IMPRESSION MANAGEMENT
AND
RISK ASSESSMENT VARIABLES
AS DISCRIMINATORS OF
SUNTANNING BEHAVIOR

A Dissertation
Presented in Partial Fulfillment of the Requirements for
the Doctor of Philosophy in the
Graduate School of the Ohio State University

by
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1993

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1993
I dedicate this dissertation
to my clients,
past, present, and future,
without whom there would have been no inspiration
and
to my husband, Dan.
ACKNOWLEDGEMENTS

Dr. Sam Osipow. Sam, how can I fit all of my gratitude into one paragraph? Your special care from my first practicum through this dissertation process has been absolutely incredible. Thank you for always hearing me, valuing my strength as a counselor, championing me when I needed it, guiding me, encouraging me... mentoring me. I feel very blessed to have had you as my advisor and am glad that I will continue to have you for my friend.

Dr. Pam Highlen. Pam, I'll never forget your voice on the phone when you, as admissions chair, called to let me know that I was a strong candidate for the program. Little did I know how your love and support would strengthen me throughout the five years in Columbus. Thank you for allowing me to stretch and grow and for the freedom to reach towards my fullest potential as a person and a therapist. I'm glad I get to finish the circle with you on my dissertation committee.

Dr. Ted Kaul. Ahh, Divinity. You have shared a lot of wisdom with me over the years that I didn't always understand until later. I remember you telling our 869 class that we were the cream of the crop, but we wouldn't realize it until we left the program, how things take longer than they do, and how important it is to abstract articles
before trying to write a lit review. (You forgot to tell me that I wouldn't fully appreciate our program until I left it.) One thing I've known for awhile, though, is that you want me to succeed. Thank you for your support and for being on my committee.

**Eve Adams.** Thank you, Eve, for helping me focus especially as I struggled with the design and the stats. Your concern and willingness to help buoyed my spirits.

**Mardia Bishop.** Mardia, my dissertation buddy!!!!!!! We're both finished. I'll miss our pep talks, but I'm ecstatic that we both persevered and are done. How painful this process has been, but sharing it with you helped so very much. Thank you, my friend, for all the love that you've given to me.

**Doug and Patou Brozovic.** Thank you for your continued prayers and for believing in me.

**Cristle Carter.** My forever friend, thank you for your unending support. You listened as I cried and rejoiced when I made progress. You have such wonderful insight and I'm sure you have the gift of encouragement.

**Susan Gentile.** I appreciate your support, my sister, my friend. Thank you for being proud of me and loving me so much you'll fly from Tampa to tell me in person.

**Kathy Ingram.** Kathy, thank you so much for thinking of me at APA and bringing me Jody Jones and Mark Leary's study. Their
research helped give me direction as I shaped my dissertation and I wouldn’t have accessed it without you.

**David and Lori Johnson.** Thank you for your prayers, the use of your copier, the encouraging words, surprise flowers (and chocolate!), and for your love. I’m looking forward to celebrating my graduation together.

**Dr. Barbara Keesling.** While all research gets scrutinized and refined over time, yours will always be what broke the first ground. Thanks for talking with me when I called and sending me your latest study.

**Dr. Mark Leary.** I really admire your research. Thank you for being so willing to share your latest findings.

**Valerie Seckel.** Val, I appreciate your prayers and concern as I’ve worked through this degree. Your wacky letters gave me laughter and your prayers have given me strength. Thank you.

**Deb Serling.** How many times have I cried on the phone as you’ve listened, encouraged, and advised me? Thank you for blazing a trail before me that made my path easier. Thanks most of all for your friendship.

**David Tokar.** I’m so glad you were learning discriminant analysis, too. Being able to share resources and ask you questions helped me from feeling isolated as I struggled with the stats. Thanks for your patience and support.
Elaine Wohlgemuth. When late night panic set in, I knew who to dial! Thanks for sharing your knowledge (and manual) with me and knowing that with our friendship I could just "call on you, sister, when I need[ed] a friend".

Bettie Amoroso. Mom, so much of who you are has affected who I am. You have shared the gift of your intuition, your zest for life, and love for people with me. Thanks for never faltering in your love or encouragement.

Dan Johnson. Not only have you shouldered the financial burden of my dissertation-year-off, you've held me as I wrestled with despair, encouraged me when I was afraid of failing, and listened as I processed endless details of the study out loud. I will be eternally thankful for your love and friendship.

God. Thank You for opening the doors for me at Ohio State, sending me treasured support people, and giving me the strength to finish.
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CHAPTER I

INTRODUCTION

Suntanning, smoking, and excessive dieting are each behaviors employed by some individuals in order to achieve and project certain images to others. They also are behaviors that may very well be detrimental to the participants' health. Considering the volumes of psychological research on eating disorders and smoking, it is surprising that so little has been written about the topic of suntanning. The scope of the tanning literature in psychology includes: two studies of subjects' attitudes about people with suntans (Broadstock, Borland, & Gason, 1992; Miller, Ashton, McHoskey, & Gimbel, 1990), five intervention studies to modify attitudes about suntanning or tanning behaviors (Cody & Lee, 1990; Jones & Leary, 1992; Keesling, 1988; Keesling & Friedman, submitted for publication; Miller, Ashton, McHoskey, & Gimbel, 1990), and two studies exploring personality antecedents in conjunction with the behaviors of tanners (Keesling & Friedman, 1987; Leary & Jones, submitted for publication) in addition to a subsection of a study from Miller, Ashton, McHoskey, & Gimbel (1990).

In designing intervention strategies, it is important to consider some basic principles from persuasive communication. Three
components are needed to convey a message: the message, the sender, and the receiver. Thus far, most research efforts in psychology have focused on studying the message style (e.g. information vs fear) and determining its' effectiveness in changing attitudes or behaviors towards tanning (Keesling, 1988; Cody & Lee, 1990; Miller, Ashton, McHoskey, and Gimbel, 1990; Keesling & Friedman, submitted for publication). These studies have provided interesting auxiliary information about the receivers (tanners). However, in order to increase the impact of the message, more studies are needed to identify and explore variables about the tanners themselves.

Therefore, the aims of this study were to cross-validate and extend past findings (Keesling & Friedman, 1987; Leary and Jones, submitted for publication; Miller, Ashton, McHoskey, & Gimbel, 1990) by focusing specifically on psychological variables of individuals involved in the pursuit of suntans.

Historically, suntanning became popular after World War I (Rumsfield, 1990). The increase in voluntary sun exposure may be due to a variety of reasons. For example, Keesling and Friedman (1987) discussed a link between tanning and health during the heliotherapy craze in the early 1900's (e.g. Rollier, 1927). Experts of the day proposed that the sun's rays helped with recovery from diseases such as tuberculosis and nervous disorders. Sanitariums across the country incorporated sunbaths into their treatment plans. Subsequently, not having color in one's skin began to be associated
with not being healthy. Phrases such as "white as a ghost" and "deathly pale" originated from such thinking.

In addition to being linked with health at the beginning of the 20th century, suntanning also became linked with wealth (Brownmiller, 1984). The Industrial Revolution changed the work settings for the poor from toiling in the fields to laboring indoors. While before, the wealthy were inside protected from the sun, now their golden tans became an indicator of leisure time to laze in the rays and money to be able to afford sun-filled vacations.

With such a strong connection to health and wealth, it is no wonder that the fashion industry began to tie tanning to the image of being vogue and attractive. In 1991, Americans spent $500 million for sun-care products alone (Seligmann & Wiley, 1992). Combine the half billion dollars spent on sun-care products with swimsuit sales, tanning salon memberships, and the numerous products needed to pursue a tan and one discovers a substantial money-making market.

What has been profitable to the fashion industry has resulted in rising health care costs and loss of human lives. Medical evidence strongly links skin cancer with exposure to ultraviolet radiation (American Cancer Society, 1985, 1988, 1991; Craig and Weiss, 1990; Raab, 1990; Scotto and Fears, 1987). The most recent reports show over 600,000 new cases of skin cancer developing each year in the United States along with an estimated 8,500+ deaths due to the disease (American Cancer Society, 1991).
Ninety-five percent of the new cases in 1991 were non-malignant basal cell or squamous cell cancer. While malignant melanoma accounted for only 5% of new skin cancer cases, this type of cell caused 76.5% of the 8,500+ deaths. This deadly cancer forms in the melanin-producing melanocytes. Melanin is activated when photo-oxidized as a result of acute exposure to ultraviolet radiation (Ortonne, 1990). As such, the melanin reaction is the body’s attempt to protect the skin from harmful UV rays by forming a suntan. An immediate consequence of overriding the protective feedback loop is a sunburn. Other consequences, not evident until years after the damage has been inflicted, are photo-aging, solar keratoses (flat, scaly, itchy patches), and skin cancer.

Some physicians believe that we are in the midst of a melanoma epidemic (A melanoma epidemic, 1990; Kopf, Riegel, & Friedman, 1982). Certainly, the cancer registry data indicate that the number of melanoma cases are increasing steadily in both sexes with no slow down in sight (American Cancer Society, 1991).

Health workers are frustrated because the vast majority of skin cancer incidences could have been avoided by proper protection from UV radiation. A number of interventions using the health education approach have been attempted (Brannon & Wagstaff, 1983; Dobes, 1986; Johnson & Lookingbill, 1984; King, Murfin, Yanagisko, Wagstaff, Putnam, Hajas, & Berger, 1983; Putnam & Yanagisko, 1985; Robinson, 1990; Schreiber, Moon, Meyskens, & Murdon, 1983; Smith, 1979). Yet, people continue to tan. Perhaps psychology, as the science
of behavior, may be able to provide more answers as to what types of people are likely to disregard medical warnings and voluntarily pursue tanning. Given such information, new interventions may be developed to better reach this high risk population.

As stated at the beginning, before effective interventions can be designed more data are needed about tanners. Thus far, only Jones and Leary's (1992) intervention implemented existing findings about psychological characteristics of suntanners in its design. While the persuasion-oriented interventions have provided interesting auxiliary information about tanners, more information about the tanners themselves is needed in order to increase the effectiveness of the interventions. Therefore, the aims of this study were to cross-validate and extend past findings which focused specifically on psychological variables of suntanners (Keesling & Friedman, 1987; Leary & Jones, submitted for publication; Miller, Ashton, McHoskey & Gimbel, 1990). This was done by using discriminant analysis to explore the usefulness of variables in differentiating between subjects' involvement in different levels of suntanning behaviors. The levels of suntanning behavior were 1) year round tanners, 2) intentional summer tanners, 3) unintentional summer tanners, and 4) those who avoided tanning.

The first variable included for cross-validation purposes was anxiety. Keesling and Friedman (1987) found that anxiety was positively related to sunscreen use, but not darkness of tans.

The second variable from past research was the illusion of unique invulnerability. The illusion of unique invulnerability (Burger
& Burns, 1988) is a construct which states that people will consistently underestimate their chances of experiencing a negative life event. Miller, Ashton, McHoskey, & Gimbel (1990) found that the darker the subjects' self-reported tans, the less they believed themselves to be at risk for developing skin problems (photoaging and skin cancer) associated with sun exposure.

