtained after re-coding 3 individual items on the behavioral beliefs scales regarding looking different, looking silly and feeling hot and sweaty. Coding for these items was changed from –3 to +3 (where -3 indicates a negative response and +3 indicates a positive response to the item) to +3 to –3.

measures, "for me to wear a wide brimmed hat is easy/difficult" had the strongest correlations with all three intention measures.

Table 7. Pearson Correlation (R) Between Intention and Measured Attitude, Subjective Norm, and Perceived Behavioral Control for Wearing Hat

	Intend to wear hat	Plan to wear hat	Intention Mean
Attitude Toward Wearing Hat (mean)	.479**	.476**	.540**
• (dumb/smart)	.335**	.073	.224*
• (bad/good)	.304**	.201*	.283**
• (unhealthy/healthy)	.217*	.185	.228*
• (embarrassing/"in")	.257*	.464**	.413**
• (useless/useful)	.216*	.148	.204*
• (unnecessary/necessary)	.328**	.249*	.329**
• (unpleasant/pleasant0	.267**	.441**	.403**
Subjective Norms Re Wearing Hat (mean)	.426**	.276**	.399**
• People approve (disagree/agree)	.285**	.116	.225*
• People encourage (disagree/agree)	.463**	.296**	.430**
• People think (disagree/agree)	.353**	.296**	.371**
Perceived Control Re Wearing Hat (mean)	.423**	.238*	.370**
• For me to wear (difficult/easy)	.510**	.348**	.481**
• Completely up to me to wear (disagree/agree)	.165	-.090	.035
• How much control over wearing (very little control/complete control)	.031	-.031	-.001
• If I want to I could easily wear (disagree/agree)	.217*	.029	.134
• Capable of wearing (not at all confident/completely confident)	.238*	.278**	.297**

*p < .05, two-tailed. **p < .01, two-tailed.

Most of the underlying behavioral beliefs were not correlated with the intention measures (Table 8). Of these measures, the behavioral beliefs mean was positively correlated with all three intention measures. Items regarding "make me look silly" and "make me look different from other people around me" were significantly correlated with all three intention measures and "make me look silly" had the strongest negative associations with all the intention measures. Of the normative beliefs construct, all of the normative beliefs were significantly correlated with all intention measures, except that

"health care providers" was not correlated with "plan to wear hat". Normative beliefs mean was most strongly correlated with all intention measures. Of the control beliefs construct, the mean of control beliefs was most highly correlated with "plan to wear hat" and "intention mean"; but "even if not convenient" had significant correlations with all three intention measures.

Table 8. Pearson Correlation (R) Between Intention and Behavioral Beliefs, Normative Beliefs, and Control Beliefs for Wearing Hat

	Intend to wear hat	Plan to wear hat	Intention Mean
Behavioral Beliefs Re Wearing Hat (mean)[1]	.235*	.220*	.257*
• Make me look different from other people around me (unlikely/likely)	-.277**	-.329**	-.348**
• Can prevent a suntan (unlikely/likely)	.006	-.050	-.025
• Can prevent rashes (unlikely/likely)	.014	-.061	-.027
• Can prevent a sunburn (unlikely/likely)	.012	-.110	-.057
• Can prevent wrinkled skin early in life (unlikely/likely)	-.010	-.124	-.077
• Can prevent freckles (unlikely/likely)	.050	.011	.033
• Can prevent heat stroke (unlikely/likely)	.018	-.051	-.019
• Can prevent skin cancer (unlikely/likely)	.095	-.053	.022
• Make me look silly (unlikely/likely)	-.428**	-.527**	-.543**
• Make me feel hot and sweaty (unlikely/likely)	-.139	-.248*	-.221*
Normative Beliefs Re Wearing Hat (mean)	.472**	.435**	.507**
• (best friend)	.432**	.401**	.467**
• (other people my age)	.395**	.358**	.424**
• (mother)	.312**	.309**	.360**
• (father)	.383**	.294**	.382**
• (other family members)	.363**	.423**	.452**
• (health care providers)	.338**	.168	.287**
• (advertisements on TV, radio, and newspaper)	.254*	.291**	.308**
• (celebrities and fashion models)	.255*	.238*	.277**

Continued...

Table 8 (Cont'd)

	Intend to wear hat	Plan to wear hat	Intention Mean
Control Beliefs Re Wearing Hat (mean)	.192	.304**	.285**
• even if parents not provide (not at all confident/completely confident)	.194	.261**	.263**
• even if expensive (not at all confident/completely confident)	.096	.214*	.182
• even if sweating (not at all confident/completely confident)	.130	.238*	.210*
• even if not convenient (not at all confident/completely confident)	.208*	.271**	.272**

*p < .05, two-tailed. **p < .01, two-tailed.

[1]Behavioral beliefs mean was obtained after re-coding 3 individual items on the behavioral beliefs scales regarding looking different, looking silly and feeling hot and sweaty. Coding for these items was changed from –3 to +3 (where -3 indicates a negative response and +3 indicates a positive response to the item) to +3 to –3.

The motivation to comply component was not included in further analyses because the correlation analysis showed that it was not correlated with subjective norm (Table 6). Further Pearson correlation analyses (Table 9) were performed to determine the correlations between the underlying beliefs (behavioral beliefs, normative beliefs, and control beliefs) in the Theory of Planned Behavior and their respective direct measures of attitude, subjective norm, and perceived behavioral control. Results showed that most behavioral beliefs positively but weakly correlated with the direct measure of attitude. Only those regarding looking silly and looking different had strong negative associations with attitude. The mean of the normative beliefs and all individual measures were significantly correlated with subjective norm, with "mother", "father", and the mean being the strongest correlation. Control beliefs mean and the item regarding confidence to wear hats even if parents do not provide them were correlated most strongly with perceived behavioral control.

Table 9. Pearson Correlation (R) of Underlying Beliefs with Direct Measures for Wearing Hat

Beliefs	Direct Measure[2]
Behavioral Beliefs (mean)[1]	.325*
• Make me look different from other people around me (unlikely/likely)	-.413**
• Can prevent a suntan (unlikely/likely)	.106
• Can prevent rashes (unlikely/likely)	-.050
• Can prevent a sunburn (unlikely/likely)	.090
• Can prevent wrinkled skin early in life (unlikely/likely)	.009
• Can prevent freckles (unlikely/likely)	.016
• Can prevent heat stroke (unlikely/likely)	.024
• Can prevent skin cancer (unlikely/likely)	.032
• Make me look silly (likely/unlikely)	-.522**
• Make me feel hot and sweaty (unlikely/likely)	-.196
Normative Beliefs (mean)	.554**
• (best friend)	.417**
• (other people my age)	.322**
• (mother)	.578**
• (father)	.529**
• (other family members)	.497**
• (health care providers)	.422**
• (advertisements on TV, radio, and newspaper)	.284**
• (celebrities and fashion models)	.259**
Control Beliefs (mean)	.418**
• Even if parents not provide (not at all confident/completely confident)	.540**
• Even if expensive (not at all confident/completely confident)	.344**
• Even if sweating (not at all confident/completely confident)	.194
• Even if not convenient (not at all confident/completely confident)	.263**

*p < .05, two tailed; **p < .01, two tailed

[1]Behavioral beliefs mean was obtained after re-coding 3 individual items on the behavioral beliefs scales regarding looking different, looking silly and feeling hot and sweaty. Coding for these items was changed from –3 to +3 (where -3 indicates a negative response and +3 indicates a positive response to the item) to +3 to –3.

[2] Direct measures were attitude for behavioral beliefs, subjective norm for normative beliefs, and perceived control for control beliefs.

Several hierarchical regression analyses were conducted to further examine the relationships among the constructs of the Theory of Planned Behavior. Results of the first hierarchical regression analysis (Table 10, Model 1) showed that attitude but not subjective norm explained significant variance in intention. Perceived behavioral control added approximately 4% to this explained variance. Table 10, Models 2 and 3 provide results of hierarchical regression analyses with the constructs being entered in different orders. In Model 2, attitude and perceived behavioral control were entered first in a block followed by subjective norm. These results showed that both attitude and perceived behavioral control contributed significantly to explained variance in intention, and subjective norm did not. In Model 3, subjective norm and perceived behavioral control were entered first as block followed by attitude. In this case, results showed that in the absence of the attitude construct, both subjective norm and perceived behavioral control explained significant variance in intention, but when attitude was added back in, an additional 7% of variance was explained, and subjective norm no longer contributed.

Table 10. Regression of Attitude, Subjective Norm, and Perceived Behavioral Control on Intention for Wearing Hat

Model 1

	b	R	R^2	F_{change}	p
Prediction of Intention to Wear Hat					
1. Attitude	.453**				
Subjective Norm	.157	.561	.314	20.388	.000
2. Attitude	.357**				
Subjective Norm	.177				
Perceived Control	.228*	.599	.359	6.130	.015

Continued...

Table 10 (Cont'd)

Model 2

	b	R	R^2	F_{change}	p
Prediction of Intention to Wear Hat					
1. Attitude	.466**				
Perceived Control	.217*	.582	.339	22.809	.000
2. Attitude	.357**				
Subjective Norm	.177				
Perceived Control	.228*	.599	.359	2.744	NS

Model 3

	b	R	R^2	F_{change}	p
Prediction of Intention to Wear Hat					
1. Subjective Norm	.373**				
Perceived Control	.327**	.535	.287	17.874	.000
2. Attitude	.357**				
Subjective Norm	.177				
Perceived Control	.228*	.599	.359	9.924	.002

Note. b= standardized regression coefficient; R = multiple correlation coefficient; R^2 = explained variance; NS = nonsignificant
*$p < .05$; **$p < .01$

Results of a second set of hierarchical regression analyses shows that both behavioral beliefs and normative beliefs contribute significantly to explained variance in intention (Table 11, Model 1), with control beliefs not adding significantly. It should be noted that contribution of behavioral beliefs is negative. Table 11, Models 2 and 3 provide the results of hierarchical regression analyses with the constructs being entered in different orders. In Model 2, behavioral beliefs and control beliefs were entered first in a block followed by normative beliefs. The results showed that both behavioral beliefs and control beliefs explained significant variance in intention in the absence of normative beliefs, with normative beliefs adding about 19% to this variance. In Model 3, normative beliefs and control beliefs were entered first as a block, followed by behavioral beliefs. The results showed that both normative beliefs and control beliefs explained significant variances in intention in the absence of behavioral beliefs, but when behavioral beliefs

was added back in, an additional 3% of variance was explained. Based on these models considered together, all these components may contribute to explained variance in intention, with normative beliefs followed by behavioral beliefs contributing the most.

Table 11. Regression of Behavioral Beliefs, Normative Beliefs, and Control Beliefs on Intention for Wearing Hat

Model 1

	b	R	R^2	F_{change}	p
Prediction of Intention to Wear Hat					
1. Behavioral Beliefs	-.225**				
Normative Beliefs	.483**	.555	.308	19.103	.000
2. Behavioral Beliefs	-.190*				
Normative Beliefs	.446**				
Control Beliefs	.161	.575	.331	2.939	NS

Model 2

	b	R	R^2	F_{change}	p
Prediction of Intention to Wear Hat					
1. Behavioral Beliefs	-.212*				
Control Beliefs	.268**	.381	.145	7.291	.001
2. Behavioral Beliefs	-.190*				
Normative Beliefs	.446**				
Control Beliefs	.161	.575	.331	23.595	.000

Model 3

	b	R	R^2	F_{change}	p
Prediction of Intention to Wear Hat					
1. Normative Beliefs	.456**				
Control Beliefs	.206*	.545	.297	18.165	.000
2. Behavioral Beliefs	-.190*				
Normative Beliefs	.446**				
Control Beliefs	.161	.575	.331	4.288	.041

Note. b= standardized regression coefficient; R = multiple correlation coefficient; R^2 = explained variance; NS = nonsignificant
*p < .05; **p < .01

Additional regression analyses were performed using the underlying beliefs as in the analyses shown in Table 11, but using the re-coded behavioral beliefs mean. When considering the regression model as a whole, the re-coded behavioral beliefs mean did not contribute significantly to the explained variance and normative beliefs mean was still

the strongest influence on intention. The total explained variance was lower than that shown in Table 11.

Wearing Shirt. Correlation analysis was performed to examine relationships among the main constructs of the Theory of Planned Behavior, their underlying beliefs, as well as past behavior regarding wearing shirts (Table 12). Correlation analysis indicated that all constructs in the model were correlated with intention. Subjective norm was strongly correlated with normative beliefs, however no relationships existed between attitude and behavioral beliefs (obtained without re-coding), subjective norm and motivation to comply or between perceived behavioral control and control beliefs. However, significant correlation existed between attitude and the re-coded behavioral beliefs. Past behavior was strongly correlated with all constructs of the Theory of Planned Behavior, except motivation to comply, and had a stronger correlation with intention than did any of the model's constructs.