The third variable, cross-validated in the present study, was public body consciousness (also termed appearance motivation). Keesling and Friedman (1987) found a positive relationship between image-related variables (e.g. belonging to a health club, exercising, percentage of friends who sunbathe) and depth of tans. However, they did not find significance between tan rating and subjects' concern with appearance. They measured concern with appearance based on a scale extracted and derived from the Tennessee Self-Concept Scale (Fitts, 1965). It is possible that their scale may not have been a valid measuring instrument.

Leary and Jones (submitted for publication) used the Public Body Consciousness Scale from Miller, Murphy, and Buss's Body Consciousness Questionnaire (1981) instead of the Tennessee Self-Concept Scale to operationalize what they termed as appearance motivation. They found a strong positive relationship between appearance motivation and self-reported levels of high risk sun exposure. The present study also used the Public Body Consciousness Scale to explore the significance of public body consciousness (appearance motivation) as a discriminator variable.
The fourth variable included for cross-validation purposes was risk taking. Risk taking was one of Keesling and Friedman's strongest variables showing a positive relationship with depth of tan (r=.30, p<.01).

A significant relationship between self-esteem and tanning has not been discovered in the research (Keesling & Friedman, 1987; Leary & Jones, submitted for publication). It could be that the instruments were not tapping into self-esteem as it relates to an individual's social self-esteem. Keesling and Friedman (1987) used the Tennessee Self-Concept Scale (Fitts, 1965) while Leary and Jones (submitted for publication) used Rosenberg's (1968) self-esteem scale. In the present study, self-esteem was assessed from the Jackson Personality Inventory's scale of the same name (JPI, Jackson, 1976). The JPI scale focuses on self-esteem as it relates to self confidence.

The sixth variable, included for cross-validation, assessed whether subjects skins burned before tanning. Leary and Jones (submitted for publication) found that people who were more likely to burn tended to use sunscreen, but did not discern if a relationship existed between skin burning and risk behaviors in the sun.

The final variable included for cross-validation purposes was subjects' skin cancer knowledge. Keesling and Friedman (1987) found that people with deeper tans displayed a negative relationship with skin cancer knowledge. In contrast, Leary and Jones (submitted for publication) did not find a relationship between skin cancer knowledge and risky sun exposure.
In order to provide theoretical and conceptual cohesiveness, the psychological variables from past empirical studies were organized according to the field risk assessment or impression management theory. Risk assessment has been defined as "an intellectual discipline . . . designed to aid in identifying, characterizing, and quantifying risk" (Slovic, 1987, p. 280). Of the discriminator variables, the ones which could be used to assess sun exposure risks were anxiety, illusion of unique vulnerability, risk taking, skin burns, and skin cancer knowledge.

Leary and Kowalski defined impression management (also termed self-presentation) as the "process by which individuals attempt to control the impressions others form of them" (Leary & Kowalski, 1990, p. 34). They reviewed the impression management studies and proposed a model with which to organize and clarify the literature. In essence, they discerned that impression management consists of two separate and distinct components. The first component, impression motivation, involves the factors which motivate people to control or change impressions others have of them. All of the present study's impression management variables originate from the impression motivation component.

The two impression management variables based on past research were appearance motivation (public body consciousness) and self-esteem. Five new impression management variables were added to the present study in order to extend the research base. Those
variables were: androgyny, conformity, femininity, masculinity, and social adroitness.

Gender role identity variables (i.e. androgyny, femininity, masculinity) have not been considered thus far in the tanning literature. We have been socialized to view certain physical traits as attractive. We also develop our gender identification roles through our interactions with society. Therefore, it may prove informative to combine the two areas in trying to understand people and their tanning behaviors.

A strong cultural message to women is that achieving high physical attractiveness is critical for one’s happiness (Brownmiller, 1984). A strong cultural message for men is that one must appear strong and athletic (Freedman, 1988). Suntans are perceived as increasing one’s attractiveness and people with suntans are viewed as more athletic (Miller, Ashton, McHoskey, & Gimbel, 1990). Therefore, femininity and masculinity should be useful variables in differentiating subjects into different levels of suntanning behaviors.

According to Bem (1974a, 1981), if a person exhibits both traditionally masculine and traditionally feminine traits, that person is androgynous. Theoretically, one could speculate that in order to go against the social norms luring a person to tan, a person would most likely be androgynous. Such a person would need to draw on her/his traditionally feminine qualities to sense the need to protect herself/himself from UV radiation. Likewise, a person would need to draw on her/his traditionally masculine qualities for strength to not
conform to society's pressure to look attractive and strong. As such, it was interesting to discover if people who were androgynous were separated in the suntanning groups.

Conformity was one of the five new impression management variables. It would seem to be an important variable in understanding subjects' participation in an activity so strongly dictated by societal attractiveness standards.

The twelfth and final variable included in the present study was social adroitness. Social adroitness measures a person's interest and energy invested in cultivating favorable social impressions. Usually these impressions are created in order to achieve some form of gain (i.e. desired career path, higher status). Leary and Jones (submitted for publication) found that people's concerns about evaluations were related to increased tanning behaviors. Certainly, socially adroit individuals are concerned about evaluations of others. Thus, it was included as a discriminator variable to gather more knowledge about the underlying motives for people to tan.

In summary, the present study attempted to cross-validate past findings concerning tanning behaviors and anxiety, illusions of unique invulnerability, and risk taking. It sought to clarify relationships between tanning and public body consciousness, self-esteem, skin burning, and skin cancer knowledge. In addition, new areas of exploration between tanning behaviors and androgyny, conformity, femininity, masculinity, and social adroitness were investigated.
Six research questions were analyzed using a direct discriminant analysis. The questions explored the: 1) significance of the 12 discriminator variables, 2) number of significant functions, 3) strength of association between the groups and variables, 4) importance of individual discriminator variables, 5) best linear classification equation, and 6) classification percentages when the linear equation was utilized. In addition, exploratory data from racial/ethnic minority subjects were reported.
CHAPTER II
LITERATURE REVIEW

In order to further explore suntanning as an impression management tool and the risk assessment factors involved, the present study focused on psychological variables that differentiate between people who tan at various levels. The following chapter consists of thirteen sections. Impression management theory is presented in the first section followed by a section overviewing the physical attractiveness literature. Gender role identity, as it relates to appearance, is discussed in the third section. The fourth section focuses on the history of suntanning in the United States. The fifth part defines ultraviolet radiation. Next, consequences of ultraviolet radiation exposure are presented with special attention given to the definition and risk factors of skin cancer. Skin cancer prevention information is summarized in the seventh section. In the eighth part, research is presented on the effectiveness of various health education interventions to prevent skin cancer. Then, concepts from the discipline of risk assessment are presented. The tenth section covers people's perceptions of suntans and tanners. Interventions based on psychological principles or findings are described in the eleventh section. Next, studies exploring the psychological variables of tanners
are reviewed. The final section concludes with implications for the field of Counseling Psychology.

**Impression Management (Self-presentation) Theory**

Leary and Kowalski defined *impression management* (also termed *self-presentation*) as the "process by which individuals attempt to control the impressions others form of them" (Leary & Kowalski, 1990, p. 34). They reviewed the impression management studies and proposed a model with which to organize and clarify the literature. In essence, they discerned that impression management consists of two separate and distinct components. The first component, *impression motivation*, involves the factors which motivate people to control or change impressions others have of them. After people have become motivated to manage aspects of their image, the second component, *impression construction*, identifies the ways by which individuals choose to regulate their images.

**Impression motivation**

Leary and Kowalski used research findings to support the idea that different levels of impression monitoring occur. There appears to be an awareness continuum of others' reactions to oneself. One anchor is complete unawareness; the other is complete awareness. For most daily activities, people fall somewhere in between the two extremes of awareness.

The authors listed three primary impression management motives: maximizing social rewards, self-esteem maintenance, and identity development. Social psychology literature has provided a
solid base of studies implicating that people strive to maximize social rewards and minimize losses. Social rewards may be interpersonal such as approval, friendship, respect, and popularity. Material acquisitions may also be viewed as societal rewards (i.e. salary raises, invitations to social and professional functions, nominations to public office, etc.).

Leary and Kowalski's second reason for impression management is self-esteem maintenance. Reactions of others can increase or decrease self-esteem, hence an investment in those responses. People also generate self-evaluations based upon the way others are perceived to react to them.

The third reason for exerting energy to manage impressions is identity development. Portrayal of images to others is a vehicle for creating identity both to others and to the self.

Besides understanding what motivates individuals to manage impressions, it is also important to recognize the antecedents of impression motivation. As Leary and Kowalski pointed out, "[t]he degree to which people are motivated to control how others perceive them is affected by a variety of situational and dispositional variables" (Leary & Kowalski, 1990, p. 38).

One antecedent variable is the goal relevance of impressions. That is, someone is more likely to actively manage their image if their projected impressions are more likely to affect whether they will obtain any of the three primary image management motives. Determinants of how relevant a person evaluates a goal to be are a)
publicity of the subject's behavior in trying to reach the goal, b) the power a target has over desired outcomes/goals, c) expectation of future interactions with the target, and d) each person's intrinsic need to impress others. For example, people with a high need for approval or who tend to be Machiavellian would tend to exert more energy in managing their images.

Another possible precursory variable for impression motivation is the value of the desired goals. Individuals will increase impression management with increasing importance of the goal. In addition, following the principle of supply and demand, if a goal is low in availability, people are inclined to increase impression management activities.

A third antecedent of impression motivation is the characteristics of the target. When a target is powerful, high in status, attractive, or likeable, subjects are more likely to be motivated to impress them.

Leary and Kowalski included a final precursory variable for image management motivation. They stated that if a discrepancy is present between a person's current image and how they wish to be perceived, higher impression management efforts will be made.

**Impression construction**

After someone is motivated to expend energy to make or change impressions, the next component is deciding upon a) the type of impression to create and b) options available for the impression creation process.
Leary and Kowalski discussed five determinants of impression construction. The first two are intrapersonal, while the other three are interpersonal in nature.

Self-concept is the first intrapersonal determinant. For the most part, people's self-presentation seems to be congruent with their self-conceptualizations as predicted by consistency theories. However, self-concepts and impressions may be inconsistent in situations where people feel the need to deceive in order to avoid personal ramifications (Schlenker, 1975) or if a person's career is exposed to positions in which others' opinions are important in job maintenance (e.g. politicians, judges, movie stars).

The second intrinsic determinant of impression construction is the development of desired (and undesired) identity images. In other words, people have internal standards and visions of how they want to be. So, they are inclined to cultivate desired identities by publicly displaying characteristics that are congruent with their visions of themselves. Likewise, people are less willing to participate in behaviors which would contribute to the inception or growth of an undesired identity.

Leary and Kowalski (1990) presented the concept of role constraints as one important interpersonal determinant of impression construction. While a degree of flexibility is allowed in most societal roles, role-specific behavioral and characterological parameters must be adhered to in order to maintain certain positions. Examples of role
constraints are occupational, familial, group affiliational, and gender role expectations.

People also determine impression construction based on values of the targets. That people adjust their images to better fit with beliefs of important others is almost an axiom within social psychology. In order to adjust their images people may be deceptive. They may also selectively present impressions which are congruent with their self-conceptions, but screen out impressions which would not be pleasing to the target.

The last determinant of impression construction is based on a person's perception of her/his current image and how targets may view them in the future. As has been shown, if people fail or are embarrassed publicly, they will be more apt to engage in strategies to repair their images (Baumeister, 1982). Leary, Barnes, and Griebel (1986) also showed that if subjects believe they have a high chance of failing, they will be preemptive in efforts to lessen the negativity with which others may view the failure.