Constructs regarding motivation to comply were not included in further analyses because correlation analysis indicated that motivation to comply was not correlated significantly with subjective norm.

Table 12. Pearson Correlation (R) Among Constructs (means) in the Theory of Planned Behavior and Past Behavior for Wearing Shirt

	2	3	4	5	6	7	8	9
1. Past Behavior	.509**	.389**	.349**	.247*	.270** (.407**)	.394**	.026	.478**
2. Intention	-	.375**	.354**	.342**	.215* (-.366**)	.440**	.206*	.303**
3. Attitude	-	-	.574**	.329**	.424** (-.146)	.474**	.036	.223*
4. Subjective Norm	-	-	-	.251*	.312** (-.243*)	.640**	.187	.166
5. Perceived Control	-	-	-	-	.263** (-.149)	.211*	-.053	.186
6. Behavioral Beliefs[1]	-	-	-	-	-	.321** (-.282**)	.063 (.000)	.295** (-.380**)
7. Normative Beliefs	-	-	-	-	-	-	.328**	.260*
8. Motivation to Comply	-	-	-	-	-	-	-	-.129
9. Control Beliefs	-	-	-	-	-	-	-	-

*p < .05, two-tailed. **p < .01, two-tailed.

Note. Numbers in ( ) represent correlations calculated without re-coding the 3 individual items on the behavioral beliefs scales

[1]Behavioral beliefs mean was obtained after re-coding 3 individual items on the behavioral beliefs scales regarding looking different, looking silly and feeling hot and sweaty. Coding for these items was changed from –3 to +3 (where -3 indicates a negative response and +3 indicates a positive response to the item) to +3 to –3.

Correlation analyses were also performed among the constructs of the Theory of Planned Behavior and past behavior of wearing long sleeved shirts in the summer sun in relation to three intention measures. A strong positive relationships existed between past behavior and all intention measures (Table 13). Of the attitude construct, attitude mean had strong correlations with both intend to wear shirt and intention mean; while "embarrassing/in" and "unpleasant/pleasant" were strongly correlated with plan to wear shirt and intention mean. The subjective norm measures were significantly correlated with intention means. Perceived behavioral control mean was highly correlated with intention to wear shirt. Of the perceived behavioral control measures, "for me to wear

long sleeved shirts is easy/difficult" was highly correlated to both intend to wear shirt and intention mean.

Table 13. Pearson Correlation (R) Between Intention and Measured Attitude, Subjective Norm, and Perceived Behavioral Control for Wearing Shirt

	Intend to wear shirt	Plan to wear shirt	Intention Mean
Past Behavior (Wear Shirt)	.536**	.379**	.509**
Attitude Toward Wearing Shirt (mean)	.411**	.280**	.375**
• (dumb/smart)	.330**	.214*	.296**
• (bad/good)	.271**	.100	.202*
• (unhealthy/healthy	.186	.065	.136
• (embarrassing/"in")	.363**	.429**	.434**
• (useless/useful)	.275**	.208*	.265**
• (unnecessary/necessary)	.318**	.173	.268**
• (unpleasant/pleasant0	.307**	.356**	.375**
Subjective Norms Re Wearing Shirt (mean)	.455**	.204*	.354**
• People approve (disagree/agree)	.381**	.210*	.320**
• People encourage (disagree/agree)	.359**	.102	.243*
• People think (disagree/agree)	.419**	.213*	.342**
Perceived Control Re Wearing Shirt (mean)	.429**	.129	.342**
• For me to wear (difficult/easy)	.577**	.341**	.547**
• Completely up to me to wear (disagree/agree)	-.071	-.379**	-.276**
• How much control over wearing (very little control/complete control)	.021	.007	.027
• If I want to I could easily wear (disagree/agree)	.180	-.073	.081
• Capable of wearing (not at all confident/completely confident)	.384**	.276**	.397**

*p < .05, two-tailed. **p < .01, two-tailed.

Among the behavioral beliefs construct (Table 14), the behavioral beliefs mean was positively correlated with "intend to wear shirt" and intention mean. Items regarding "looking silly", "looking different from other people around me", and "feeling hot and sweaty" were negatively correlated to all three intention measures. Of the normative

beliefs construct, all normative beliefs were significantly correlated with all three intention measures, except "health care providers" and "advertisements on TV, radio, and newspaper" which were not correlated with either "plan to wear shirt" or "intention mean". The normative beliefs mean was most strongly correlated with all intention measures. Of the control beliefs construct, control beliefs mean and "even if sweating" were correlated with all three intention measures.

Table 14. Pearson Correlation (R) Between Intention and Behavioral Beliefs, Normative Beliefs, and Control Beliefs for Wearing Shirt

	Intend to wear shirt	Plan to wear shirt	Intention Mean
Behavioral Beliefs Re Wearing Shirt (mean)[1]	.208*	.196	.215*
• Make me look different from other people around me (unlikely/likely)	-.317**	-.325**	-.389**
• Can prevent a suntan (unlikely/likely)	-.145	-.153	-.176
• Can prevent rashes (unlikely/likely)	-.031	.047	.032
• Can prevent a sunburn (unlikely/likely)	-.093	-.143	-.143
• Can prevent skin cancer (unlikely/likely)	.022	-.256**	-.099
• Make me look silly (unlikely/likely)	-.362**	-.261**	-.359**
• Make me feel hot and sweaty (unlikely/likely)	-.206*	-.275**	-.306**
Normative Beliefs Re Wearing Shirt (mean)	.521**	.274**	.440**
• (best friend)	.422**	.221*	.355**
• (other people my age)	.461**	.257*	.396**
• (mother)	.436**	.242*	.376**
• (father)	.463**	.232*	.383**
• (other family members)	.422**	.271**	.385**
• (health care providers)	.213*	.013	.120
• (advertisements on TV, radio, and newspaper)	.258**	.086	.187
• (celebrities and fashion models)	.272**	.228*	.280**

Continued...

Table 14 (Cont'd)

	Intend to wear shirt	Plan to wear shirt	Intention Mean
Control Beliefs Re Wearing Shirt (mean)	.280**	.205*	.303**
• Even if expensive (not at all confident/completely confident)	.262**	.178	.284**
• Even if sweating (not at all confident/completely confident)	.293**	.233*	.329**
• Even if not convenient (not at all confident/completely confident)	.155	.169	.199*

*$p < .05$, two-tailed. **$p < .01$, two-tailed.

[1]Behavioral beliefs mean was obtained after re-coding 3 individual items on the behavioral beliefs scales regarding looking different, looking silly and feeling hot and sweaty. Coding for these items was changed from –3 to +3 (where -3 indicates a negative response and +3 indicates a positive response to the item) to +3 to –3.

Further correlation analyses were conducted to provide greater understanding of relationships between underlying beliefs and their direct measures, as well as past behavior (Table 15). Of the behavioral belief components, behavioral beliefs mean was positively correlated with attitude and past behavior. Components regarding looking silly, feeling hot and sweaty, looking different, and preventing a suntan had negative correlations with both attitude toward wearing shirts and past behavior. Of the normative beliefs construct, all components were significantly correlated with subjective norm and past behavior, except "health care providers" was not correlated with past behavior. Normative beliefs mean and several individual items (mother, father, and other family members) were strongly correlated with subjective norm, while mother, father and other people of my age were strongly correlated with past behavior. No control belief measures were correlated with perceived behavioral control, but all correlated significantly with past behavior.

Table 15. Pearson Correlation (R) of Underlying Beliefs with Direct Measure and Past Behavior for Wearing Shirt

Beliefs	Direct Measure[2]	Past Behavior (wear shirt)
Behavioral Beliefs (mean)[1]	.424**	.270**
• Make me look different from other people around me (unlikely/likely)	-.288**	-.316**
• Can prevent a suntan (unlikely/likely)	-.078	-.211*
• Can prevent rashes (unlikely/likely)	.131	.043
• Can prevent a sunburn (unlikely/likely)	.254*	-.097
• Can prevent skin cancer (unlikely/likely)	.271**	.014
• Make me look silly (unlikely/likely)	-.369**	-.499**
• Make me feel hot and sweaty (unlikely/likely)	-.334**	-.251*
Normative Beliefs (mean)	.640**	.394**
• (best friend)	.505**	.349**
• (other people my age)	.484**	.390**
• (mother)	.639**	.398**
• (father)	.604**	.414**
• (other family members)	.642**	.343**
• (health care providers)	.375**	-.015
• (advertisements on TV, radio, and newspaper)	.468**	.268**
• (celebrities and fashion models)	.406**	.312**
Control Beliefs (mean)	.186	.478**
• even expensive (not at all confident/completely confident)	.168	.387**
• even sweating (not at all confident/completely confident)	.174	.429**
• even not convenient (not at all confident/completely confident)	.109	.432**

*p < .05, two tailed; **p < .01, two tailed

[1]Behavioral beliefs mean was obtained after re-coding 3 individual items on the behavioral beliefs scales regarding looking different, looking silly and feeling hot and sweaty. Coding for these items was changed from –3 to +3 (where -3 indicates a negative response and +3 indicates a positive response to the item) to +3 to –3.

[2] Direct measures were attitude for behavioral beliefs, subjective norm for normative beliefs, and perceived control for control beliefs.

Results of the first hierarchical regression analysis (Table 16, Model 1) showed that attitude but not subjective norm explained significant variance in intention. Perceived behavioral control added approximately 11% to explained variance. However, when past behavior was entered as the third block to the model, an additional 10% of variance was explained and attitude no longer contributed to the explained variance. Table 16, Models 2 and 3 provide the results of hierarchical regression analyses with the constructs being entered in different orders. In Model 2, attitude and perceived behavioral control were entered first in a block, followed by subjective norm, and finally past behavior. The results showed that in the absence of subjective norm, both attitude and perceived behavioral control contributed significantly to the explained variance in intention, and subjective norm did not contribute significantly to the explained variance when added back in the model. The explained variance increased by about 10% when past behavior was added as the third block to this model. In Model 3, subjective norm and perceived behavioral control were entered first as a block, followed by attitude. The results showed that in the absence of attitude, both subjective norm and perceived behavioral control explained significant variance in intention. When added to the model, attitude did not contribute significantly to explained variance. As above, the explained variance increased by about 10% when past behavior was added as the third block to the model.

Table 16. Regression of Attitude, Subjective Norm, Perceived Behavioral Control, and Past Behavior on Intention for Wearing Shirt

Model 1

	b	R	R^2	F_{change}	p
Prediction of Intention to Wear Shirt					
1. Attitude	.252*				
Subjective Norm	.197	.408	.167	8.899	.000
2. Attitude	.179				
Subjective Norm	.138				
Perceived Control	.357**	.527	.278	11.292	.000
3. Attitude	.095				
Subjective Norm	.101				
Perceived Control	.257**				
Past Behavior (Wear Shirt)	.354**	.611	.374	12.975	.000

Model 2

	b	R	R^2	F_{change}	p
Prediction of Intention to Wear Shirt					
1. Attitude	.252**				
Perceived Control	.374**	.515	.266	16.086	.000
2. Attitude	.179				
Subjective Norm	.138				
Perceived Control	357**	.527	.278	11.292	.000
3. Attitude	.095				
Subjective Norm	.101				
Perceived Control	.257**				
Past Behavior (Wear Shirt)	.354**	.611	.374	12.975	.000

Model 3

	b	R	R^2	F_{change}	p
Prediction of Intention to Wear Shirt					
1. Subjective Norm	.231*				
Perceived Control	.388**	.507	.257	15.428	.000
2. Attitude	.179				
Subjective Norm	.138				
Perceived Control	.357**	.527	.278	11.292	.000
3. Attitude	.095				
Subjective Norm	.101				
Perceived Control	.257**				
Past Behavior (Wear Shirt)	.354**	.611	.374	12.975	.000

Note. b= standardized regression coefficient; R = multiple correlation coefficient; R^2 = explained variance; NS = nonsignificant

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

Results of the second set of hierarchical regression analyses showed that both behavioral beliefs and normative beliefs contributed significantly to explained variance in intention, with control beliefs not adding significantly (Table 17, Model 1). It should be noted that the contribution of behavioral beliefs is negative. Table 17, Models 2 and 3 show the results of hierarchical regression analyses with the constructs being entered in different orders. In Model 2, behavioral beliefs and control beliefs were entered first in a block followed by normative beliefs. The results showed that in the absence of normative beliefs, both behavioral beliefs and control beliefs explained significant variance in intention. When added to the model, normative beliefs added about 11% to explained variance and control beliefs no longer contributed. In Table 16, Model 3, normative beliefs and control beliefs were entered first as a block followed by behavioral beliefs. The results showed that in the absence of behavioral beliefs, both normative beliefs and control beliefs explained significant variance in intention, when added to the model, behavioral beliefs added about 3% to explained variance and control beliefs no longer contributed.

Additional regression analyses were performed using the underlying beliefs as in the analyses shown in Table 17, but using the re-coded behavioral beliefs mean. When considering the regression model as a whole, behavioral beliefs still did not contribute significantly to the explained variance and normative beliefs had the strongest influence on intention. The total explained variance is lower than that shown in Table 17.

Table 17. Regression of Behavioral Beliefs, Normative Beliefs, and Control Beliefs on Intention for Wearing Shirt

Model 1

	b	R	R^2	F_{change}	p
Prediction of Intention to Wear Shirt					
1. Behavioral Beliefs	-.260**				
Normative Beliefs	.378**	.520	.271	16.343	.000
2. Behavioral Beliefs	-.201*				
Normative Beliefs	.353**				
Control Beliefs	.162	.540	.292	2.600	NS

Model 2

	b	R	R^2	F_{change}	p
Prediction of Intention to Wear Shirt					
1. Behavioral Beliefs	-.286**				
Control Beliefs	.220*	.427	.182	9.803	.000
2. Behavioral Beliefs	-.201*				
Normative Beliefs	.353**				
Control Beliefs	.162	.540	.292	13.491	.000

Model 3

	b	R	R^2	F_{change}	p
Prediction of Intention to Wear Shirt					
1. Normative Beleifs	.396**				
Control Beliefs	.233*	.510	.260	15.481	.000
2. Behavioral Beliefs	-.201*				
Normative Beliefs	.353**				
Control Beliefs	.162	.540	.292	3.899	.051

Note. b= standardized regression coefficient; R = multiple correlation coefficient; R^2 = explained variance; NS = nonsignificant

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

In a third set of hierarchical regression analyses, the results showed that behavioral beliefs and normative beliefs explained significant variance in intention, with past behavior adding 11% to this variance (Table 18, Model 1). In another analysis (Model 2), both behavioral beliefs and normative beliefs explained significant variances in intention, with control beliefs and past behavior together adding about 13% to explained variance.

Additional regression analyses were performed similar to analyses shown in Table 18, both using the re-coded behavioral beliefs mean. Results showed that the total explained variance was lower than shown in Table 18.

Table 18. Regression of Underlying Beliefs and Past Behavior on Intention for Wearing Shirt

Model 1

	b	R	R^2	F_{change}	p
Prediction of Intention to Wear Shirt					
1. Behavioral Beliefs	-.296**				
Normative Beliefs	.357**	.523	.274	16.778	.000
2. Behavioral Beliefs	-.162				
Normative Beliefs	.236**				
Past Behavior (Wear Shirt)	.395**	.623	.388	18.618	.000

Model 2

	b	R	R^2	F_{change}	p
Prediction of Intention to Wear Shirt					
1. Behavioral Beliefs	-.260**				
Normative Beliefs	.378**	.520	.271	16.343	.000
2. Behavioral Beliefs	-.097				
Normative Beliefs	.257**				
Control Beliefs	.008				
Past Behavior (Wear Shirt)	.429**	.636	.405	14.629	.000

Note. b= standardized regression coefficient; R = multiple correlation coefficient; R^2 = explained variance; NS = nonsignificant
*p < .05; **p < .01

Ho_2: There are no significant differences in the Theory of Planned Behavior between students from the Aspen area and the respondents from the internet.

Analysis for Testing Null Hypothesis II

T-tests were performed to determine if there were significant differences between responses for two samples. There were significant differences between responses collected from the in-school and the internet surveys for some of the components in the

Theory of Planned Behavior for wearing both hats and shirts. However, because of the large difference in the number of respondents between the two samples, no generalizations or assumptions can be drawn from the results. Because the number of respondents in the internet portion of the study was so small, no further analyses were performed on the internet survey data.

CHAPTER 5

DISCUSSION

Using the Theory of Planned Behavior as the conceptual framework, the primary goals of this study were to determine the intended behavior of the adolescent population toward sun protection, especially the wearing of wide brimmed hats and long sleeved shirts, as well as antecedents to their use. The secondary goal of this study was to investigate the feasibility of the internet as a survey tool for such research.

The Survey Process

Overall, there was a low response in this study. One major reason for low responses for both in-school and internet portions of the survey may have been because the survey was conducted in late fall and early winter, internet respondents and teachers may not have found the subject to be relevant to them at that time. For the in-school survey, teachers might not have wanted to contribute time for the survey in the middle of the school term. Although classes were selected from both health and CALM classes, teachers might not have thought that the research subject matched their class syllabus. Also, several students who failed to obtain parental consent could not participate in this study. In addition to the issue of the low response rate, all respondents were from farming communities in Alberta. This sample bias must be taken into account in interpreting the results of the present study.

For the internet portion of the survey, the length of questionnaire was an important issue. There were over one hundred visitors to the survey web-site. However,

only thirteen people responded to the questionnaire. Of these, two were over the age of nineteen and resided outside of Canada. Internet respondents were given the choice to answer either the first part or the entire questionnaire. Only two respondents completed both parts of the questionnaire. This low completion rate suggests that the questionnaire was too long for internet users, especially teenagers. The computer system that the respondent used might have affected the download time of the questionnaire. Lengthy download times through slow connections could have been a major factor keeping respondents from looking at and completing the questionnaire. In addition, there were no incentives given to internet respondents to complete the questionnaire, likely contributing to the low response rate. Most respondents participated either through requests from friends, or because of a personal interest in health issues. Therefore, this selection bias has to be taken into account when comparing this sample to others.

Typical Sun Protection Behavior

The **first objective** of this study was *to determine adolescents' reported behavior regarding sun protection in general.* Overall, respondents were less likely to typically wear long sleeved shirts in the sun than to wear sunscreens, hat, or sunglasses. This reflects what respondents reported on the behavioral beliefs scales, that wearing long sleeved shirts in the summer sun would make them feel much hotter and sweatier and look more different from other people around them than would wearing wide brimmed hats. Generally speaking, long sleeved shirts can provide better sun protection than sunscreens, wide brimmed hats or sunglasses, but the comfort and appearance related beliefs reported by the respondents regarding wearing long sleeved shirts weighed against the benefits of their use. Teenagers tend to conform to their peers to reduce anxiety and

gain social acceptance by expressing their ability to identify with peers (Kaiser, 1997). They may also show their ability to identify with the referents through wearing the same dress (Sterm, 1985). Adolescents perceive that it is not "cool" to cover-up (Heidorn, 1996). They might want to conform to their peers and look "cool" to them to gain acceptance through not covering up by wearing long sleeved shirts.

Although respondents reported that they typically wore hats when out in the summer sun, almost all of them reported that they wore baseball caps instead of hats which would provide more sun protection, such as wide brimmed hats. Although results of this study regarding gender differences were not significant, the trend noted concur with findings from studies of Cody and Lee (1990), Carmel et al. (1994), and Heidorn, (1996), who found associations between sun exposure protective behavior and gender, and thus such differences should be taken into consideration when designing both health promotional and educational programs regarding sun protection and teenagers. Our results also concur with Cody and Lee's study, who found that females were more likely to use sunscreens than males.

Overall, the results showed that respondents were more likely to have seen, heard, or read information from television and magazines than from school, radio, and doctors. This result is in accordance with prior studies that conclude media were major influences on teenagers (Easey, 1995), and that television was an information source for teenagers for the fashionable and popular (Power, 1991). Although media such as television was identified as a way to reach teenagers, selection of television programs also plays an important role when reaching teenagers, as Tootelian and Gaekeke (1992) indicated that teenagers, especially boys, do not tend to watch prime-time television. Also, in recent

years, more teenagers spend more time on the internet than with television (Cohen, 1996), internet brings the newest trends to teenagers faster and easier, and becomes one medium to reach them.

The Theory of Planned Behavior

Objectives two to four of this study addressed the operationalization and applicability of the Theory of Planned Behavior. The **second objective** of this study was *to determine adolescents' beliefs, attitudes, and intended behavior toward the use of clothing such as wide brimmed hats and long sleeved shirts as sun protection agents.* Intentions to wear both wide brimmed hats and long sleeved shirts in the summer sun were negative, but generally, respondents had less negative intention to wear wide brimmed hats than long sleeved shirts in the summer sun. This also reflected the behavioral beliefs results wherein respondents reported more positive beliefs about wearing wide brimmed hats than long sleeved shirts in the summer sun. They reported that wearing long sleeved shirts would make them feel much hotter and sweatier and look more different from other people around them than would wearing wide brimmed hats. Respondents' interpretation of the wording used in the items related to the intention construct (i.e. "plan" and "intend") might possibly have affected the responses.

Overall, respondents held more positive attitudes toward wearing wide brimmed hats than long sleeved shirts when out in the summer sun, with the exception that they thought wearing wide brimmed hats would be slightly more embarrassing than wearing long sleeved shirts. For both behaviors, respondents gave especially negative responses on the two attitudinal scales: "pleasant/unpleasant" and "in/embarrassing". The respondents might have identified these two items as different concepts from the rest of

the items on the attitudinal scale. It seems they thought that it would be smart, good, healthy, useful, and necessary to wear wide brimmed hats and long sleeved shirts in the sun from the health point of view. However, they likely felt it was unpleasant to wear such items in the summer sun because of heat and perspiration, or because it made them look different from their referents. If the last assumption was true, pleasantness might be related to embarrassing, or not "in".

Respondents tended to believe that wearing long sleeved shirts was more likely than wearing wide brimmed hats to prevent them from getting suntans, sunburn, skin cancer and rashes. However, they also believed that wearing long sleeved shirts would make them feel much hotter and sweatier and look more different from other people around them than would wearing wide brimmed hats. These beliefs were related to the two attitudinal scales ("pleasant/unpleasant" and "in/embarrassing") which the respondents rated the most negatively. In general, respondents acknowledged and held beliefs about the benefits of wearing wide brimmed hats and long sleeved shirts in the summer sun. However, beliefs such as feeling hot and sweaty, especially in the case of wearing long sleeved shirts, might prevent respondents from acting out their health-related beliefs.

It is also interesting to note that respondents held contradictory opinions regarding having suntans. They had positive attitude towards wearing wide brimmed hats and long sleeved shirts in the summer sun, and they generally believed that wearing such items could prevent them from getting suntans. However, they also evaluated having suntan as making them look good and alive. The sense of looking healthy and alive associated with

having suntans might also negate their positive attitudes toward protecting themselves from the harmful sun.

For the subjective norm scales, respondents tended to think that people who are important to them would be somewhat likely to approve, encourage, and think that they should wear wide brimmed hats, but were unlikely to do so for wearing long sleeved shirts when out in the summer sun. For the two antecedents of subjective norm, motivation to comply and normative beliefs, responses about wearing wide brimmed hats and long sleeved shirts were close to neutral. Overall, respondents indicated they did not believe that their referents would think or encourage them to wear wide brimmed hats and long sleeved shirts in the summer sun. They also had the tendency of not wanting to comply with these referents. With respect to wearing long sleeved shirts in the summer sun, best friends, other people their age, and other family members were indicated as more negative influences compared to other referents identified on the normative beliefs scales. A possible explanation of the close to neutral responses is that respondents might not have such normative beliefs and they might not know if they would comply with their referents. Another possible explanation of the responses is that the respondents might not know what the different referents think. These results were consistent, however, with some responses from the focus group studies where respondents indicated that they would wear what they like regardless of how others think. Furthermore, the idea of individualism or "be yourself" seemed to be a message conveyed among the teen culture. On the other hand, it might be that respondents comply unconsciously with social norms but do not recognize or admit such compliance.

Examination of perceived behavioral control components indicated that respondents held more positive perceptions of the ease of succeeding in wearing wide brimmed hats than for wearing long sleeved shirts in the summer sun. They strongly agree that it was completely up to them and that they had almost complete control over wearing wide brimmed hats and long sleeved shirts in the summer sun. They also strongly agree that, if they wanted to, they could easily wear wide brimmed hats and long sleeved shirts in the summer sun. For both behaviors under investigation, however, beliefs held toward the control over wearing wide brimmed hats and long sleeved shirts were low. Subjects from our focus group studies mentioned that they might want to wear sun protection but sometimes they could not find the items available or have time to put on sun protection. At other times, they did not expect to go out in the sun when they dressed. The perceived control construct might not be as good an indicator of intention to wear wide brimmed hats or long sleeved shirts as it is for other behaviors such as cancer preventive measures and regular exercising. This is because people generally have such clothing items at home, they are available on the market at reasonable prices, and people are capable of wearing them if they want to.