Many tools may be utilized in impression construction. The most common method studied in the literature is subjects' use of self-descriptions. Leary and Kowalski (1990) listed other researchers who recognized alternate options which are useful in creating images such as nonverbal behavior (Reiss, 1982), public attributions (Arkin & Baumgardner, 1986), group affiliation (Cialdini et al. 1976), prominent display of material possessions (Schlenker, 1980), types of food eaten
(Mori et al., 1987), and physical appearance (Hatfield & Sprecher, 1986).

In summary, impression management is an ever-changing process as people assess the effectiveness of their impressions through feedback gathered from the environment and, if motivated, choose to construct impressions to present back to the environment. When people feel they have attained a desired image, they tend to monitor their impressions without feeling the need to actively engage in changing impressions. If, however, they have not developed a satisfactory image, they might continue current strategies, change their focus to creating an alternate impression, or become protective by decreasing their chances of being hurt and not investing energy in new impressions. When impression management activities are activated, Leary and Kowalski (1990) believe that people employ the impression motivation and impression construction processes.

Overview of Physical Attractiveness Literature

Physical attractiveness is "typically defined as the person's aesthetic appeal as a visual social stimulus" (Cash, Rissi, & Chapman, 1985, p. 246). Interest in the importance of physical attractiveness as a psychosocial variable has steadily increased over the past three decades. In Berscheid and Walster's (1974) classic review, wherein they concluded that attractiveness stereotypes influence others behavior towards targets, was based on 50 studies. By 1986 over 1,000 studies on physical attractiveness were recorded (Hatfield &

Reviews by Adams (1977), Cash (1981), and Hatfield and Sprecher (1986) documented that the bulk of literature supports the "what is beautiful is good" stereotype. For example, attractive people have been perceived as more intelligent, kinder, more sociable, more likely to be chosen as a dating partner, and more interesting than less attractive people (Berscheid & Walster, 1974; Cash and Trimer, 1984; Dion, Berscheid, & Walster, 1972; Sprecher, 1989). In classroom settings, attractive professors were viewed as being better teachers who would be less at fault for a student's failing grades (Romano & Bordieri, 1989). Within the field of forensic psychology subjects consistently chose attractive targets as less likely to commit murder and armed robbery (Saladin, Saper, & Breen, 1988). While in analog business settings, attractive people were more often chosen to be business partners (Kushnir, 1982) and predicted to achieve a higher level of success in prestigious positions (Crofton, Van Rensselaer, Dutton, & Ellis, 1989). In short, the vast majority of results in the literature support the existence of the what is beautiful is good phenomenon because highly attractive people are perceived, judged, and treated better than less attractive individuals.

Some researchers have probed the effects of attractiveness stereotypes on less attractive individuals. A central assumption has been that people internalize society's biases against uncomely people,
thereby producing negative intrapersonal consequences leading to maladjustment.

Farina, Fischer, Sherman, Smith, Groh, and Mermin (1977) were the first to publish findings linking physical attractiveness to maladjustment. They observed psychiatric inpatients and found that less attractive patients were hospitalized longer, did not receive as many visitors, and were given more severe diagnoses than more attractive patients. Less attractive subjects also reported fewer satisfying interpersonal relationships in adolescence and displayed a lower level of interpersonal skills while interacting with the experimenters.

Farina and colleague's (1977) conclusions linking unattractive patients with severity of psychopathology may have been confounded. Indicators of maladjustment were based on others' judgements except for subjects reporting fewer satisfying interpersonal relationships in adolescence. It is possible that the researchers, staff, and outside persons' attractiveness stereotypes got tangled with their perceptions of adjustment. Therefore, instead of the unattractive people actually being more maladjusted than the attractive inpatients, they may simply have been perceived by others as being more maladjusted. Also, the indicators of maladjustment may have actually been measuring discriminatory attitudes of the staff and researchers instead of indicating maladjustment in the less attractive patients.

In a more recent article (Burns & Farina, 1987), the authors begin with "[t]here is a relation between physical attractiveness and
severity of psychopathology". They cite Archer and Cash (1985), Farina et al. (1977), and Napoleon, Chassin, and Young's (1980) research as depicting a small but consistent relationship between maladjustment and attractiveness. The correlation coefficients range from .15 to .30. In other words, the strongest relationship between attractiveness and severity of psychopathology accounted for 2-9% of the variance between the two variables. Consistent with such findings, Burns and Farina (1987) found attractiveness significant at the .01 level with r = .17 (relationship with social competence), r = -.18 (relationship with perceived risk of mental disorder), and r = -.21 (relationship with self-perception of mental disorder). They stated that "[t]he data support the hypothesis that attractiveness influences self-perception of maladjustment". Burns and Farina conceded that perceived maladjustment is not actual maladjustment. In an attempt to substantiate the importance of their findings, they mentioned results from Farina, Burns, Austad, Bugglin, and Fischer (1986) in which more attractive inpatients spent more days out of the hospital than less attractive patients over a six month period. Then, they concluded that "[t]he two studies provide different types of data to support the hypothesis that attractiveness influences adjustment" (Burns & Farina, 1987, p. 162).

Similar to Burns and Farina's reasoning, O'Grady ((1989) "clearly supported" his hypothesis that attractiveness and maladjustment were related with a coefficient of r = -.22. Less than 5% of the variance was
accounted for between attractiveness and maladjustment as measured by the Incomplete Sentence Blank (Rotter & Rafferty, 1950).

It is time to recognize that the relationship between attractiveness and maladjustment is consistent, but to question its practical significance. Such strongly worded statements of relation between the two variables made by researchers may ascribe more significance to the findings than the statistics warrant.

Researchers have taken what is beautiful is good stereotype and attempted to determine if it could be expanded to what is more beautiful is better. In two experiments Freeman (1985) explored whether somatically attractive individuals would be rated as more likely to attain future life happiness. He determined the presence of a somatic attractiveness stereotype using sketches, photographs, and the Sex Role Stereotype Scale. Analyses revealed that targets of intermediate attractiveness were ranked as having the highest life happiness items.

In another experiment (Wilson, Crocker, Brown, Johnson, Liotta, and Konat, 1985), subjects were randomly assigned in a 3 (low, moderate, high attractiveness) x 2 (male vs female executive) x 2 (all male vs all female board members) audio-visual presentation. The experimenters hypothesized that attractive individuals would be perceived more favorably in terms of social skills and professional competence than unattractive targets. They found that male targets were perceived as more competent than the women. However, results indicated that while attractive targets were viewed as having higher
social skills, they were rated as less competent than moderately attractive targets. As such, both Freeman (1985) and Wilson et al.'s (1985) results indicate that sometimes more is not necessarily better.

In parallel research, experimenters have been unable to delineate a strong and stable relationship between self-esteem and attractiveness. (Adams, 1977; Mathes & Kahn, 1975; Walster Aronson, Abrahams, & Rotterman, 1966). Maryuama and Miller (1981) hypothesized that attractive people discount positive feedback concerning areas of competence, thereby nullifying some of the feedback that could raise their self-esteem. In retrospect, Sigall and Michela's (1976) findings lent support to Maryuama and Miller's theory. Sigall and Michela had female subjects write an essay which was supposedly evaluated by a male "evaluator". The women were randomly assigned to 2 (elevated self-perceived attractiveness vs lowered) x 2 (evaluator supposedly saw vs did not see subject before feedback) groups. Self-perceived attraction was adjusted by having the volunteers compare themselves to photos of either highly attractive or highly unattractive women. It was thought that the women who compared themselves to highly attractive photos would subsequently lower their self-perception of attraction and vice versa.

Results indicated that subjects with raised self-perceptions of attractiveness were less trusting of the evaluator's comments if they believed he had seen them before judging their work. Conversely, the other participants tended to accept and trust the evaluator's comments when they were informed that he had seen them.
Major, Carrington, and Carnevale (1984) further clarified Sigall and Michela's (1976) and Maryuama and Miller's (1981) attributional explanation of the relationship between self-esteem and attractiveness by systematically replicating Maryuama and Miller's study. Major et al. did not try to manipulate self-perceived attractiveness. Instead, they gathered data from both men and women several months before the experiment. The subjects were pre-screened according to their stated level of perceived attractiveness.

As in Maryuama and Miller's (1981) experiment, participants wrote an essay which was evaluated. In this study, evaluators were always the same sex as the subject.

Major et al. (1986) added four attributional items to the response questionnaires. Students were asked to what degree they felt their evaluation was based on competence factors (i.e. quality of work and writing style) and noncompetence factors (i.e. personality and appearance).

Analyses of variance revealed that subjects who regarded themselves as more attractive were less likely to attribute positive feedback to competence factors when evaluators had "seen" them. Likewise, subjects who regarded themselves as unattractive attributed positive feedback to competence factors when they believed they had been seen by the evaluator.

Most social interactions take place with people who are aware of a person's attractiveness. Therefore, the tendency for attractive
individuals to discredit praise if they have first been seen lends itself as a kind of self-esteem equalizer when comparing less attractive people to those who are more attractive. In sum, unattractive people experience less beneficial social perceptions and expectations than attractive individuals. While such differences influence less comely individuals' personalities and behaviors (Adams, 1977), due to compensatory mechanisms at work, the intra and interpersonal effects do not seem to be as negative as one would expect.

As stated before, the bulk of the literature supports the what is beautiful is good stereotype. Because most people are interested in how others react to and perceive them (Arkin & Baumgardner, 1986; Leary and Kowalski, 1990) it is reasonable to assume that they will experience some degree of concern about self-presentation and attractiveness. In fact, Cash, Winstead, and Janda (1986) surveyed college students and found that 82% of the men and 93% of the women are actively trying to cultivate an attractive appearance.

Cash (1985; 1988; Cash, et al., 1989) noted that in most studies attractiveness has been approached as a fixed trait. Consequently, experimenters have overlooked the numerous ways by which people actively alter their appearances in order to increase their level of attractiveness. On one extreme, people submit themselves to a plastic surgeon's knife or inject steroids to achieve desired images. Most appearance altering strategies are not as excessive as surgery or drug use and are oriented towards grooming behaviors. For example, people who wore eyeglasses were judged to be more intelligent
(Argyle & McHenry, 1971), more hardworking and honest (Manz &
Luek, 1968; Thornton, 1943), gentler and more sensitive, albeit, more
of a follower (Elman, 1977) than when they were without glasses.

In more recent self-presentational research, Cash and colleagues
have conceptualized cosmetics use as a way to manage and control
both social impressions and self-image (e.g. body image, self-
perceptions, and mood states) (Cash, Dawson, Davis, Bowen, &
Galumbeck, 1989). Their research findings have supported an
impression management conceptualization of cosmetics use. For
instance, in a 1985 study, Cash, Rissi, and Chapman explored
individual differences in cosmetics use among 75 college women.
Because Graham and Jouhar (1981) found that people perceived
targets to be more feminine and attractive when wearing makeup,
Cash, Rissi, and Chapman (1985) hypothesized that gender role
identity would be related to makeup use. Their second hypothesis
stated that cosmetics would be related to social self-esteem and
achievement locus of control due to makeup being viewed as a means
of self-presentation.