The **third objective** of this study was *to identify and measure relationships among the elements of the Theory of Planned Behavior (behavioral beliefs, normative beliefs, control beliefs, attitudes, subjective norm, perceived behavioral control, and intention) relative to wearing clothing items as protection from ultraviolet radiation.* Among the main constructs, findings of this study showed that significant relationships existed among some elements in the model. For wearing hats, constructs of the model were significantly correlated to each other, except that subjective norm was not correlated

significantly with perceived behavioral control. The strongest correlation existed between attitude and subjective norm. For wearing shirts, constructs of the model were positively correlated to each other. The strongest correlation also existed between attitude and subjective norm.

For both behaviors, results showed that influence of others and their expectations (subjective norm) had a strong association with respondents' own attitude toward the consequences of performing the behavior (attitude component). Subjective norm played an important role in influencing attitude for wearing hats, and thus, also had an indirect influence on intention. The findings were consistent with those of Ajzen and Fishbein (1981), who suggested a definite relationship between the attitude and subjective norm components. They stated that subjective norm and attitude are two distinct but related components. While subjective norm and attitude are two independent components derived from different sets of beliefs, it is still possible for a single belief to affect both components simultaneously, as subjective norm likely affects intention through attitude.

The relationship between attitude and subjective norm might also be explained by other psychology-related literature which suggests that parents, peers, and media are major agents in the socialization process through which adolescents learn attitudes, values, and motives to conform to societal expectations through interaction with others (Sproles & Burns, 1989). Therefore, teenagers are likely to learn their attitudes from socialization agents or people who are important to them (subjective norm), thus causing the formation of positive or negative attitudes toward wearing wide brimmed hats and long sleeved shirts.

The Theory of Planned Behavior proposes that the beliefs underlying the main constructs (attitude, subjective norm, and perceived behavioral control) are behavioral beliefs, normative beliefs, and control beliefs respectively. Associations should exist between the main components and their underlying beliefs. For both behaviors under investigation, the relationships between subjective norm and normative beliefs were the strongest. For wearing hats, there were significant relationships between attitude and behavioral beliefs, between subjective norm and normative beliefs, and between perceived behavioral control and control beliefs. For wearing shirts, however, significant correlations existed only between attitude and behavioral beliefs and between subjective norm and normative beliefs, but not between perceived behavioral control and control beliefs. This might be because we did not capture all the relevant control beliefs.

Among the underlying beliefs regarding wearing hats, components correlated significantly with each other. The strongest correlation existed between the normative beliefs and intention. Among the underlying beliefs for wearing shirts, all components correlated to each other significantly. The strongest correlation also existed between the normative beliefs and intention. These findings suggest that normative beliefs especially regarding peers play a very important role in teenagers' intention to wear wide brimmed hat and long sleeved shirts in the summer sun and may be a better measure than subjective norm in capturing the important normative influence.

For both behaviors, stronger correlations existed between intention and attitude than between intention and the underlying behavioral beliefs. It is not surprising that the attitudes captured in this study did not necessarily reflect all of the behavioral beliefs identified.

The **fourth objective** of this study was *to determine the predictive power of the constructs of the Theory of Planned Behavior through regression analysis*. Hierarchical regression analyses were performed to determine what portion of the variance in intention could be explained by: (a) attitude, subjective norm, perceived behavioral control and past behavior; and (b) behavioral beliefs, normative beliefs, and control beliefs, and past behavior.

According to the Theory of Planned Behavior, attitude, subjective norm, and perceived behavioral control may be measured either directly, or each concept is broken down into its components and an indirect measure is calculated. The components used for calculating attitude are behavioral beliefs and outcome evaluations; the components used for calculating subjective norm are normative beliefs and motivation to comply; and the components used for calculating perceived behavioral control are control beliefs and perceived power. In the present study, the indirect measures were not calculated or used in the hierarchical regression analyses. Regarding the calculated attitude component, because of the "motherhood" nature of some questions relating to outcome evaluations, they were not included in the questionnaire. Likewise, for the perceived behavioral control component, the perceived power component was not measured; therefore no calculated measurement was obtained. For the subjective norm component, the direct measurements of subjective norm accounted for more variance in intention than the calculated measures and the motivation to comply measures were not significantly correlated with the subjective norm component; therefore, only the normative beliefs component was used in the hierarchical regression analyses. This might suggest that subjective norm is not necessarily the result of normative beliefs multiplied with

motivation to comply as claimed by Fishbein and Ajzen. Rather, the normative beliefs by themselves contribute most to the subjective norm.

Results of the present study suggest that for wearing hats, attitude provides the largest influence on intention, with some contribution from the perceived behavioral control component. Among the main components of the model, attitude and perceived behavioral control were direct determinants of intention. Underlying normative beliefs and behavioral beliefs regarding looking silly and looking different were also found to be determinants of intention, with normative beliefs having the strongest predictive power.

For wearing shirts, the perceived behavioral control component provided the larger influence on intention, with a smaller contribution from the attitude component, suggesting that both perceived behavioral control and attitude are direct determinants of intention. Again, two underlying beliefs (behavioral beliefs and normative beliefs) were found to be determinant of intention, with normative beliefs having the strongest predictive power. When taking past behavior into account, results showed that past behavior provided the strongest influence on intention. This finding concurs with other studies, (Bentler and Speckart, 1979; Crosby and Muehling, 1982; and Fredricks & Dossett, 1983), which found that external variables, such as past behavior, age, and gender, have direct link to behavior and behavioral intention, contradicting the claim of Ajzen and Fishbein (1980) that such external variables should be captured in the main constructs of the model.

For both behaviors under investigation, normative beliefs tended to capture the normative influences on intention much better than the main construct, subjective norm, did. This might be because the items related to the normative beliefs construct ask more

specific questions regarding what respondents' referents would think about wearing wide brimmed hats and long sleeved shirts in the summer sun than the items related to subjective norm. In addition, the two behavioral beliefs regarding looking silly or different reflect a normative component.

For both wearing wide brimmed hats and long sleeved shirts, all the regression analyses showed that the total explained variances obtained using the behavioral beliefs mean calculated after re-coding 3 individual items regarding looking silly and different, and feeling hot and sweaty was lower than the total explained variances obtained using the behavioral beliefs mean without re-coding. This suggests that the "negative" beliefs contributed significant influence on intention.

Furthermore, the total explained variances for both behaviors in this study were relatively low. As indicated by Ajzen who suggested that The Theory of Planned Behavior appears to be more appropriate for predicting single instances of behavior such as voting in an election and donating blood, rather than for multiple or repeated instances of behavior. As both wearing wide brimmed hats and long sleeved shirts in the summer sun are habitual or repeated behaviors, rather than single instance behavior, this might explain the relatively low explained variances found in this study. Reference groups were important influences for teenagers, therefore, normative beliefs were found to be the strongest predictor of respondents' intention regarding their use of wide brimmed hats and long sleeved shirts in the summer sun.

In-School vs. Internet Surveys

The **fifth objective** of this study was *to compare the results of a traditional in-school survey and an internet survey.* Because the response rate of the internet portion of

the study was very low, and differences existed between responses to the in-school survey and those to the internet survey, no further analyses were conducted on the data from the internet. It seems that the traditional means of measuring the constructs of the Theory of Planned Behavior are not appropriate for a survey of teenagers via the internet.

CHAPTER 6

SUMMARY, CONCLUSIONS & RECOMMENDATIONS

Summary

The primary purpose of this study was to determine the sun protection behavior of the adolescent population, especially the intended behavior of adolescents relative to the use of clothing items such as wide brimmed hats and long sleeved shirts as protection from ultraviolet radiation; and the antecedents to their use. A secondary purpose was to investigate the feasibility of the internet as a survey tool for such research. The Theory of Planned Behavior was used in this research.

A questionnaire was developed consisting of 100 items based on results of focused group interviews and used to measure the constructs in the Theory of Planned Behavior, and 17 items relating to variables external to this model. Items measuring the constructs of the model were Likert-type scales, while the external variables were measured by multiple-choice type and open-ended questions. For the in-school survey, the questionnaires were administered during class time to 101 teenaged respondents studying in grades 9 to 12 in schools in the region served by Aspen Health Services. For the internet survey, 11 teenaged respondents completed either Part I or both parts of the questionnaire.

Data analyses were conducted using the SPSS package. Hierarchical regression analyses, Pearson product moment correlations, and t-tests were used to test the null hypotheses.

Variables external to the model were expected to contribute to the understanding of respondents' intention regarding use of sun protection. There tended to be both gender and age differences in employment of sun protection and information received about risks of excessive sun exposure from various information sources, however these differences were not significant.

In the Theory of Planned Behavior, the three determinants of intention are attitude, subjective norm, and perceived behavioral control. According to the theory, these components are measured directly, but can also be separated into two further components which are first measured and then multiplied together, and summed. In this study, we did not obtain the calculated measures. Overall, a positive attitude was indicated towards wearing wide brimmed hats and long sleeved shirts in the summer sun. Respondents weakly agreed that most people who are important to them would think they should wear wide brimmed hats in the summer sun, but slightly disagreed that these people would think they should wear long sleeved shirts in the summer sun. In general, they perceived that they have control over wearing such items in the summer sun.

Most of the respondents reported negative intentions toward wearing wide brimmed hats and long sleeved shirts in the summer sun. For wearing hats, all three main constructs in the model were significantly correlated with intention, with attitude being the strongest. Hierarchical regression analyses indicated that attitude, subjective norm and perceived control together explained 36% of the variance, with attitude and subjective norm contributing the most to this model. All three types of underlying beliefs correlated significantly with intention. Behavioral beliefs, normative beliefs, and control beliefs together explained 33% of the variance in intention, with normative beliefs

contributing the most, followed by behavioral beliefs. For wearing shirts, only attitude and perceived behavioral control correlated significantly with intention. Attitude, subjective norm, and perceived behavioral control together explained 28% of the variance, with perceived behavioral control contributing the most to explained variance. Of the beliefs components, only behavioral beliefs and normative beliefs correlated significantly with intention. Behavioral beliefs, normative beliefs, and control beliefs together contributed about 29% to the explained variance in intention, with normative beliefs followed by behavioral beliefs contributing the most. Past behavior of wearing long sleeved shirts, which is external to the model, had a stronger influence on intention than did any of the model's constructs, however.

Conclusions

The first objective was to determine adolescents' reported behavior regarding sun protection in general. Overall, respondents were less likely to wear long sleeved shirts than to use sunscreens, hats, or sunglasses when out in the summer sun.

The second objective was to determine adolescents' beliefs, attitudes, and intended behavior toward the use of clothing such as wide brimmed hats and long sleeved shirts as sun protection agents. Although respondents generally had positive health-related beliefs and attitudes towards the use of clothing as sun protection agents, their intention of using such items was negative, reflecting negative appearance and comfort-related beliefs

The third objective was to identify and measure relationships among the elements of the Theory of Planned Behavior (behavioral beliefs, normative beliefs, control beliefs, attitudes, subjective norm, perceived behavioral control, and intention) relative to

clothing as protection from ultraviolet radiation. Overall, it appears strong associations existed between attitude and intention, between normative beliefs and intention, and between attitude and subjective norm regarding wearing wide brimmed hats and long sleeved shirts in the summer sun.

The fourth objective of this study was to determine the predictive power of the constructs of the Theory of Planned Behavior through regression analysis. In the study, not all constructs of the model were direct determinants of intention to wear wide brimmed hats and long sleeved shirts in the summer sun. Subjective norm and control beliefs did not contribute to the explained variance for either behavior under investigation. Normative beliefs were found to have much stronger influence on intention than subjective norm, as did behavioral beliefs related to looking silly or different. The two behavioral beliefs regarding looking silly or different also reflect a normative component. Furthermore, past behavior, which is external to the model, had a large direct influence on intention regarding wearing long sleeved shirts in the summer sun.

The fifth objective was to determine and compare the results of the traditional in-school survey and the internet survey. The small number of respondents to the internet survey indicated that it might not be feasible to conduct such survey on the internet without modification of the instruments. Results of t-test analyses led to the conclusion that significant differences existed between the two samples on some of the constructs of the Theory of Planned Behavior, but the overall number of internet respondents suggested that any such conclusion must be tentative.

Implications for Health Promotion

Education about the risk of excessive sun exposure and the importance of using sun protection should be increased in schools. Appearance and comfort related beliefs were found to be major barriers to wearing wide brimmed hats and long sleeved shirts as sun protection for teenagers. Peers were found to be negative normative influences regarding the use of such items as sun protection for teenagers. Health promotion and educational programs should address the barriers found in this study regarding the use of sun protection clothing items and be directed at convincing teenagers that wearing such items is fashionable, "in" or "cool", or at least acceptable to their important referents.

The Theory of Planned Behavior suggests that behavioral change is ultimately the result of changes in beliefs. Therefore, educational programs should address relevant beliefs. Different health promotion and educational programs should also be designed to target different ages and genders. Cookburn et al (1989) and Carmel et al (1993) indicated that adolescents are most unlikely to change their behavior. However, one way to decrease barriers such as the sense of looking different and silly when wearing sun protection items is to have children start to wear such items when they are much younger. More fashionable sun protection clothing items could also increase the likelihood for teenagers to wear them without feeling different and silly from their important referents. What is 'fashionable' at any given time for the teenage population, however is likely to change rapidly.

Recommendations for Future Research

1. A larger survey sample size would provide more statistically representative results.

2. In order to examine how well intention predicts actual behavior, future research should measure respondents' intention regarding the use of sun protection before the summer, and then measure behavior during and soon after the summer.
3. Modification of the instruments used is needed. The questionnaire was too long for teenaged respondents to complete. This was a particularly important issue for the internet survey. Length of questionnaire, interactive designs, and download time could be taken into consideration when designing for another internet survey. The questionnaire could be shortened by only including items related to the key constructs, and by focusing on one behavior rather than two as in this study. Less traditional measures of the constructs must be developed to help shorten the questionnaire and to increase the interests of teenage respondents. Control over the kind of computer system and internet connection respondents use is unlikely; however, better design of the survey web-site could decrease the download time and attract respondents completing the questionnaire.
4. The effectiveness of current educational programs for teenagers related to sun protection need to be evaluated and such programs modified, taking into account the findings of this study.

References

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

Ajzen, I. (1988). Attitudes, personality, and behavior. Chicago: Dorsey Press.

Ajzen, I. (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50, 179-211.

Ajzen, I., & Fishbein, M. (1980). Understanding attitudes and predicting social behavior. Englewood Cliffs, NJ: Prentice-Hall.

Ajzen, I., & Madden, T.J. (1986). Prediction of goal-directed behavior: Attitudes, intentions and perceived behavioral control. Journal of Experimental Social Psychology, 22, 453-474.

Armstrong, H.K., & Kricker A. (1993). How much melanoma is caused by sun exposure? Melanoma Research, 3, 395-401.

Bandura, A. (1977a). Social learning theory. Englewood Cliffs, N.J.: Prentice-Hall.

Bandura, A. (1977b). Self-Efficacy: Toward a unifying theory of behavior change. Psychological Review, 84, 191-215.

Bandura, A. (1986). Social foundations of thought and action. Englewood Cliffs, N.J.: Prentice-Hall.

Banks, B.A., Silverman, R.A., Schwartz, R.H., & Tunnesen, W.W. (1992). Attitudes of teenagers toward sun exposure and sunscreen use. Pediatrics, 89, 40-42.

Bentler, P.M., & Speckart, G. (1979). Models of attitude-behavior relations. Psychological Review, 85(5), 452-464.

Berne, B., & Fischer, T. (1979). Protective effects of various types of clothes against UV radiation. University Hospital, Uppsala, Sweden, Department of Dermatology.

Brightman, J. (1994). What smeels like teen spirit? American Demographics, 16(11), 10-11.

Burnkrant, R.E. & Cousineau, A. (1975). "Informational and normative social influence in buyer behavior". Journal of Consumer Research, 2(December), 206-215.

Capjack, L., Kerr, N., Davis, S., Fedosejevs, R., Hatch, K.L., Markee, N.L. (1994). Protection of humans from ultraviolet radiation through the use of textiles: A review. Family and Consumer Sciences Research Journal, 23(2), 198-218.

Carmel, S., Shani, E., & Rosenberg, L. (1994). The role of age and an expanded health belief model in predicting skin cancer protective behavior. Health Education Research, 9(4), 433-447.

Carmel, S., Shani, E., & Rosenberg, L. (1996). Skin cancer protective behaviors among the elderly explaining their response to a health education program using the health belief model. Educational Gerontology, 22(7), 651-668.

Champion, V.L. (1984). Instrument development for Health Belief Model constructs. Advances in Nursing Science (April), 75-85.

Cockburn, J., Hennrikus, D., Scott, R., & Sanson-Fisher, R. (1989). Adolescent use of sun-protection measures. The Medical Journal of Australia, 151(Augues 7), 136-140.

Cody, R. & Lee, C. (1990). Behaviors, beliefs, and intentions in skin cancer prevention. Journal of Behavioral Medicine, 13(4), 373-389.

Cohen, J.B. (1996). Segmenting the teenager. Editor & Publisher, 129(17), 82-84.

Commentaries. (1989). Sunburns, melanoma, and the pediatrician. Pediatrics, 84, 381-392.

Council on Scientific Affairs. (1989). Harmful effects of ultraviolet radiation. Journal of American Medical Association, 262(3), 380-384.

Courneya, K.S. & McAuley, E. (1993). Predicting physical activity from intention: Conceptual and methodological issues. Journal of Sport and Exercise Psychology, 14, 18-20.

Creekmore, A.M. (1980). Clothing and personal attractiveness of adolescents related to conformity, to clothing mode, peer acceptance, and leadership potential. Home Economics Research Journal, 8(3), 203-215.

Crosby, L.A., & Muehling, D.D. (1982). External variables and the Fishbein model: Mediation, moderation, or direct effects? In P. Bagozzi & A.M. Tybout (Eds.). Advances in Consumer Research, 10, 64-99.

Davis, L.L. (1984). Clothing and human behavior: A review. Home Economics Research Journal, 12(3), 325-339.

Davis, S., Capjack, L., Kerr, N., & Fedosejevs, R. (1997). Clothing as protection from ultraviolet radiation: which fabric is most effective? International Journal of Dermatology, 36, 374-379.

Dortch, S. (1994). Why teens have less green. American Demographics, 16(7), 9.

Easey, M. (1995). Fashion marketing. London: Blackwell Science Ltd.

Feldman, R.S. (1995). Social psychology. Englewood Cliffs, N.J: Prentice Hall Inc.

Fink, D.G. (1991). Guidelines for the cancer-related checkup: recommendations and rationale. Atlanta: American Cancer Society.

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

Fisher, K.J., Lowe, J.B., Gillespie, A.M., Balanda, K.P., Baade, P.D., & Stanton, W.R. (1996). The relationship between Australian students' perception of parental behavior, school policies & sun protection behaviors. Journal of Health Education, 27(4), 242-247.

Francis, S., & Burns, L.K. (1992). Effect of consumer socialization on clothing shopping attitudes, clothing acquisition, and clothing satisfaction. Clothing and Textiles Research Journal, 10(4), 35-39.

Fredricks, A.J., & Dossett, D.L. (1983). Attitude-behavior relations: A comparison of the Fishbein-Ajzen and the Bentler-Speckart models. Journal of Personality and Social Psychology, 45, 501-512.

Friedman, L.C., Weinberg, A.D., Webb, J.A., Cooper, H.P., & Bruce, S. (1995). Skin cancer prevention and early detection intentions and behavior. American Journal of Preventive Medicine, 11(1), 59-65.

Fritischi, L., Green, A., & Solomon, P.J. (1992). Sun exposure in Australian adolescents. Journal of the American Academy of Dermatology, 27, 25-29.

Gallagher, R.P., Hill, G.B., Bajdik, C.D., Fincham, S., Coldman, A.J., McLean, D.I., & Threlfall, W.J. (1995). Sunlight exposure, pigmentary factors, and risk of nonmelanocytic skin cancer. Archives Dermatology, 131, 157-163.

Gilkison, P. (1973). Teen-agers' perceptions of buying frames of reference: A decade in retrospect. Journal of Retailing, 49(2), 25-37.

Gillespie, A., Lowe, J.B., Balanda, K.P., Del Mar, C.B. (1993). Qualitative methods in adolescent skin protection Health Promotion Journal of Australia, 3, 10-14.

Gies, H.P., Roy, C.R., Elliott, G., & Wang, Z. (1994). Ultraviolet radiation protection factors for clothing. Health Physics, 67(2), 131-139.

Gilmore, G.D. (1989). Sunscreen: A review of the skin cancer protection value and educational opportunities. Journal of School Health, 59(5), 210-213.

Girgis, A., Sansan-Fisher R.W., & Tripodi, D.A. (1993). Evaluation of interventions to improve solar protection in primary schools. Health Education Quarterly, 20, 275-287.

Godin, G., & Kok, G. (1996). The theory of planned behavior: A review of its application to health-related behaviors. The Science of Health Promotion, 11(2), 87-98.

Grob, J.J., Guglielmina, C., Gouverner, J, Zarour, H, Noe, C., & Bonerandi, J.J. (1993). Study of sunbathing habits in children and adolescents: Application to the prevention of melanoma. Dermatology, 186, 94-98.

Hacker, S.M., Browder, J.F., & Ramos-Caro, F.A. (1993). Basel cell carcinoma. Postgraduate Medicine, 93, 101-111.

Hanke, D., Hoffmann, K., Altmeyer, P., Bibhringer, B., Schindler, G., Schon, V., & Klotz, M.L. (1997). UV protection by textiles. Chemical Fibers International, 47(April), 130-132.

Heidorn, K.C. (1996). The psychology of sun protection. The UVB Impacts Reporter. [On-line]. Available: http:\\www.islandnet.com/~uvb/sample/protect.htm.

Hurwitz, S. (1988). The sun and sunscreen protection: Recommendation for children. Journal of Dermatology and Surgical Oncology, 14, 657-660.

Jarnett, P., Sharp, C., McClelland, J. (1993). Protection of children by their mothers against sunburn. British Medical Journal, 306, 1448.

Johnson, E.Y., & Lookingbill, D.P. (1984). Sunscreen use and sun exposure trends in a white population. Archive Dermatology, 120, 727-731.

Kaiser, S. (1997). The social psychology of clothing: Symbolic appearance in context (2nd ed. revised). New York: Fairchild Publications.

Keesling, B., & Friedman, H.S. (1987). Psychosocial factors in sunbathing and sunscreen use. Health Psychology, 6(5), 477-493.

Klein M. (February, 1998). Teen green. American Demographics. [On-line]. Available: http:\\www.americandemographics.com/publications/ad/98_ad/9802_ad/ad980220.htm

Koh, H.K., & Lew, R.A. (1994). Sunscreens and melanoma: implication for prevention. Journal of National Cancer Institute, 86, 78-79.

LARC monograph on the evaluation of carcinogenic risks to humans: solar and ultraviolet radiation. (1992). LARC Monography Evaluation of Carcinogen Risks Hum, 55, 1-316.

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

Liu, T., & Soong, S.J. (1996). Epidemiology of malignant melanoma. The Surgical Clinic of North America, 76, 1205-1222.

Lowe, J.B., Balanda, K.P., Gillespie, A.M., Del Mar, C.B., & Gentle, A.F. (1993). Sun-related attitudes and beliefs among Queensland school children: the role of gender and age. Australian Journal of Public Health, 17(3), 202-208.

Lovato, C.Y., Shoveller, J.A., Peters, L., & Rivers, J.K. (1998). Canadian national survey on sun exposure & protective behavior: youth at leisure. Cancer Prevention and Control, 2(3), 117-122.

Marlenga, B. (1995). The health beliefs and skin cancer prevention practices of Wisconsin dairy farmers. Oncology Nursing Forum, 22(4), 681-686.

Mascarenhas, O.A. J., & Higby, M.A. (1993). Peer, parent, and media influences in teen apparel shopping. Journal of the Academy of Marketing Science, 21(1), 53-58.

McNeely, C. (May, 1994). UV Index Fact sheet: The National IV Index and Health Effect of Excessive UV Exposure. NAPE. [On-line]. Available: http:\\www.intr.net/napenet/uvfacts.html.

Menter, M.J., Hollins, T.D., Sayre, R.M., Etemadi, A.A., Willis, I., & Huhes, S.N.G. (1994). Protection against UV photocarcinogenesis by fabric materials. Journal of the American Academy of Dermatology, 31(5), 711-716.