Their findings were surprising in that androgyny was not
correlated with lower quantities of cosmetics used as measured by the
Cash Cosmetics Use Inventory (CCUI; Cash & Cash, 1982). However,
femininity scores, as measured by the Personality Attributes
Questionnaire (PAQ; Spence, Helmreich, & Stapp, 1974), were
significantly higher for high quantity makeup users. Another surprise
was that high users were found to be less external in achievement locus of control than low-quantity users.

Subjects were divided by the median split procedure into groups of situational and dispositional cosmetics users. Again, androgyny was not a factor in group differences. Yet, women who were more profeminist in sex-role attitudes, as measured by The Attitudes Toward Women (ATW; Spence & Helmreich, 1972, 1978) scale, were significantly more situational in their use of makeup. No group differences were found on the PAQ, self-esteem, or achievement locus of control measures.

In another study, Cash et al. (1989) explored self-perceptions of subjects and perceptions of others when subjects were with and without their customary makeup. Subjects also reported their body satisfaction while looking into a mirror after their cosmetics were removed.

Results of a 2 (Cosmetics Condition) x 2 (Sex of Rater) ANOVA revealed that in comparison to judges, subjects consistently underestimated their level of attractiveness when cosmetics were absent and overrated level of attractiveness when cosmetics were present. Female raters judged subjects as being less attractive without makeup than male raters, but the opposite was found when cosmetics were present.

Since subjects were always perceived by others and themselves as being more attractive while wearing makeup, support was generated for the idea that cosmetics may be used to manage
impressions. It is also interesting that a sort of dependency cycle exists between cosmetics users and their cosmetics as seen by the users' false beliefs they are less attractive than others actually perceive them to be without their makeup. Such a cycle may be reinforced by their beliefs that they are even more attractive than others view them when they are wearing makeup. Thus, self-presentational sense may be made out of some women's comments such as, "I could never leave my house without wearing makeup".

Cash et al. (1989) also found main effects for face satisfaction and overall appearance when subjects were wearing cosmetics. Body satisfaction did not yield a main effect with use of cosmetics. In addition, higher cosmetics usage was correlated with higher satisfaction with appearance. Therefore, support was provided for the hypothesis that women may use makeup as a tool to control and manage certain aspects of their body images.

Another way by which people actively alter their appearances in order to increase their level of attractiveness is through suntanning. This topic has been sparsely studied in the literature. In fact, all of the studies examining tanning and psychological issues are reviewed in following sections of this chapter. Like cosmetics use, tanning can be viewed from an impression management perspective as a method by which people attempt to manage and control their social impressions and self-images. Eventually, enough research may be garnered to support a conceptualization of behaviors by which to alter physical appearance as lying on a continuum of healthiness. To
clarify, one anchor may be behaviors with lesser amounts of physical and psychological ramifications (i.e. fashion use, grooming behaviors) while more potentially harmful behaviors (i.e. eating disorders, steroid use, plastic surgery, etc.) would lie at the other end. Tanning, with its links to skin cancer would fall on the less healthy side of such a continuum. Clearly, research is needed to piece together the conceptual puzzle of tanning and impression management.

**Gender Role Identity**

Gender role identity is a person’s self view in terms of societal standards of emotions and behaviors that are desirable for men and women to display. Both Kagan (1964) and Kohlberg (1966) stated that highly sex-typed individuals (traditionally masculine or feminine) would be motivated to express emotions and behaviors that are consistent with internalized sex role norms by suppressing emotions or behaviors not defined as socially acceptable for one’s sex. Bem (1974a) provided a new dimension of gender role identity conceptualization by adding that non-sex-typed individuals are those who either do not show strong evidences of sex role stereotyping in either direction (undifferentiated) or who exhibit behaviors and emotions from both of the masculine and feminine repertoires (androgynous).

In the gender schema theory, Bem (1981) stated that we have learned to process information in terms of gender-based cognitive schema. In order to determine how such information is processed, she tested latency and recall of sex-stereotyped information. She found
that sex-typed subjects responded quicker, remembered more, and made more differentiated judgements about people when presented with sex-stereotyped stimulus materials. In short, Bem described individuals whose gender schema is highly available as sex-typed. On the other hand, non-sex-typed individuals were not as quick to encode and organize information in stereotyped formations of femaleness and maleness.

Physical attractiveness and practices to enhance physical appearance (i.e., fashion, grooming) seem to communicate cultural and subcultural norms (Kaiser, 1985; Morris, 1985). Many studies have explored physical attractiveness and gender role identity by first judging the subjects' attractiveness and then exploring how gender role identity affects their personality characteristics or other's perceptions of them (e.g., Cash & Smith, 1982; Moore, Graziano, Millar, 1987). Others have researched how a subject's gender role identity affects their evaluations of target individuals (e.g., Anderson and Bem, 1981). However, besides Cash's work in the psychology of cosmetics (Cash, et al., 1985), numerous computer searches have yielded only one study which explored the relationship between a person's gender role identity and concern about their own appearance (Jackson, Sullivan, & Hymes, 1987).

Jackson, Sullivan, and Hymes had 60 undergraduate men and 60 undergraduate women complete the Bem Sex Role Inventory (Bem, 1981b) and the Physical Attributes Inventory (PAI). The PAI is a 60 item questionnaire used to assess attractiveness of, importance of, and
desire to change 20 physical attributes. Reliability and validity data for the PAI were not reported.

Their results indicated that traditionally sex-typed people were not more concerned about their physiques than androgynous people. The cross-typed women (women evidencing traditionally masculine emotions and behaviors) were more apt to want to change their bodies.

Sex-typed women and undifferentiated people rated their facial attributes as less attractive than cross-typed and androgynous women. Information about sex-typed or androgynous men was not provided on this variable. Yet, the authors reported that sex-typed people were more interested in changing attributes of their facial appearance than androgynous people leading to the assumption that sex-typed men were not as satisfied with their facial appearance as androgynous people.

Jackson, Sullivan, and Hymes found several gender differences. For example, men rated their bodies as more attractive than women. As such, the men also reported less desire to change their bodies on all comparisons except height. Also, women expressed more interest in changing their facial features than men.

To summarize, the gender schema theory suggests that people with different gender role identities may vary in their concerns about physical appearance due to how their schema is organized according to gender. Jackson, Sullivan, and Hymes found support for their hypothesis that androgynous people would be less likely to want to
change their facial appearance than other gender-types. Yet, no
differences were found between androgynous people and sex-typed
individuals concerning satisfaction with their bodies. While such
results are interesting, caution should be taken in generalizing the
findings until more psychometric data is available for the PAI.

Cash et al. (1989) stated that research on physical attractiveness
needs to consider the "self-management aspect of aesthetic states of
appearance" (Cash, et al., 1989, p. 354). Obviously, the self-
management aspect of attractiveness and its relationship with gender
role identity is in the infancy stage of exploration. Areas such as
appearance alteration through suntanning and gender role
identification are ripe for investigation.

History of Suntanning

Suntanning became popular in the United States after World
War I (Rumsfield, 1990). The increase in voluntary sun exposure may
be due to a variety of reasons. For example, Keesling and Friedman
(1987) discussed a link between tanning and health during the
heliotherapy craze in the early 1900's (e.g. Rollier, 1927). Experts of
the day proposed that the sun's rays helped with recovery from
diseases such as tuberculosis and nervous disorders. Sanitariums
across the country incorporated sunbaths into their treatment plans.
Subsequently, not having color in one's skin began to be associated
with not being healthy. Phrases such as "white as a ghost" and
"deathly pale" originated from such thinking.
In addition to being linked with health at the beginning of the 20th century, suntanning also became linked with wealth. Previous to The Great War, white skin was prized. Women wore protective clothing, tooted parasols, piled on layers of powder, and were also known to eat small amounts of arsenic when desperate to acquire translucent skin (Brownmiller, 1984). Then, the Industrial Revolution changed the work settings of the poor from toiling in the fields to laboring indoors. While before, the wealthier side of society was inside sheltered from the sun, now their golden tans became an indicator of leisure time to laze in the rays and money to be able to afford sun-filled vacations.

With such a strong connection to health and wealth, it is no wonder that the fashion industry began to tie tanning to the image of being vogue and attractive. Late in the 1920's, Coco Chanel began to tout tanning as a fashion statement (deMarty, 1980) while Patou and Schiaparelli designed swimsuits for the rich to wear on the Riviera (Probert, 1981). Today, Americans spend $500 million a year for sun-care products alone (Seligmann & Wiley, 1992). Combine the half billion dollars spent on sun-care products with swimsuit sales, tanning salon memberships, with the numerous products needed to pursue a tan and one discovers a substantial money-making market.

**Ultraviolet Radiation**

Ultraviolet (UV) radiation that is damaging to the skin includes radiation wavelengths in the 200-400 nanometer (nm) range. (A nanometer is one billionth of a meter.) UVA wavelengths are 320-400
nm in length; UVB wavelengths range from 290-320 nm. UVB is responsible for most skin damage (Sayre & Agin, 1990). UVA rays do not cause sunburn reactions and were previously hailed as "safe" rays. However, it has been well-documented that UVA causes photodamage (e.g., Sayre & Agin, 1990), damages DNA, acts as a carcinogen, and promotes UVB carcinogenesis (Matsui & DeLeo, 1990).

UVA is especially threatening because it is a year-round threat and only one chemical, Parsol 1789, blocks the whole spectrum (Rumsfield, 1990). In addition, 10 to 20 times more UVA is present at midday than UVB. Furthermore, it is the predominant wavelength used in artificial tanning devices such as sunlamps and tanning booths, beds, or columns.

**Consequences of Ultraviolet Radiation Exposure**

One of the lesser known consequences of ultraviolet radiation exposure is damage to the eyes. An increase in cataracts has been noted in people who regularly suntan, work outdoors, or regularly use artificial tanning devices without adequate UV protection for the eyes. Federal guidelines now mandate information labels on sunglasses informing buyers of UV protection coatings on the lenses. Most dime store children's sunglasses do not have either UV information labels on them or UV protection coatings. This can be extremely harmful because the dark lenses cause the pupil to open wider and admit more damaging UV rays to the interior of the eye (Stern, Weinstein, & Baker, 1986).
Eyes have also been UV damaged by burns on the cornea. Such burns are largely consequences of artificial tanning without proper eye protection. Indoor tanners have been known to substitute sunglasses, cotton balls, or towels for the specially designed goggles. Sometimes tanners even choose to not wear the goggles in order to avoid tan lines around the eyes. At other times, the goggles have been cracked or damaged (Swinyer, 1990).

A second consequence of overexposure to UV radiation is photoaging (pigmented spots, dryness, itchiness, and wrinkles). UV rays damage DNA. The level needed to cause such damage is lower than the minimal amount of UVB to cause a sunburn. Consequently, people do not have an overt warning that the rays are irreparably damaging their skin (Raab, 1990).

By far, the most dire consequence of ultraviolet radiation is the development of skin cancer. Medical evidence strongly links skin cancer with exposure to ultraviolet radiation (American Cancer Society, 1985, 1988, 1991; Craig and Weiss, 1990; Raab, 1990; Scotto & Fears, 1987). Last year over 600,000 new cases of skin cancer were reported in the United States along with an estimated 8,500+ deaths due to the disease (American Cancer Society, 1991).