Mermelstein, R.J., & Riesenberg, L.A. (1992). Changing knowledge and attitudes about skin cancer risk factors in adolescents. Health Psychology, 11(6), 371-375.

Mikbail, B. (1981). The health belief model: a review and critical evaluation of model, research, and practice. Advances in Nursing Science (October), 65-91.

Mills, C.J., & Jackson, S. (1995). Public education messages for reducing health risks from ultraviolet radiation. Chronic Disease in Canada, 16, 33-26.

Mills, C.J., Trouton, K.J., & Gibbons, L. (1997). Symposium report: second symposium on ultra-violet radiation-related disease. Chronic Disease in Canada, 18, 27-39.

National Cancer Institute of Canada. (1993). Canadian cancer statistics 1993. Toronto: The institute, 1993: 11-13.

National Cancer Institute of Canada. (1998). Canadian cancer statistics 1997. Toronto: The institute, 1998: 11

Pailthorpe, M.T. (1993). Textiles and sun protection newsletter. University of New South Wales, Department of Textile Technology.

Pailthorpe, M.T. (1994). Textiles and sun protection: The current situation. University of New South Wales, Department of Textile Technology.

Power, C. (1991, September 9). Getting 'em while they're young. Business Week, 230, 94-95.

Reinert, G., Fuso, F., Hilfiker, R., & Schmidt, E. (1997). UV-protecting properties of textile fabrics and their improvement. Textile Chemist and Colorist, 29(1), 36-43.

Rivers, J.K. (1996). Melanoma. Lancer, 347, 803-907.

Rosenstock, I.M. (1990). The health belief model: Explaining health behavior through expectancies. In K. Glanz, Figure. Lewis, & B. Rimer (Eds), Health behavior and health education (p. 39-62), San Francisco: Jossey-Bass.

Rossi, J.S. (1989). The hazards of sunlight: A report on the consensus development conference on sunlight, ultraviolet radiation, and the skin. Health Psychologist, 11(3), 3-5.

Salazar, M.K. (1991). Comparison of four behavioral theories: A literature review. AAOHN Journal, 39(3), 128-135.

Sellers, P. (1989, May 8). The ABC's of marketing to kids. Fortune. 114-117.

Sprole, G.B., & Burns, L.D. (1989). Changing appearances: Understanding dress in contemporary society. New York: Fairchild.

Stern, A.L. (1985). Companies target big-spending teens. Dun's Business Month, 125(3), 48-52.

Stern, R.S., Weinstein, M.C., & Baker, S.G. (1996). Risk reduction for nonmelanoma skin cancer with childhood sunscreen use. Archive Dermatology, 122, 537-545.

Stoneman, B. (January, 1998). Teen spending keeps climbing. Forecast Magazine. [On-line]. Available: http:\\www.demographics.com/publications/FC/98_FC/9801_fc/9801F01.htm.

The National Skin Cancer Prevention Education Program. (1998). National skin cancer prevention education program: At-A-Glance 1998. [On-line]. Available: http://www.cdc.gov/nccdphp/dcpc/nscpep/skin.htm.

Threlfall, T.J. (1992). Sunglasses and clothing – an unhealthy correlation?. Australian Journal of Public Health, 16(2), 192-196.

Tootelian, D.H., & Gaedeke, R.M. (1992). The teen market: An exploratory analysis of income, spending, and shopping patterns. The Journal of Consumer Marketing, 9(4), 35-44.

Tootelian, D.H., & Windeshausen, H.N. (1976). The teen-age market: A comparative analysis, 1964-1074. Journal of Retailing, 52(2), 51-60.

Truhan, A.P. (1991). Sun protection in childhood. Clinical Pediatric, 30, 676-681.

Urbach, F. (1978). Evidence and epidemiology of ultraviolet induced cancers in man. National Cancer Institute Monograph, 50, 5.

Weinstein, N.D. (1993). Testing four competing theories of health-protective behavior. Health Psychology, 12(4), 324-333.

Weinstock, M.A., Colditz, G.A., Willet, W.C., et al. (1989). Non-familial cutaneous melanoma incidence in women associated with sun exposure before 20 years of age. Pediatrics, 84, 199-204.

Appendix A

Focus Group Interview Guide

Teenagers and Sun Protection: A Preliminary Study

Focus group study script:

Moderators introduce themselves

Thank you for agreeing to take part in this discussion this evening. We appreciate your participation. All of your ideas will be very valuable. There are no right or wrong answers to my questions. Please feel that you can discuss your ideas freely here. Your responses will be treated confidentially. The tapes will be destroyed after we code the data. Your responses will then be associated only with a number, not your name.

The purpose of bringing you together is to discuss your personal opinion about sun exposure, tanning, and protection.

Now, lets think of the last time you went out on a sunny day, perhaps to have an informal game of **soccer** with your friends.

First, I will ask each of you to take a few minutes to independently write down several things for me. Then I will ask you each in turn to tell me what you have thought. Finally we will have an opportunity to discuss your responses.

First, focus on the items that you wore last time you had an informal game of **soccer** with your friends on a warm sunny day.

1. If you did not have an informal **soccer** game recently, then think of the items that you wore last time when you had other similar outdoor activities with your friends on a sunny day. Write down at least three things that you wore. The items would include everything you wore, not necessary just clothes.

   [wait 2 minutes.]

O.K. Now I'd like each one of you to list and describe the items you have written down.

[moderators write down the responses and identify the common responses and items related to sun protection.]

2. Lets focus on sun protection. Write down at least three kinds of things that you could have worn to improve protection from the sun's ultraviolet rays.

[wait 2 minutes.]

O.K. Now I^d like each of you to list and describe what were the items that you have written down.

[moderators write down the responses and identify common responses and items not mentioned in question 1.]

3. One of the sun protective items many of you used was: _____

Tell me more about this. Why did you use that . . .

4. Another sun protective item many of you mentioned was: _____

Tell me more about this one as well. Why did you use that

5. **[ask questions a, b, c, or d based on responses that were not mentioned or less frequently mentioned]**

[a. sunglasses b. sunscreens c. hats d. long sleeves]

[Only a few/None of you mentioned] [a,b,c,d] when playing **softball** informally or other outdoor activities with friends. Have you ever considered of using **[a,b,c,d]** when playing **soccer?**

[Show participants samples of [a,b,c,d], then ask...]

Why? Why not?

[Observe their reactions]

6. What do you think about suntans? Do you like suntans? Why or why not?
7. Do you intentionally get tanned?
8. Do you get sunburned often?
9. Are you aware of the potential consequences of too much sun exposure?

   [guide discussion to both long and short term effects.]
10. What are some of the things or situations that might influence you to get more sun exposure?

    [emphasize and guide towards persons or groups, media, sources of socialization, may have to specifically ask "who would you listen to when they tell you to use sun tan lotion", or "how . . ."]
11. What are some of the things or situations that might influence you toward less sun exposure?

    [emphasize and guide towards persons or groups, media, sources of socialization, may have to specifically ask "who would you listen to when they tell you to use more sun protection", or "how . . ."]
12. One of the ways to protect yourself against the harmful effects of the sun is to wear protective clothing that includes hats, and long sleeves. What are your thoughts about that?

    [cover positive and negative aspects, such as esthetic problems, heat, style, fashion, peer derision, . . .]
13. Another way to protect you against the harmful effects of the sun is to wear clothing made with polyester fabrics. What are your thoughts about that?

[cover positive and negative aspects, such as esthetic problems, heat, style, fashion, peer derision, . . .]

14. If we accept that sun exposure is harmful and sun protective clothing is good, what do you think is the best way to get people of your age group to use such protective clothing?

[distribute brochure]

Appendix B

Focus Group: Sample Parental Consent Forms

Dear Parent,

RE: focus group discussion on Teenagers and Sun Protection

A group of your son's friends have been selected to participate in a focus group discussion on the topic of Teenagers and Sun Protection. We are conducting a research project on adolescents' beliefs about suntanning, sun protection, and sun exposure. The purpose of inviting your son to participate in this focus group is to discuss his personal opinion about these topics. We will ask your son to share ideas on these subjects in a group setting. The discussion session will be held on Wednesday evening, July 29, 1998, at 8:00 p.m., at the Trigg home (14737 – 45 Ave.).. The ideas these teenagers share with us will help to increase our understanding of the beliefs of teenagers about sun protection. The responses will also help us develop a questionnaire for future research, and develop educational programs.

I am requesting your permission to allow your son to participate in this focus group study on July 29, 1998. If you agree, please fill in the information below and sign your name. PLEASE SEND THE COMPLETED FORM TO THE GROUP SESSION WITH YOUR SON.

The responses in this group discussion will be treated confidentially. Your son is free to leave the group session whenever he wishes.

Dr. Betty Crown
Professor
Ph: (403) 492-8856

Ruby Tsang
M.Sc Candidate
Ph: (403) 492-5385

✂ _____

I grant permission for (Son's name:) _____ to participate in this
(Please Print)
research discussion on Teenagers and Sun Protection.

Your Name: _____ Signature: _____
(Please Print)

Phone No: _____ Date: _____

_____ I would like a copy of the results of the project.

_____ I would like more information on sun protection.

Send it to (address): _____

Appendix C

Focus Group: Sample Respondents' Consent Forms

Title of Project: Teenagers and Sun Protection

Project Team: Ruby Tsang
Dept. of Human Ecology
University of Alberta
Office Phone: 492-5385

Dr. Betty Crown
Dept. of Human Ecology
University of Alberta
Office Phone: 492-8856

The purpose of this group session is to discuss your personal opinion about sun exposure, tanning, and protection. We ask that you share your ideas on the subject while participating in this discussion. The ideas you share with us will help to increase our understanding of the beliefs of teenagers about sun protection. Your responses will also help us to develop a questionnaire for future research, and develop educational programs. If you agree to attend this study, please fill in the information below and sign your name. The complete form may be given back to the interviewer. Thank you.

Please Note:

1. Interviews are confidential – no one from outside this group will know who you are.
2. You are free to leave the group session whenever you wish.
3. You may question the interviewer about the project at any time. Please speak to her in person or phone one of the researchers listed above.
4. You may wish to have your name entered for a draw of a T-shirt.
5. You may have a copy of the results of the project. Let us know by the end of the interview if you wish a copy.

✂ _____

CONSENT

1. I understand the research procedures that have been explained to me.
2. I have a copy of the procedures and I agree to be tape-recorded.
3. My questions about the project have been answered to my satisfaction.
4. I know I can contact a member of the project team if I have questions in the future.
5. I understand the possible benefits of joining the research study as well as the possible risks and discomforts.
6. I understand the personal information collected in this study will be kept confidential.
7. I understand that I am free to leave the group session at any time.

Name:_____ (Plsase Print)

Signature: _____ Date:_____

_____ I would like a copy of the results of the project.

Send it to (address):_____

Phone No: _____

Interviewer: _____

Appendix D

Summary of the Focus Group Findings

Beliefs of what could be worn to improve sun protection:

Group 1
* Sunscreens
* Sunglasses
* Hats
Makeup with SPF 15
Long sleeved shirts
Contacts with SPF 15
Jeans

Group 2
* Sunscreens
* Hats
* Sunglasses

Group 5
* Sunscreens
* Long-sleeved shirts
* Long pants
* Baseball hats
* Sunglasses (1 specified UV protective sunglasses)
Hats with brim all around
Longer clothing
Shirt
Shoes

*** Sunscreens, hats, sunglasses, and long sleeves were most often entioned

Beliefs of wearing:

Hats

Behavioral beliefs:	Doesn't look good
(appearance)	Looks silly
	Looks good
	Doesn't want to look different
(comfort)	Sweat
	Itchy
	Hot
	Like hiking hats
	Like tilley hats
(protection)	Avoid sunburn
	Prevent heat stoke
	Protect from the sun

Perceived behavioral control: Not available (don't have one, brother took it)

*** Depends on how they look
Most prefer baseball hats

Sunglasses

Behavioral beliefs:	See better
	To avoid sunlight
	To avoid glare
	For protection
	Too dark (can't see well)
(appearance)	Look good
	Look silly
	Don't want to be different, stick out from the crowd
	Fall off head (Fit)
Perceived Control:	Didn't expect to go out
	Don't have any
	Expensive

Sunscreens

Behavioral beliefs:	Avoid sunburn
	Greasy
	Smell good
	Gitty
	Smell funny
Perceived control:	Don't remember to bring
	Don't have time to put on
	Too much work
	Forget to put on
	Expensive