A majority of the new cases were non-malignant basal cell or squamous cell cancer. Basal cell cancer accounted for 75% of skin cancers. These cells resemble the layer of cells that form the base between the epidermis and the dermis. As such, it usually begins with a small shiny bump on the head, neck, or hand. When treated
these cells have a 40% recurrence rate. If not treated they can grow into underlying tissues and kill them.

Squamous cells resemble the upper two layers of the skin and accounted for 20% of skin cancers. They grow faster than basal cells and, therefore, are more likely to spread to various parts of the body. Two percent have been known to metastasize and become malignant.

Malignant melanoma accounted for only 5% of new skin cancer cases, but in 1991 this type of cell caused 76.5% of the 8,500+ deaths. This deadly cancer forms in melanocytes, the skin cells that produce melanin. Melanin is the dark protective pigment that is activated due to photo-oxidation as a result of acute exposure to ultraviolet radiation (Ortonne, 1990). The melanin reaction is the body's attempt to protect the skin from UV rays by forming a suntan while the immediate result of overriding the protective feedback loop is a sunburn.

Some physicians believe that we are in the midst of a melanoma epidemic (Kopf, Riegel, & Friedman, 1982; A melanoma epidemic, 1990) Certainly, the cancer registry data indicates that the number of melanoma cases are increasing steadily in both sexes (American Cancer Society, 1991) and a trend has been observed in it developing at younger ages (Crutcher & Cohen, 1990).

Prevention of Skin Cancer

Skin cancer can be caused by over exposure to x-rays, chemicals (e.g. coal tar, arsenic, radium), and certain genetic conditions (e.g. dysplastic nevi, congenital melanocytic nevus). However, the most
important cause is exposure to ultraviolet rays found in sunlight or artificial tanning devices (American Cancer Society, 1988).

Individuals can protect themselves from the harmful effects of UV rays by not using artificial tanning devices, applying sunscreens properly, wearing sunscreens with a sun protection factor (SPF) of 15 or above, avoiding the sun from 10 AM-3PM, and wearing protective attire (e.g. hats, long-sleeved shirts). By taking such precautions, it has been estimated that the incidence of skin cancer could be reduced by as much as 90% (National Institutes of Health, 1985).

It is difficult to determine exactly how many Americans intentionally pursue sun tans. Findings from a survey by the American Academy of Dermatology (1987) indicated that 1/3 of American adults and 1/3 of teenaged boys intentionally pursued a tan. Results from same survey found that 2/3 of adolescent girls actively pursued sun tans. In another study by Johnson and Lookingbill (1984), 71% of the participants reported at least one hour of intentional sun exposure per week. In addition, Putnam, Brannon, & Yanagisako (1982) surveyed 1,616 white Hawaiian residents about their tanning habits. Respondents reported an average of 15.5 hours of sun exposure per week. Finally, 407 adults were surveyed on Puerto Rican beaches (Ross & Sanchez, 1990). Approximately half of the sample were tourists, while the rest were Puerto Rican residents. Due to the context of the questioning, all were exposing themselves to UV rays. Ross and Sanchez found that 95% believed the sun to be a cause of skin cancer, but only half of the sample believed they were at
risk to develop the disease. Eighty three percent understood the SPF numbers, yet, over a third used tanning oils or no sunscreen at all.

**Health Education Interventions**

Until recently, a majority of the interventions designed to persuade people to reduce their chances of developing skin cancer have been health education interventions. These interventions are founded on the assumption that simply by giving people information about skin cancer prevention, people will utilize the knowledge.

In 1979, a major mass media project was implemented to increase early diagnosis of melanoma in Australia (Smith, 1979). While Australia still has the highest incidence of skin cancer in the world, this project in Queensland improved survival rates and the melanoma rates have not continued to skyrocket.

In another study, Johnson and Lookingbill (1984) surveyed 489 dermatology patients about their skin cancer knowledge. The subjects received a free sample of sunscreen and a pamphlet about skin cancer to take with them. A month later follow-up calls were made reaching 342 of the subjects. The subjects possessed improved knowledge about sun protection factors, skin cancer risk factors, and photoaging. And, while statistical analyses were not performed on this factor, Johnson and Lookingbill reported an increase in sunscreen use. It might have been interesting to explore if the increase in sunscreen use was by using the free samples only or if subjects expended some effort in obtaining their own.
Another large intervention project was embarked upon in Hawaii (Brannon & Wagstaff, 1983; King, Murfin, Yanagisako, Wagstaff, Putnam, Hajas, & Berger, 1983; Putnam & Yanagisako, 1985). The project coordinators designed a comic book on the topic of skin cancer. The book was given to white residents with high income and high education levels. A total of 118 targets received the book. Three percent called a cancer information hotline, 31% reported wearing protective attire, 39% reported sunscreen use, 44% stated they avoided the sun from 10 AM-2 PM, and 35% examined their skin for unusual growths. No solid baseline information was gathered before distribution of the comic book, neither was a comparison group surveyed.

The lack of control group was addressed later in the study. Original subjects were compared to a group who had not been given the book. At this point in time, 62% of the original subjects reported using sunscreen as compared to 37% of the comparison group. The authors found this difference to be significant using a chi-square analysis. Not surprisingly, people who read the book also reported more skin cancer knowledge than those who did not. However, it appeared that understanding and retaining the health information did not affect subjects' sun behavior because no differences were discovered between original subjects and new subjects in wearing protective attire, examining the skin, or pursuing a skin check up with a physician. It should be noted that the comparison group would have
been questioned at a different time of the year, subsequently, internal validity may have become confounded.

Startling findings were reported in a recent health education intervention (Robinson, 1990). One thousand forty two patients were treated for non-malignant skin cancer and provided with education about future skin cancer prevention. Half of the educational component was provided by nurses two weeks after cancer removal in 15 minute sessions with individual patients about sunscreen use, specific times during the day to avoid the sun, and the wearing of protective attire. At a check up six months later, patients discussed sun safety topics, again, with nurses. One year later, 62% reported using sunscreen and 56% had modified outdoor activities to reduce their amount of sun exposure. While the increase in safer sun practices is encouraging, it is very important to note that 38% of patients who had a lesion removed still were not using sunscreen and 44% had not modified their outdoor behaviors to reduce UV exposure. Another point of consideration is that the self-reported improvements may have also had some "good patient" confounding when in reality, healthier sun behaviors may be somewhat less than reported. Finally, a comparison group was not included in the intervention's design.

In summary, the health education interventions have provided useful information about the behaviors of tanners and some insights about methods to get some people to practice safer sun behaviors. However, it is clear from these studies that information alone is not enough to get many people to alter their UV exposure behaviors.
Risk Assessment

Findings from the discipline of risk assessment may help researchers understand why health interventions have not been very successful in changing individuals' tanning behaviors. Risk assessment has been defined as "an intellectual discipline ... designed to aid in identifying, characterizing, and quantifying risk" (Slovic, 1987, p. 280).

In the late 1970's, Kahneman and Tversky proposed the prospect theory (Kahneman & Tversky, 1979). It grew out of their work exploring uncertainty and decision making. They posited that people are averse to loss and because of this aversion, people's choices change according to their perceptions of potential gains or losses. For example, they found that the way dilemmas were worded, or framed, affected subjects' answers (Tversky & Kahneman, 1981). If problems or dilemmas were worded in terms of losses, people chose the "safer" alternative. Yet, when the exact dilemma was worded in terms of gains, people chose alternate strategies. While some researchers have not found support for Kahneman and Tversky's belief that framing is robust across all situations (Fagley & Miller, 1990; Miller & Fagley, 1991), it may still prove useful in the design and wording of future suntanning interventions.

Heuristics are the strategies that people use while making decisions (Slovic, 1986; Tversky & Kahneman, 1973). People do not necessarily employ straightforward decision-making strategies, like probability theory, when dealing with the outside world. Often intuition and certain cognitive distortions come into play with linear-
type decision making rules. For example, availability takes place when people judge an event to be more probable based upon how readily they can recall similar examples (Kahneman & Tversky, 1982; Tversky & Kahneman, 1973). Thus, if an event can be easily visualized, people will rate such a situation as being more apt to happen. In today’s age of media bombardment, people are readily able to visualize disasters, and therefore overestimate the likelihood of such an event occurring (Lichtenstein, Slovic, Fischhoff, Layman, & Combs, 1978).

Lichtenstein et al.’s results have been supported by parallel research. In MacLeod, Williams, and Bekerian’s (1991) study, the experimenters found that people who worry more find it easier to construct cognitive scenarios of negative events happening than those who are less apt to worry.

While individuals tend to overestimate the probability of catastrophic events occurring, they typically ignore background information, base rate data, and underestimate the probability of statistically more common negative life events occurring to them (e.g., Perloff & Fetzer, 1986). This phenomenon has been called an optimistic bias or the illusion of unique invulnerability (Burger & Burns, 1988; Kulik & Mahler, 1987; Miller Ashton, McHoskey, & Gimbel, 1990; Weinstein, 1980).

Kahneman and Tversky’s representativeness heuristic (Kahneman & Tversky, 1972; Tversky & Kahneman, 1977) plays a role in the illusion of unique invulnerability. The representativeness
heuristic depicts individuals as generating mental models of stereotyped individuals to whom specific negative life events would happen. People compare themselves to their stereotype to determine the likelihood of the same event happening to them. As Weinstein (1980) noted, people overlook the possibility that few individuals, to whom the negative event befalls, actually fit the stereotype. To show this, he had college students generate lists of why they would not be susceptible to undesirable experiences. When other subjects read these lists, their optimistic biases decreased.

In addition to the cognitive explanation that the representativeness heuristic provides for the illusion of unique invulnerability, other researchers have proposed some underlying motivational mechanisms (Perloff, 1983). For instance, people may attempt to reduce their anxiety, caused by feeling out of control, through denial and other defense mechanisms.

It has been documented that people feel less vulnerable to risk when the life event is perceived as more controllable. (Slovic, 1987; Weinstein, 1980). Slovic (1987) described two factors, which combined characteristics of risk, from the risk assessment literature. The first factor was termed dread risk. At the high end of the dread risk continuum, events were characterized by lack of control, dread, fatal consequences, etc. Examples of such incidences would be nuclear war and nerve gas accidents. The other end of the dread risk continuum contained controllable, easily reduced, voluntary kinds of risks. Examples of such risks would be caffeine consumption and use
of power motors. The second factor was termed unknown risk. Events at the higher risk end of this continuum were described as unobservable, new, and unknown in their risk (i.e electric fields, laetril use). In contrast, events at the other end were described as old risks, observable, known to those exposed, and evidencing immediate effects (i.e. auto accidents, alcohol accidents).

Slovic (1987) pointed out that the definition of risk is subjective. Lay people typically view risks according to characteristics organized within the factor-analytic representation. Experts and people more familiar with statistics tend to view risk with regard to base rates and expected annual mortalities. As such, health experts understand that tanning behaviors, while perceived as low risk to lay people because of being voluntary and the potential consequences are understood scientifically, are much riskier and potentially more harmful than the public realizes.

Wilson and Crouch (1987) noted that effective illumination and minimization of risks first requires identifying and describing them. The end results of heuristics, such as the illusion of unique invulnerability and availability, are that people are more afraid of potential catastrophes than the more common events over which they have some control. Many times they miss opportunities to decrease their chances of experiencing very real negative life events by failing to take sufficient precautions against threats to their well-being.
Perceptions of Suntans

Miller, Ashton, McHoskey, and Gimbel (1990) performed two experiments. First, they investigated stereotypes associated with suntanning. Then, they examined the effects of an educational intervention on subjects' attitudes about tanning. The results from the first experiment are discussed in this section.

In their first experiment, the authors formulated three hypotheses. First, subjects would more favorably rank the person described as having a tan. Second, a negative component (e.g. "cocky", "vain") would surface along with the positive personality impression responses. The third was an exploratory attributional hypothesis. Subjects would be critical of those who actively pursued a tan or, because tans are highly valued in the American culture, subjects would report more positive impressions about intentional tanners.

205 (93 male, 112 female) students participated for partial fulfillment of a research requirement. The authors did not report other demographic information.

Participants were instructed to read descriptions of four target people and report their impressions on scales with 27 bipolar trait items. One of the targets included either a tan or no tan condition.

A significant main effect for the tanning description was found in 14 of the 27 bipolar trait dimensions along with six significant interactions. Therefore, to interpret the data more systematically, impressions of the target were factor analyzed and three factors
emerged. Attractiveness accounted for 35%, competence for 27%, and vanity accounted for 22% of the variance.

No significant effects were associated with the sex of target or perceiver in any of the situations. However, the target in the tan condition was perceived as more athletic than the other conditions. In addition, targets in the intentional tan condition were perceived as being more concerned about what others think. And, targets in the no tan condition were viewed as being less concerned about health than in the other conditions.

Results supported Miller et al.'s first hypothesis. "Tanned" targets were perceived as more attractive than those with no reported tans even when the tan was intentionally obtained.

Their second hypothesis was also supported because tanned targets were rated as more vain than people without tans. Intentional tanners rated highest on the vanity factor.

The experimenters' exploratory hypothesis yielded mixed results. While participants were more critical of intentional tanners, they were still rated as more attractive than targets without a tan. This led to the observation that the social benefits of an intentional tan seem to outweigh the social repercussions.

Broadstock, Borland, and Gason (1992) explored the relationship between levels of suntans and perceptions of healthiness and attractiveness. Subjects included 191 teenagers (95 females, 96 males) with the mean age of 14 years from five schools in Australia. They were shown 48 pairs of slides in which models had been
photographed up from the hip. Four white models, two females and two males, were used. After presentation of a slide, subjects were asked to rate which was the healthier and more attractive in each pair. It was not clear in the article if the subjects were given a forced choice as to which of the models was more attractive and which was more healthy looking or if one model could be rated as both more attractive and healthier looking than the other. Independent variables were tan level (no tan, light, medium, and dark tan), sex of model, and sex of subject. Subjects also completed questionnaires about their current tan levels, their skin reaction to the sun, and beliefs about tans making people more attractive or more healthy.

Subjects reported strong preferences for a medium tan over a dark tan, with both dark and no tans being less preferred. No tan was the least preferred suntan level. Related to judgements of the tan was the subjects' desire for a tan. Support was found for the prediction that subjects who desired a darker tan would judge a darker tan as being more healthy and attractive. The authors suggested that this finding supports the idea that the desire for a tan is motivated by the positive images associated with a tan.

Unlike Miller et al. (1990), sex differences between the perceivers were detected. Results indicated that males tended to view darker tans as more attractive than did females. Males also judged darker tans as more attractive than healthy looking.

Both male and female subjects rated male models as looking healthier and more attractive with darker tans than female models
with female subjects ranking the darker tans as even more desirable. This could be an outgrowth from women's publications warnings about photoaging being associated with sun exposure (e.g. Gaynor, 1992). Wrinkles are not seen as desirable for either sex, but women experience more societal pressure to not show signs of age than men (Freedman, 1986).

Results from this study may compare differently to other samples due to an intensive skin cancer control program in effect in the geographical area. Public education campaigns were designed to promote untanned bodies and lightly tanned bodies as more fashionable. While people reported behavior changes (Borland, Hill, & Noy, 1990), it is interesting that the adolescents perceptions about tans were still rooted in the belief that no tans were least attractive.

To summarize, the two empirical studies focusing on perceptions of suntans provided results that people with suntans are viewed as more attractive and healthy than those without tans. While people who intentionally pursed tans are regarded as more vain than others, they are still viewed as more attractive. Therefore, in designing interventions, it would be wise to target the fashion industry and pressure them to begin portraying people without tans as attractive. It would also seem that subjects' attitudes about suntans need to be targeted in interventions. The sole use of skin cancer prevention information, without changing attitudes about tans, will not be very effective in persuading people to change UV exposure habits.
Psychological Interventions

Barbara Keesling's dissertation (1988) explored the effects of skin cancer information, fear arousal, and risk taking personality orientation on skin cancer knowledge, sun exposure, and sunscreen use. She combined various health belief and persuasion models in forming her hypotheses and designing her study. One hundred thirty six middle class, white California residents were interviewed on southern California beaches. Subjects were selected based on depth of tan (no tan, pale tan, moderate tan, dark tan, and extremely dark tan). The tan rating system produced an intrarater reliability of $r=0.95$.

Once chosen, subjects completed questionnaires about their sun exposure habits and skin cancer knowledge. They also completed Carney's (1970) Risk-taking Attitudes Questionnaire, Farley’s Type T (thrill-seeker) inventory (Skrzycki, Horn, Moore, Golden, Linnon, & Dworkin, 1987), Zuckerman’s (1979) Sensation Seeking Scale, and the Need for Harmavoidance subscale from the Personality Research Form (Jackson, 1974).

After completing the paperwork, subjects received information about skin cancer (high or low) and a fear (high or low) arousing picture. Participants were randomly assigned to the treatment groups.

Not surprisingly, results showed that information affected skin cancer knowledge. Knowledge was also an important factor at follow-up in that it predicted intentions to prevent skin cancer. The specific important factor was knowing a number of ways to prevent skin cancer.
Keesling did not find fear arousal affecting attitudes about suntans, sun exposure, sunscreen use, or skin cancer prevention. She discussed a number of reasons for the failure to manipulate behaviors through fear, but felt most strongly that the population studied accounted for most of the failure. Her subjects were "hard core" tanners found on a beach, and may have been "immunizided" to fear messages concerning sun exposure. In effect, she probably had a skewed sample. She suggested experiments investigating the antecedents of sun exposure attitudes (beliefs and social norms) in a sample including both high tanners and people who did not tan.

Risk-taking variables were found to be related to self-protection behaviors. Keesling's risk-taking measures measured physical or financial risks. As such, it is logical that a person low in the measured risk-taking would be more apt to take precautions in the sun. Yet, Keesling repeatedly misses one important issue, her risk-taking measures do not assess social risk-taking. A person's willingness to risk for social rewards is very different from sensation seeking or thrill seeking which have been shown in her study to be related to protective behaviors. Thus, measures including social risk-taking variables may be more useful in predicting attitudes towards tanning and subsequent tanning behaviors than measures of physical or financial risk-taking.

A second intervention using psychological principles was done by Cody and Lee (1990) in Australia. College students (181 females, 131 males) viewed a control videotape, informational videotape, or an
emotional videotape. A ten week follow-up was included in the design. The goals of the study were to assess the effectiveness of the different videos on health beliefs, skin protection intentions, skin examination behavior, and treatment seeking behaviors.

Findings indicated that both treatment videos significantly increased skin protection intentions. Maintenance of those intentions was highest in the emotional video cell.

Females evidenced greater knowledge and stronger intentions to prevent skin cancer than men. They also reported fewer high risk behaviors.

Keesling and Friedman (submitted for publication) commented that the Cody and Lee study had some methodological problems. In particular, Cody and Lee did not separate emotions in the video. Thus, the question of which emotions are most effective could not be answered. Keesling and Friedman also noted that behaviors and intentions were not separated. Actual behaviors were not measured at follow-up.

Miller, Ashton, McHoskey, and Gimbel (1990) assessed respondents' reactions to a 30 minute video which documented the dangers of suntanning. Their questionnaire contained three parts: aspects of subjects' suntanning behaviors, risks associated with sun exposure, and reactions to the video. Parts one and two were alternated with part three to produce before and after tape conditions. They proposed that viewing the video prior to completing the questionnaire would increase awareness of risks and decrease
acknowledgement of social benefits. The experimenters also explored the relationship between self-reported darkness of summer tan ratings with reactions to the tape.

128 men and 227 women participated in the study as part of a research requirement for introductory psychology. No other demographic information was reported.

Four interpretable factors emerged from a varimax rotation. Factor 1 accounted for 34% of the variance and was labeled attractiveness value. Subjects with higher tan levels purported a belief linking tans with attractiveness. However, after seeing the tape, they were less likely to endorse such a belief.

Factor 2, convincingness of video on risk factors, accounted for 23% of the variance. Female subjects perceived the video as more convincing than the males. Females also indicated that they were more likely to change their tanning behaviors.

High tanners did not show an effect on the convincingness factor. The authors speculated that the tape may have been threatening to high tanners, whereupon, dissonance-reducing denial may have been utilized.

Overall, the mean level of convincingness was relatively low. Miller et al. concluded that participants acknowledged a degree of risk in tanning, but did not believe that risk to be as dangerous as experts claimed. This effect could also have been related to the illusion of unique invulnerability (i.e. suntanning is a risk for others, but not necessarily for me).
Factor 3, degree of tanning development, accounted for 21% of the variance. Males reported a higher level of tanning development than the females. And, expectedly, subjects who reported higher tan levels also indicated having darker natural skin color, a higher current tan, a greater ease in developing a tan, and a significant lower use of sunscreen.

Factor 4 accounted for 20% of the variance and was called concern about danger of sun exposure. Subjects who viewed the video first were more apt to be concerned about consequences of sun exposure. Females indicated more concern than males, especially about wrinkling and skin cancer.

In addition to the four factors, the authors found interesting relationships among some specific items. In particular, high tanners indicated less control over sun exposure dangers and were least likely to agree that too much value is placed on attractiveness. They indicated more often that the risks were worth the benefits, that the public had enough information about sun risks, and more often believed that cancer was a problem of older people.

Supporting the hypothesis that tan level would be related to the illusion of unique invulnerability, all subjects displayed optimistic bias. In comparing the groups, high tanners ranked themselves as having the least risk of reaping consequences from sun exposure, followed by medium tanners, with low tanners ranking themselves as more likely than the others.
A potential problem with this study is that the criterion used to classify subjects into the independent variable of tan level was subjects' rating of their "maximum suntan level this past summer". Various skin types tan at different rates and to different shades. Perhaps a better criterion would be amount of energy spent in pursuing a tan.

Jones and Leary (1992) presented a poster at the APA convention in Washington, D.C.. They described an intervention based on principles derived from their research (Leary & Jones, submitted for publication). They compared the effectiveness of health-based messages to appearance-based messages on university students' intentions to protect their skin from UV rays. Subjects included 64 females and 64 males.

Participants received the Public Body Consciousness Scale (Miller, Murphy, & Buss, 1981). It is a six item questionnaire assessing a person's concern about public appearance.

After reading either the health-based, appearance-based, or control essays, subjects answered questions concerning the degree with which they (a) were concerned about effects of the sun, (b) planned to work on tans next summer, and (c) intended to use sunscreen.