Long sleeves

Behavioral beliefs:	Avoid rashes from sun exposure
	Inconvenience (don't want to get changed)
Perceived control:	Don't plan to go out (just go out)
Outcome evaluation:	Keep cool
	Hot
	Keep warmth (wear long sleeves in the morning, tank top underneath)

Behavioral beliefs:	Long pants are comfortable
	No need to wear. Not enough sun
	Doesn't go with outfit
	Don't like the look of shorts

Getting suntans

Outcome:	Look good
(+ive evaluation)	Look Pretty
	Look old soon (tanning bed)
	Look Healthy
	Look more alive
	Look glowing
	Want some color
	Don't want to look white and ghostly
	Better than look pale

Too much sun exposure (outcome)

Outcome:	Skin cancer
(-ive evaluation)	Moles
	Freckles
	Wrinkles
	Premature aging
	Sunburn
	Sun stoke
	Pealing
	Rash
	Too early to think
	Eyes burned

Polyester fabrics

Knowledge and experience:	Don't breath
	Comfortable
	Hot
	Sticky
	Don't know
	Protect against the sun more
	Man-made fibres

Choose clothing depends on how they look and feel

Influences toward less sun exposure

Normative Beliefs: (family members)	Parents (especially mom) Grandparents
(peers)	Friends
(Health care providers)	Dermatologists Doctors Nurse reminders
(media)	Models and movie stars (trend towards pale skin) Fashion Advertising UV index

Influences toward more sun exposure

Normative Beliefs:	Dad Friends Sun Models Movie stars Outdoor activities (swimming) Advertising

Ways to promote the usage of sun protection to peers:

Role models, set example (parents and peers, movie stars)
Free gifts,
samples,
draws,
Billboard

Examples [show pictures of people (young people) with skin cancer, wrinkles, freckles]
Show the results of sun exposure.
Educational programs on TV, radio, and news
Start educational programs at early ages (elementary schools)
Nurses reminder

Past experience, knowledge, and characteristics of participants

- Among the 5 focus groups, some participants have relatives who have or had skin cancer.
- The majority of participants have light skin (Type I and II skin)
- Some participants get sunburned easily

- They did not hear things related to sun protection and skin cancer from teachers. Participants of a soccer team hear sun protection from their coach.
- They find the promotion of both less and more sun exposure from **advertising**.
- They learn sun protection from family **doctors**, but only when they see their doctors when they have sunburned.
- The majority of the participants do not intentionally get suntanned
- Most of them **would wear hats** for sun protection, but **not long sleeves**. The majority thinks that it is too **hot** to wear long sleeves and may be **dangerous** to wear long sleeves.

Appendix E

Questionnaire

General Instruction

Thank you for agreeing to participate in this study. There are no right or wrong answers; all we ask is that you provide responses that are as honest and accurate as possible. It is important to complete all questions so that we can include your responses in our analyses. If you have any questions about completing this questionnaire, please ask one of the staff members present in the class.

The questions which follow make use of rating scales with seven choices; you are to circle one of the choices for each scale that best describes your opinion. For example if you were asked to rate the following question:

I think attending math class is:

1	2	3	4	5	6	7
extremely boring	quite boring	slightly boring	neither	slightly interesting	quite interesting	extremely interesting

If you think that attending math class is "quite interesting", than you would circle "quite interesting" as follow:

1	2	3	4	5	⑥	7
extremely boring	quite boring	slightly boring	neither	slightly interesting	quite interesting	extremely interesting

For questions containing more than one scale, please circle each scale. For example:

I think attending math class is:

1	2	3	4	5	⑥	7
extremely boring	quite boring	slightly boring	neither	slightly interesting	quite interesting	extremely interesting
①	2	3	4	5	6	7
extremely useful	quite useful	slightly useful	neither	slightly useless	quite useless	extremely useless

Note: Never circle more than one choice on each scale.

The items in this questionnaire concern your personal beliefs and attitudes towards wearing "sun protective clothing items" in the "summer sun". For this questionnaire, "sun protective clothing items" are defined as long sleeved shirt and wide brimmed hat (a hat with a brim of 5 cm or more all the way around), and "summer sun" is defined as a sunny summer day with a temperature of 20°C or higher.

The following questions concern your intention to wear sun protective clothing items in the summer sun. Please circle the number that best reflects your thoughts.

1. **When I am outdoors in the summer sun, I plan to:**

   a) wear a wide brimmed hat.

1	2	3	4	5	6	7
extremely unlikely	quite unlikely	slightly unlikely	neither	slightly likely	quite likely	extremely likely

   b) wear a long sleeved shirt.

1	2	3	4	5	6	7
extremely unlikely	quite unlikely	slightly unlikely	neither	slightly likely	quite likely	extremely likely

2. **When I am outdoors in the summer sun, I intend to:**

   a) wear a wide brimmed hat.

1	2	3	4	5	6	7
all of the time			sometimes			none of the time

   b) wear a long sleeved shirt.

1	2	3	4	5	6	7
all of the time			sometimes			none of the time

The following questions ask you to rate how you personally feel about wearing sun protective clothing items in the summer sun. Pay attention to the words at each end of the scales and circle the number that best represents how you feel.

3. **Wearing a wide brimmed hat in the summer sun is:**

1	2	3	4	5	6	7
extremely smart	quite smart	slightly smart	neither	slightly dumb	quite dumb	extremely dumb
1	2	3	4	5	6	7
extremely good	quite good	slightly good	neither	slightly bad	quite bad	extremely bad
1	2	3	4	5	6	7
extremely healthy	quite healthy	slightly healthy	neither	slightly unhealthy	quite unhealthy	extremely unhealthy
1	2	3	4	5	6	7
extremely "in"	quite "in"	slightly "in"	neither	slightly embarrassing	quite embarrassing	extremely embarrassing

1	2	3	4	5	6	7
extremely useful	quite useful	slightly useful	neither	slightly useless	quite useless	extremely useless
1	2	3	4	5	6	7
extremely necessary	quite necessary	slightly necessary	neither	slightly unnecessary	quite unnecessary	extremely unnecessary
1	2	3	4	5	6	7
extremely pleasant	quite pleasant	slightly pleasant	neither	slightly unpleasant	quite unpleasant	extremely unpleasant

4. **Wearing a <u>long sleeved shirt</u> in the summer sun is:**

1	2	3	4	5	6	7
extremely smart	quite smart	slightly smart	neither	slightly dumb	quite dumb	extremely dumb
1	2	3	4	5	6	7
extremely good	quite good	slightly good	neither	slightly bad	quite bad	extremely bad
1	2	3	4	5	6	7
extremely healthy	quite healthy	slightly healthy	neither	slightly unhealthy	quite unhealthy	extremely unhealthy
1	2	3	4	5	6	7
extremely "in"	quite "in"	slightly "in"	neither	slightly embarrassing	quite embarrassing	extremely embarrassing
1	2	3	4	5	6	7
extremely useful	quite useful	slightly useful	neither	slightly useless	quite useless	extremely useless
1	2	3	4	5	6	7
extremely necessary	quite necessary	slightly necessary	neither	slightly unnecessary	quite unnecessary	extremely unnecessary
1	2	3	4	5	6	7
extremely pleasant	quite pleasant	slightly pleasant	neither	slightly unpleasant	quite unpleasant	extremely unpleasant

The following questions require you to say what important people in your life would think about you wearing sun protective clothing items in the summer sun. Please circle the number that best represents your beliefs at this time.

5. **Most people important to me <u>think</u> that I should:**

   a) **wear a <u>wide brimmed hat</u> in the summer sun.**

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree

   b) **wear a <u>long sleeved shirt</u> in the summer sun.**

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree

6. **Most people important to me would approve of:**

a) my wearing a wide brimmed hat in the summer sun.

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree

b) my wearing a long sleeved shirt in the summer sun.

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree

7. **Most people important to me would encourage me to:**

a) wear a wide brimmed hat in the summer sun.

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree

b) wear a long sleeved shirt in the summer sun.

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree

The following questions concern how much control you believe you have over wearing sun protective clothing items in the summer sun. Please read the questions carefully and circle the number that best represents your thoughts.

8. **For me to wear a wide brimmed hat in the summer sun is:**

1	2	3	4	5	6	7
extremely easy	quite easy	slightly difficult	neither	slightly difficult	quite difficult	extremely difficult

9. **In the summer sun, it is completely up to me to wear a wide brimmed hat.**

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree

10. **How much control do you have over wearing a wide brimmed hat in the summer sun?**

1	2	3	4	5	6	7
very little control			moderately control			complete control

11. **If I wanted to, I could easily wear a wide brimmed hat in the summer sun.**

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree

12. **How confident are you that you are capable of wearing a wide brimmed hat in the summer sun?**

1	2	3	4	5	6	7
not at all confident			moderately confident			completely confident

13. For me to wear a long sleeved shirt in the summer sun is:

1	2	3	4	5	6	7
extremely easy	quite easy	slightly difficult		slightly difficult	quite difficult	extremely difficult

14. In the summer sun, it is completely up to me to wear a long sleeved shirt.

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree

15. How much control do you have over wearing a long sleeved shirt in the summer sun?

1	2	3	4	5	6	7
very little control			moderately control			complete control

16. If I wanted to, I could easily wear a long sleeved shirt in the summer sun.

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree

17. How confident are you that you are capable of wearing a long sleeved shirt in the summer sun?

1	2	3	4	5	6	7
not at all confident			moderately confident			completely confident

The following questions ask you to evaluate certain outcomes regarding sun exposure. Please circle the number that best reflects your thoughts.

18. Preventing a suntan is:

1	2	3	4	5	6	7
extremely good	quite good	slightly good	neither	slightly bad	quite bad	extremely bad
1	2	3	4	5	6	7
extremely healthy	quite healthy	slightly healthy	neither	slightly unhealthy	quite unhealthy	extremely unhealthy

19. Having a suntan makes me look:

1	2	3	4	5	6	7
extremely good	quite good	slightly good	neither	slightly bad	quite bad	extremely bad
1	2	3	4	5	6	7
extremely alive	quite alive	slightly alive	neither	slightly ghostly	quite ghostly	extremely ghostly

20. Having freckles is:

1	2	3	4	5	6	7
extremely good	quite good	slightly good	neither	slightly bad	quite bad	extremely bad
1	2	3	4	5	6	7
extremely healthy	quite healthy	slightly healthy	neither	slightly unhealthy	quite unhealthy	extremely unhealthy

The next set of questions asks you to rate how likely it is that certain outcomes would result if you wear sun protective clothing items in the summer sun. Please circle the number that best reflects your beliefs.

21. Wearing a <u>wide brimmed hat</u> in the summer sun:

a) makes me look different from other people around me.

1	2	3	4	5	6	7
extremely unlikely	quite unlikely	slightly unlikely	neither	slightly likely	quite likely	extremely likely

b) can prevent a suntan.

1	2	3	4	5	6	7
extremely unlikely	quite unlikely	slightly unlikely	neither	slightly likely	quite likely	extremely likely

c) can prevent rashes.

1	2	3	4	5	6	7
extremely unlikely	quite unlikely	slightly unlikely	neither	slightly likely	quite likely	extremely likely

d) can prevent a sunburn.

1	2	3	4	5	6	7
extremely unlikely	quite unlikely	slightly unlikely	neither	slightly likely	quite likely	extremely likely

e) can prevent wrinkled skin early in life.

1	2	3	4	5	6	7
extremely unlikely	quite unlikely	slightly unlikely	neither	slightly likely	quite likely	extremely likely

f) can prevent freckles.

1	2	3	4	5	6	7
extremely unlikely	quite unlikely	slightly unlikely	neither	slightly likely	quite likely	extremely likely

g) can prevent heat stroke.

1	2	3	4	5	6	7
extremely unlikely	quite unlikely	slightly unlikely	neither	slightly likely	quite likely	extremely likely

h) can prevent skin cancer.

1	2	3	4	5	6	7
extremely unlikely	quite unlikely	slightly unlikely	neither	slightly likely	quite likely	extremely likely

i) makes me look silly.

1	2	3	4	5	6	7
extremely unlikely	quite unlikely	slightly unlikely	neither	slightly likely	quite likely	extremely likely

j) makes me feel hot and sweaty.

1	2	3	4	5	6	7
extremely unlikely	quite unlikely	slightly unlikely	neither	slightly likely	quite likely	extremely likely

22. Wearing a long sleeved shirt in the summer sun:

a) makes me look different from other people around me.

1	2	3	4	5	6	7
extremely unlikely	quite unlikely	slightly unlikely	neither	slightly likely	quite likely	extremely likely

b) can prevent a suntan.

1	2	3	4	5	6	7
extremely unlikely	quite unlikely	slightly unlikely	neither	slightly likely	quite likely	extremely likely

c) can prevent rashes.

1	2	3	4	5	6	7
extremely unlikely	quite unlikely	slightly unlikely	neither	slightly likely	quite likely	extremely likely

d) can prevent a sunburn.

1	2	3	4	5	6	7
extremely unlikely	quite unlikely	slightly unlikely	neither	slightly likely	quite likely	extremely likely

e) can prevent skin cancer.

1	2	3	4	5	6	7
extremely unlikely	quite unlikely	slightly unlikely	neither	slightly likely	quite likely	extremely likely

f) makes me look silly.

1	2	3	4	5	6	7
extremely unlikely	quite unlikely	slightly unlikely	neither	slightly likely	quite likely	extremely likely

g) makes me feel hot and sweaty.

1	2	3	4	5	6	7
extremely unlikely	quite unlikely	slightly unlikely	neither	slightly likely	quite likely	extremely likely

The following questions require you to rate the likelihood that you would do what important people in your life want you to do. Please circle the number that best represents your beliefs.

23. Generally speaking with respect to wearing clothes, I want to do what:

a) My best friend thinks I should do.

1	2	3	4	5	6	7
extremely unlikely	quite unlikely	slightly unlikely	neither	slightly likely	quite likely	extremely likely

b) Other people my age think I should do.

1	2	3	4	5	6	7
extremely unlikely	quite unlikely	slightly unlikely	neither	slightly likely	quite likely	extremely likely

c) My mother thinks I should do.

1	2	3	4	5	6	7
extremely unlikely	quite unlikely	slightly unlikely	neither	slightly likely	quite likely	extremely likely

N/A _____

d) My father thinks I should do.

1	2	3	4	5	6	7
extremely unlikely	quite unlikely	slightly unlikely	neither	slightly likely	quite likely	extremely likely

N/A _____

e) Other family members think I should do.

1	2	3	4	5	6	7
extremely unlikely	quite unlikely	slightly unlikely	neither	slightly likely	quite likely	extremely likely

N/A _____

f) Health care providers such as my family doctors and nurses think I should do.

1	2	3	4	5	6	7
extremely unlikely	quite unlikely	slightly unlikely	neither	slightly likely	quite likely	extremely likely

N/A _____

g) Advertisements on television, radio, and newspaper promote.

1	2	3	4	5	6	7
extremely unlikely	quite unlikely	slightly unlikely	neither	slightly likely	quite likely	extremely likely

h) Celebrities and fashion models do.

1	2	3	4	5	6	7
extremely unlikely	quite unlikely	slightly unlikely	neither	slightly likely	quite likely	extremely likely

The following questions ask you to rate what important people in your life would think about you wearing sun protective clothing items in the summer sun. Please circle the number that most accurately reflects your beliefs.

24. The following people think I should wear a <u>wide brimmed hat</u> in the summer sun:

a) My best friend.

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree

b) Other people my age.

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree

c) My mother.

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree
N/A	_____					

d) My father.

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree
N/A	_____					

e) Other family members.

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree
N/A	_____					

f) Health care providers such as my family doctors and nurses.

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree
N/A	_____					

25. The following people think I should wear a <u>long sleeved shirt</u> in the summer sun:

a) My best friend.

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree

b) Other people my age.

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree

c) My mother.

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree
N/A	_____					

d) My father.

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree
N/A	_____					

e) Other family members.

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree

N/A _____

f) Health care providers such as my family doctors and nurses.

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree

N/A _____

26. The following people would <u>encourage</u> me to wear a <u>wide brimmed hat</u> in the summer sun:

a) My best friend.

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree

b) Other people my age.

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree

c) My mother.

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree

N/A _____

d) My father.

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree

N/A _____

e) Other family members.

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree

N/A _____

f) Health care providers such as my family doctors and nurses.

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree

N/A _____

27. The following people would <u>encourage</u> me to wear a <u>long sleeved shirt</u> in the summer sun:

a) My best friend.

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree

b) **Other people my age.**

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree

c) **My mother.**

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree

N/A _____

d) **My father.**

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree

N/A _____

e) **Other family members.**

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree

N/A _____

f) **Health care providers such as my family doctors and nurses.**

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree

N/A _____

28. **Advertisements on television, radio, and newspaper promote the idea that I should:**

a) **wear a wide brimmed hat in the summer sun.**

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree

b) **wear a long sleeved shirt in the summer sun.**

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree

29. **Celebrities and fashion models imply that I should:**

a) **wear a wide brimmed hat in the summer sun.**

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree

b) **wear a long sleeved shirt in the summer sun.**

1	2	3	4	5	6	7
strongly agree	moderately agree	slightly agree	neither	slightly disagree	moderately disagree	strongly disagree

The next set of questions asks you to rate how confident you are that you could wear sun protective clothing items in the summer sun given the following circumstances. Please circle the number that best reflects your beliefs.

30. **How confident are you that you could wear a <u>wide brimmed hat</u> in the summer sun even if:**

a) Your parents do not provide one.

1	2	3	4	5	6	7
not at all confident			moderately confident			completely confident

b) It is expensive.

1	2	3	4	5	6	7
not at all confident			moderately confident			completely confident

c) You are sweating.

1	2	3	4	5	6	7
not at all confident			moderately confident			completely confident

d) It is not convenient.

1	2	3	4	5	6	7
not at all confident			moderately confident			completely confident

31. **How confident are you that you could wear a <u>long sleeved shirt</u> in the summer sun even if:**

a) It is expensive.

1	2	3	4	5	6	7
not at all confident			moderately confident			completely confident

b) You are sweating.

1	2	3	4	5	6	7
not at all confident			moderately confident			completely confident

c) It is not convenient.

1	2	3	4	5	6	7
not at all confident			moderately confident			completely confident

For this part of the questionnaire, please read the questions carefully. Check the most appropriate choices or fill in your responses for some of the questions if necessarily.

1. Have any of your close family members had skin cancer? Yes ____ No ____

2. Have any of your friends had skin cancer? Yes ____ No ____

3. Have you ever experienced a blistering sunburn? Yes ____ No ____
   If yes, approximately how many times have you experienced a blistering sunburn which was painful and led to peeling skin
   i) 1 _____
   ii) 2-3 _____
   iii) more than 3 _____

4. From which of the following sources have you seen, heard, or read anything about the risks of excessive sun exposure?
   Television Yes ____ No ____
   Radio Yes ____ No ____
   Magazine Yes ____ No ____
   Personal Doctor Yes ____ No ____
   School Yes ____ No ____

5. How old are you? _____ years

6. Your gender? Male ____ Female ____

7. What grade are you in at school? Grade ____

8. Do you use the Internet? Yes ____ No ____
   If yes, how often do you go online? Approximately ____ time(s) a week?

9. Do you typically wear sunglasses when you go out in the summer sun?
   i) Always ____
   ii) Often ____
   iii) Sometimes ____
   iv) Rarely ____
   v) Never ____

10a. Do you typically wear a hat when you go out in the summer sun?
   i) Always ____
   ii) Often ____
   iii) Sometimes ____
   iv) Rarely ____
   v) Never ____

b. If you do wear a hat, please describe what kind of hat you wear:

_____

11. Do you typically wear a long-sleeved shirt when you go out in the summer sun?

i)	Always	____
ii)	Often	____
iii)	Sometimes	____
iv)	Rarely	____
v)	Never	____

12a. Do you typically use sunscreens when you go out in the summer sun?

iv)	Always	____
v)	Often	____
vi)	Sometimes	____
iv)	Rarely	____
v)	Never	____

b. If you do use sunscreen, what SPF do you usually use?

i)	10	____
ii)	15	____
iii)	30	____
iv)	Other, please specify	____
v)	Don't know	____

13. Do you freckle easily? Yes ____ No ____

14. Do you get sunburns easily? Yes ____ No ____

15. In this past summer, did you get a suntan on purpose? Yes ____ No ____

16. Have you ever used the suntanning booth? Yes ____ No ____

17. What is your skin type? Check **ONE** of the choices below that best describes you:

a) ____Red-blond hair, blue-green eyes, and very light skin which mostly burns and does not tan with over exposure to sunlight.

b) ____ Light to medium hair, light to medium eyes, and light to medium skin which usually burns and seldom tans with over exposure to sunlight.

c) ____ Medium hair, medium to dark eyes, and medium to olive skin which moderately burns and usually tans with over exposure to sunlight.

d) ____ Dark hair, dark eyes, and dark olive to light brown skin which burns mildly and moderate brown with over exposure to sunlight.

e) ____ Dark hair, dark eyes, and dark skin which seldom burns, and turn dark brown with over exposure to sunlight.

f) ____ Dark hair, dark eyes, and very dark skin which is insensitive and does not burn with over exposure to sunlight.

Thank you very much for your participation in this research project.

Appendix F

In-School Survey: Parental Informed Consent Form

Date

Dear Parents:
Students in your son or daughter's health/CALM class have been chosen to participate in a pilot study on **Teenagers and Sun Protection**. The study is being conducted jointly by Aspen Health Services and the Department of Human Ecology at the University of Alberta. Permission has been granted by (name of school) to conduct this study. We will be asking the students about their beliefs and attitudes about sun-tanning, sun protection, and sun exposure. A questionnaire will be distributed in class and will take about 20-30 minutes to complete. The class teacher, a representative from Aspen Health Services and a researcher from the University of Alberta will be present while the questionnaire is being completed to answer any questions students have and to speak to these issues after the survey is completed. Your son or daughter's name or identity will not be associated in any way with their responses.

The data collected from the survey will help to increase our understanding of the sun protection behavior of teenagers. We will use the results of this pilot study to develop a national study of teenagers and ultimately to design educational programs to help reduce the incidence of skin cancer.

Since your son or daughter is under the age of 18, we are seeking a parent's permission for him or her to participate in this study. If you agree, please fill in the attached form and sign your name to indicate your consent. In order that your son or daughter may participate, the form must be returned to the health/CALM class teacher, _____(name)_____, by _____(date)_____.

For those students participating in the study, there will be a draw for a free T-shirt. If you have any questions about the study, please call one of the researchers below.

Betty Crown, PhD, PHEc	Linda Capjack, MSc, PHEc	Ruby Tsang, B.HEc
Professor	Associate Professor	MSc Candidate
Ph: (403) 492-8856	Ph: (403) 492-5997	Ph: (403) 492-5385

PARENTAL CONSENT

I have read the attached information about the project, Teenagers and Sun Protection.

I grant permission for (Son or Daughter's name:) _____ to
(Please Print)
participate in this survey on Teenagers and Sun Protection. I recognize that participation is voluntarily and that he/she can withdraw from the study at anytime.

Your Name:_____ Signature: _____
(Please Print)

Date: _____

Phone No: _____

_____ I would like a copy of the results of the project.

_____ I would like more information on sun protection.

Send
to(address):_____

Appendix G

In-School Survey: Respondents' Informed Consent Form

Title of Project: **Teenagers and Sun Protection**

Project Team:

Betty Crown	Linda Capjack	Ruby Tsang	Kelly Deis
Professor	Associate Professor	MSc Candidate	Aspen Health Services
Ph: (403) 492-8856	Ph: (403) 492-5997	Ph: (403) 492-5385	(403) 939-3388

During this class period, we invite you to participate in a study on sun protection. We will be asking you to complete a questionnaire about your beliefs and attitudes about suntanning, sun protection, and sun exposure. The questionnaire will take about 20-30 minutes to complete. It is not necessary to know your name. It is important that your questionnaire be answered as completely as possible.. However, if you do not feel comfortable with any question asked, you may skip that question and you are free to withdraw at any time.

The data collected from the survey will help to increase our understanding of sun protection behavior of teenagers. If you agree to participate in this study, please fill in the information below and sign your name to indicate you have read and understand this letter and agree to complete the questionnaire. The completed form should be given back to the researcher and it will be kept separately from the questionnaire. Thank you.

Please Note:

1. You have the right to withdraw the study at any time.
2. You may question one of the researchers about the project at any time. Please speak to her in person or phone one of the researchers listed above.
3. You may wish to have your name entered for a draw of a T-shirt.
4. You may have a copy of the results of the project. Please indicate in the form below.

✂_____

CONSENT

I have read the information above about the project, Teenagers and Sun Protection, and based on that information agree to participate..

Name:_____ (Please Print)

Signature: _____ Date:_____

_____ I would like a copy of the results of the project.

Send it to (address):_____

Phone No: _____

Witness: _____

Investigator: _____