Subjects were more influenced by the appearance-based essay to change their sun exposure behaviors. However, the subjects who ranked the highest in appearance motivation reacted defensively to the essay and indicated even greater intentions to continue tanning. A
follow-up study to determine the relationship between the subjects' intentions about sun exposure and actual behavior change is needed.

Keesling and Friedman's (submitted for publication) experiment is the final intervention study to be reviewed in this section. They explored the influence of information (high/low) and anxiety arousal (high/low) on skin cancer knowledge, attitudes, intentions, and behaviors. Subjects were 82 female and 54 male white California residents who were interviewed on southern California beaches in the summer. As in Keesling and Friedman's (1987) study and Keesling's (1988) dissertation, subjects were chosen on the basis of the depth of their tans.

Results indicated that information affected skin cancer knowledge and information-seeking behavior, but not attitudes or intentions. Anxiety did not influence any of the dependent variables. Keesling and Friedman concluded that contrary to their findings in the 1988 study, specific cancer education can be "somewhat effective" with this population even though attitudes and intentions were not affected by the intervention.

Perhaps Keesling and Friedman's contradictory findings are due to other major variables being absent in their interventions. For instance, self-presentational messages were not included. It may not be enough to simply supply anxiety messages about skin cancer. Instead, it may be necessary to take the next step and explain to tanners how consequences of sun exposure can affect them especially on image-related dimensions.
Overall, interventions attempting to modify behaviors or attitudes about tanning have provided information about the levels of effectiveness of the message content. As in the 1988 study (Keesling, 1988), Keesling and Friedman (submitted for publication) did not find anxiety/fear messages affecting subjects' attitudes or behaviors towards tanning. Cody and Lee (1990) found both informational and emotional interventions to be more effective in changing intentions than the control group. Miller et al. (1990) found that a video with information and anxiety factors affected subjects' impressions about tanning if the video was administered before the questionnaire. They also found that high tanners acknowledge the risks, but still chose to participate in risky behaviors. Finally, results from Leary and Jones' (1992) study indicated that appearance-based messages were more effective in changing attitudes and behavioral intentions than information-messages. If one looks closely, the variable that seems most closely linked with effectiveness of the interventions is the inclusion or exclusion of appearance-motivated messages.

**Psychological Variables of Tanners**

Only one full empirical study (Keesling and Friedman, 1987) has been published on this topic, although a new study by Leary and Jones has been submitted for publication. In addition, in a subsection of their second experiment, Miller et al.'s (1990) found a positive relationship between subjects' depth of tans and their illusions of unique invulnerability.
Keesling and Friedman (1987) explored psychosocial factors in suntanning and sunscreen use. They used a combination of theoretical models to predict the performance of health behaviors and generated four areas of variables which were studied as predictors of sun exposure. The first variable compared personalities of tanners to non-tanners. These predictions were based on popular stereotypes, e.g. tanners would have a higher concern with his/her appearance; tanners would score higher for social desirability; tanners would have a lower need for achievement, higher need for aggression, and worry less about cancer; And finally, they would view themselves as more daring and have more positive risk taking attitudes than non-tanners.

The second set of variables posited had to do with subjects' moods. Keesling and Friedman based these predictions on anecdotal accounts and research concerning positive effects of sunlight on mental health. It was expected that tanners would score lower on depression and anxiety scales, but would score higher on relaxation scales.

The third set of variables dealt with health behaviors. Specifically, tanners were expected to be more involved in appearance-related behaviors (i.e. exercising, dieting). Keesling and Friedman also thought it was possible that tanners would engage more often in general health behaviors (i.e. getting medical check-ups, wearing seat belts).

The fourth area concerned social network variables. Suntanners would be more apt to belong to health clubs and have friends who
sunbathe than non-tanners. They would be less likely to know someone who had cancer. The degree of their tan would be associated with reporting more positive comments on the tan.

Besides sun exposure, the authors were also interested in attempting to predict characteristics found in sunscreen users. They hypothesized that women would be more likely to use sunscreen because they are used to applying makeup and they would want to prevent facial wrinkles. Sunscreen users would have more skin cancer knowledge, view themselves as being more vulnerable to skin cancer, and be more apt to know someone with cancer. Lastly, Keesling and Friedman predicted that sunscreen users would rate skin cancer as a more severe medical disorder than non-sunscreen users.

Keesling and Friedman (1987) stated two main goals for their study. First, they wanted to gain a better understanding of suntanning with the hope of developing interventions to change harmful behaviors. Second, they were striving to clarify more general relationships among personality factors, social influence factors, and engaging in health-compromising behaviors.

They studied 120 (66 female, 54 male) white California residents who were recruited by approaching them at five beach locations. Subjects ranged from 18 to 64 years old with a mean age of 33 for men and 32 for women. The modal responses for other demographic variables were "some college", a family income of $20,000-$39,000, and working a 40 hour work week. Fifteen subjects reported that they did not work at all.
Participants were interviewed about their health practices, tanning habits, social networks, and health beliefs. They completed Crowne and Marlowe's (1964) Social Desirability Scale, Carney's (1970) Risk Taking Attitudes Questionnaire, a scale based on the Tennessee Self-Concept Scale (Fitts, 1965), and the Need for Achievement, the Need for Harm Avoidance, and the Need for Aggression subscales from Jackson's (1974) Personality Research Form.

Dependent variables which assessed tanning included reported hours of sunbathing, hours of sun exposure and tan rating. The dependent variables which assessed sunscreen use were percentage of time subjects use sunscreen and the highest SPF (sun protection factor) the subject reported applying.

Keesling and Friedman found that tan rating was the best measure of sun exposure because it correlated most often and most highly with the measured personality, mood, social network, and health behavior variables. The authors ran a multiple regression utilizing the predictor variables significant at the .05 level or below to find combinations of variables which best predicted tan rating. Due to the number of comparisons (n=66) reported and the other 66 comparisons not included in the table, an alpha level of .05 seems too low to protect against spurious findings. Keesling and Friedman stated that it was not useful to adjust the alpha level because of baseline intercorrelations between some variables. They suggested that findings above .25 were "likely reliable". Therefore, caution should be exercised when interpreting and applying their results.
Keesling and Friedman found that belonging to a health club (r = .34, p < .01), having a larger percentage of suntanning friends (r = .30, p < .01), low need for harm avoidance (r = -.30, p < .01), not having much skin cancer knowledge (r = -.25, p < .01), and perceiving the performance of risky behaviors as an avenue for positive gains (r = .30, p < .01) best predicted the darkness of tans.

Additional variables that were found to be related to depth of tans were low need for achievement (r = -.20, p < .05), high need for aggression (r = .24, p < .05), higher feelings of relaxation (r = .24, p < .05), weighing less (r = -.23, p < .05), and hours of exercise participated in per week (r = .23, p < .05).

As predicted, more women used sunscreen (r = -.27, p < .01) as did people who knew more about skin cancer (r = .21, p < .05). Anxiety was related to sunscreen use (r = .20, p < .05). Also, if subjects knew people who had cancer, they were more likely to use protective lotions (r = .23, p < .05).

Like Keesling and Friedman, Leary and Jones (submitted for publication) also studied psychological variables of tanners. Leary and Jones based their conceptualizations of tanning on image management theory and were interested in the lack of a relationship between appearance concerns and tanning behaviors in earlier research. They postulated that people who placed more importance on physical attractiveness would be more likely to engage in high risk sun behaviors.
Subjects were 133 female and 133 male Caucasian undergraduates who participated in early fall. They completed a questionnaire assessing: sun risk behaviors (e.g. how long spent in sun), intentions to use sunscreen, personal reactions to the sun, skin cancer knowledge, sunscreen knowledge, attitudes towards sunscreen, estimate of cancer risk, and personality variables. The more externally evident personality variables included: evaluation concern, body self-consciousness, interaction anxiety, public self-consciousness, social identity orientation (the degree to which people’s identities are based on relationships with others), and physique anxiety. The personality variables assessing more internal dimensions were: private self-consciousness, self-esteem, personal identity orientation, and body self-esteem.

Leary and Jones found variables associated with a high appearance concern (e.g. high need to impress and high concern about attractiveness) plus the belief that tans are attractive were the strongest predictors of sun risk behaviors. On the other hand, sunscreen use was best predicted by more cognitive variables such as skin cancer knowledge, knowing someone with skin cancer, and feeling in control over one’s health. Yet, even with these cognitive factors, when a person believed a tan increased attractiveness, sunscreen use decreased.

The data also produced some gender differences. Unlike Cody and Lee’s Australian (1990) sample, men were less likely to engage in
higher skin cancer risk behaviors than women. Women, however, were more likely to use sunscreen when being exposed to sunlight.

Leary and Jones concluded that future research needs to pay greater attention to personal motives for tanning. They also suggested that interventions not rely only on health information, but address issues of attractiveness, too. In this case, tanning's stronghold is its link with attractiveness, but it may also be its Achilles' heel. If interventions were able to convince people that they would be less attractive due to damage from the sun, people might be more likely to change their behaviors. Finally, Leary and Jones concluded that interventions to increase protective behaviors may be more cognitive in approach than interventions to reduce the tanning behaviors.

Caution needs to be used when applying findings from basic studies about tanners to interventions. For example, it might be tempting to design an intervention for tanners and to encourage the fashion industry to portray tans as unattractive. This approach could produce a backlash against darker skin. The needed message is that skin types are diverse and attractive in and of themselves. And all skin needs protection to maintain its inherent healthiness and attractiveness.

Implications for Counseling Psychology

Counseling psychology is distinguished from other areas by its multi-faceted approach to wellness. Four main areas are recognized as being important in understanding issues and helping clients strive for mental health: research, education, prevention, and intervention.
An abundance of research opportunities exist in studying the phenomenon of suntanning. As stated earlier in this chapter, there is a need for further understanding of antecedent variables of impression motivation with regards to suntanning. It would also be helpful for continued research to explore what reasons and characteristics are predominate in people who choose to avoid suntanning. Furthermore, conceptual links to other areas of impression management in which people jeopardize their health are ripe for exploration. There is also a critical need for the development of a psychometrically sound skin cancer knowledge questionnaire.

A goal in counseling psychology is to link its research with its field of practice. While the above paragraph contains only a few examples of potential research opportunities, it is clear that in investigating such questions, researchers' findings will enable them and practitioners to develop more effective interventions and therapy strategies.

Wilson and Crouch (1987) noted that effective illumination and minimization of risks first requires identifying and describing the risks. Therefore, it is important to implement and refine educational messages for clients and communities. However, before such strategies can be implemented, those within the mental health field need to be educated about the real risks, the underlying issues, and the dynamics involved in the continued pursuit of tans. Because tanning is such a common practice and the risks are understood by science, there is a tendency, even for experts, to minimize its perils
(Slovic, 1987). With their roots in a wellness model of mental health, counseling psychologists would likely be more receptive to education and research findings concerning suntanning. Thus, counseling psychologists would be a good group to target for the initial educational phase.

Then, research about tanners and risk assessment principles need to be incorporated into suntanning interventions. These interventions will need to be refined in pilot studies before implemented in widespread public educational campaigns.

After the public receives the intervention messages, the next step is for people to choose to take preventive actions from the sun. When people so educated continue to tan, counseling psychologists' training in assessment may prove helpful in understanding where the prevention efforts have derailed. Other preventive efforts such as lobbying the fashion industry may also be options.

People's perceptions about the risks associated with tanning appear to be slow to change. For instance, physicians have been issuing warnings since the 1940's about the dangers of ultraviolet radiation exposure (Keesling & Friedman, 1987). An acceleration of attitude change is imperative as scientists continue to amass evidence that the ozone layer is disintegrating much faster than predicted. For example, besides the growing hole over the Antarctic, an unexpected one is developing over the Arctic (Brune, Anderson, Toohey, Fahey, Kawa, Jones, McKenna, & Poole, 1991) and astronauts on the Columbia
shuttle mission reported that the ozone is thinner than ever (National Public Radio, April, 1993).

The Antarctic hole stretches over Chile and Argentina during the Southern Hemisphere’s summer. As the natural belt of protective gases has been depleted, urgent health messages have increased in South America. Yet, reporters testified that the beaches of South America remained full. When surveyed, beachgoers expressed fear along with the desire to continue tanning (Nash, 1992).

The worry expressed by South American beachgoers, combined with their continued pursuit of suntans, indicates a clashing of health messages with attraction messages. Escalation of this conflict appears inevitable as holes in the ozone spread and the health messages can no longer be ignored. Mental health practitioners who listened to the educational messages and acquainted themselves with the underlying issues will be better prepared to assist clients when conflicts over tanning and health begin to be expressed. Professionals’ suntanning interventions need to be grounded on the belief that clients can choose to be healthy. Based on such a belief, practitioners can then provide the guidance and support that clients will need as they oppose the powerful messages about tanning and attractiveness.
CHAPTER III
METHOD

Subjects and Procedures

Data from 300 subjects were collected during the third week of November, 1992. Some data were omitted in the main analysis based on four subject variables. First, because tanning behaviors are strongly linked to cultural norms, only data from subjects raised in the USA were employed. Second, because tanning norms vary in different parts of the USA, subjects who lived in sunny climates (e.g. Florida or Texas) during the 1991-1992 school year were screened. Third, data from subjects who were not able to choose to go outside (i.e. working) during the months of May 1992-August 1992 were also disregarded. Fourth, subjects whose scores were invalid on any of the instruments (e.g., The Jackson Personality Inventory) were deleted from the pool. Therefore, only the data from 113 female and 97 male, Caucasian, undergraduate subjects were analyzed in the study.

Subjects' ages ranged from 17 to 38 with the mean = 19.1, the standard deviation = 2.2, and the median = 18.2. They were enrolled in introductory psychology classes at a large Midwestern university. Their participation partially fulfilled course requirements.
Information about 28 female and 19 male racial/ethnic minority subjects, with ages from 18-24, was also collected. The group consisted of 21 African, 16 Asian, and 10 Hispanic Americans. The variety of ethnic backgrounds among the minority students did not contribute to large enough sample sizes with the power required for statistical analyses. However, descriptive and exploratory data were reported along with suggestions for future research.

Participants completed the demographic questionnaires and psychological instruments in classroom settings. After having completed the materials, subjects were given debriefing sheets that explained the purpose of the study (Appendix A). The experimenter remained to answer potential questions.

Design

The aims of this correlational study were to replicate and extend past research findings by exploring more fully the psychological variables involved in the pursuit of suntans.

Order of instrument presentation was randomized except for the demographic questionnaire. The questionnaire always appeared last because earlier exposure to it could have altered subjects' responses to the other instruments.

Subjects were categorized into one of four groups depending on the level of effort expended in their pursuit of suntans. The first group, year round tanners (YRT), were subjects who regularly pursued suntans during the winter months of September 1991-April 1992. In order to create mutually exclusive groups, entrance into this group
required tanning in the off-season as well as intentional tanning in the summer months. Because people who lived in sunny climates (e.g. Florida or Texas) were screened, YRTs used artificial methods of acquiring suntans. The second group consisted of subjects who intentionally pursued suntans (intentional summer tanners, IST) during the summer months of May 1992- August 1992. Subjects in the third group unintentionally acquired suntans (unintentional summer tanners, UST) from May 1992- August 1992. The final group consisted of people who avoided tanning (AT).

Impression management and risk assessment variables were explored in order to determine their significance in predicting tanning group membership. The impression management variables were: appearance motivation, conformity, gender role identity, self-esteem, and social adroitness. Risk assessment variables were: anxiety, illusion of unique invulnerability, risk taking, skin cancer knowledge, and skin sensitivity to the sun. In addition, an initial investigation of ethnicity as a discriminator variable was conducted.

Materials

The Bem Sex Role Inventory (BSRI). Sex role orientation was measured using the BSRI (Bem, 1974b). The BSRI consists of 60 descriptors: 20 masculine, 20 feminine, and 20 neutral. Each descriptor is accompanied by a 7-point rating scale ranging from 1, "never or almost never true," to 7, "always or almost always true". The scale yields scores of the Masculinity and Femininity by summing the 20 items for each scale and dividing by 20. Total scale can range
from 1-7. If Masculine is greater than the 4.9 median and Feminine is less than the 4.9 median, a person is "masculine-typed". If Feminine is greater than 4.9 and Masculine; is less than 4.9, a person is "feminine-typed". If both Masculinity and Femininity are greater than 4.9, a person is considered androgynous.

Items were selected for the BSRI from pools of 200 positive masculine and feminine traits and 200 neutral traits. The final items were selected by judges based upon the criterion that the descriptors be more desirable in American society for one sex than for the other (Bem, 1974a).

Original norm bases were 279 female and 444 male introductory students at Stanford University; 77 female and 117 male paid volunteers from Foothill Junior College. By 1990 (Beere, 1990a), over 875 articles and 167 Eric documents utilized the BSRI, inadvertently providing a vast supply of information about diverse populations and BSRI scores.

Bem reported (1974a) internal consistency scores to be highly reliable in both the Stanford and Foothill samples. The coefficient alpha was computed separately for the Masculinity and Femininity scores of the two samples. The coefficient alpha was equal to .86 and .80 respectively, for the Stanford Masculinity and Femininity scales. The Foothill alphas were equal to .86 for Masculinity and .82 for Femininity. The reliability of the Androgyny difference score was .85 for the Stanford students and .86 for the Foothill students.
The relationship between Masculinity and Femininity was found to be empirically independent. The correlations were reported for the Stanford males, r=-.11, and females, r=-.14. Bem reported correlations for the Foothill males, r=-.02 and females r=-.07.

In order to determine that Androgyny was not purely tapping into a social desirability response set, product moment correlations were calculated between the Social Desirability score and the Masculinity, Femininity, and Androgynous scores for both the Stanford and Foothill samples. As predicted, the Masculinity and Femininity scales correlated with Social Desirability. However, near zero correlations were produced between the Androgyny and Social Desirability scales. Bem concluded that Androgyny was not simply measuring a person’s "socially desirable" answers, but was tapping into that person’s very specific tendency to describe her/himself in terms of sex-typed standards of behavior desirable for both men and women.

To compute test-retest reliability scores, a subsample (28 females, 28 males) of the original Stanford sample retook the BSRI four weeks after the first administration. Product-moment correlations were calculated and r=-.90 for Masculinity, r=-.90 for Femininity, and r=-.93 for Androgyny scores.

Finally, in determining discriminant validity, Bem (1981b) compared the BSRI with the Masculinity-Femininity scales of the California Psychological Inventory (CPI) (Gough, 1975) and the Guilford-Zimmerman Temperament Survey (GZTS) (Guilford &
Zimmerman, 1978). She found that none of the GZTS scales correlated with the BSRI scales. While BSRI Masculinity scale moderately correlated with CPI females (r = -.25) and males (r = -.42), Bem determined that the correlations were not particularly high, the BSRI measures different sex role aspects than the CPI.

Since publication of Bem’s (1974a) seminal article, there have been many debates in the literature about the psychometric properties and usefulness of the BSRI. For example, Gaudreau (1977), Sines and Russell (1978), and Waters, Waters, and Pincus (1977) provided evidence that they felt discredited Bem’s (1974) claim that the BSRI measures masculinity and femininity as two separate traits as opposed to one bipolar construct. Larsen and Seidman (1986) contended that Gaudreau (1977) and Waters, Waters, and Pincus (1977) combined sex-typed and non-sex-typed subjects in their factor analyses, thereby confounding their results. By combining both groups, the researchers identified four factors, with one factor moderately bipolar in that it highly correlated with sex of subject and consisted of mostly Masculine and Feminine items. Larsen and Seidman separated the two groups and performed two factor analyses on the intercorrelations of 41 variables: 20 BSRI Masculine, 20 BSRI Feminine items, and sex of subject. They also subjected the four factors found by the other researchers to varimax rotations. Larsen and Seidman found bipolar factors for the sex-typed group anchored by Masculinity items and Femininity items. However, the non-sex-typed group yielded results that three out of four factors were
unidimensional with no distinct anchors of either Masculinity or Femininity traits.

Larsen and Seidman also employed a congruence coefficient to the responses from both groups. Their results indicated that factor patterns existed from two different samples, supplying more evidence for the construct validity of the BSRI.

Like Gaudreau (1977) and Waters, Waters, and Pincus (1977), Sines and Russell also combined the sex-typed and non-sex-typed groups in their correlational analyses. It could be suggested that Sines and Russell's (1978) results might also provide support for the construct validity of the BSRI if the two groups responses were separated for analysis.

Spence and Helmreich (1979) expressed the belief that the search for sex role identity measures is a "snare and a delusion" because many differences exist between men and women and those differences vary both by time and individual. They concluded that the concept of androgynty is a "worthy topic of investigation that awaits the development of more appropriate measuring instruments than the BSRI or PAQ" (p. 1045).

Examination of Beere's (1990a & 1990b) gender role tests and measures handbooks indicated that the newest trend in the field is the development of multidimensional sex role inventories as opposed to unidimensional or bidimensional instruments (Bernard 1981, 1984, 1990). Bernard (1984) reported findings which suggested that traditional M-F scales are comprised of five independent factors:
Aesthetic Interests, Mechanical Interests, Anxiety, Feminine Conventions, and Masculine Conventions. He also stated that the newer bidimensional scales comprise of two factors: Dominant and Supportive (Bernard, 1990). He combined the seven factors into one instrument, the Multidimensional Sex Role Inventory-Revised (MSRI-R), and ran several factor analyses. Reliability and validity for two of the scales, Feminine Conventions and Masculine Conventions remained questionable over several trials. Bernard encouraged the MSRI-R to be utilized without using data obtained from the suspect scales.

Another potential problem exists with the MSRI-R's Anxiety scale. A majority of the scale's items were derived from the MMPI, thereby, tapping into pathological anxiety. Bernard (1990) conceded that it "legitimately might be questioned as a sex role factor" (p.219).

Consequently, there are four scales useful in research with a well-adjusted population on the MSRI-R: Aesthetic Interests, Mechanical Interests, Dominant, and Supportive. The Aesthetic and Mechanical Interests items were taken from the Strong Vocational Interest Blank (SVIB) (Campbell, 1971) and their primary use was intended to be as tools for career choice and development. Thus, the Dominant and Supportive scales appear to be the most useful MSRI-R scales. Importantly, the items for these scales were taken from the BSRI. Bernard's use of the scales denotes that the BSRI was neither tapping the global concepts of masculinity and femininity nor concepts from the gender-schematic processing, but the more limited concepts of dominance and supportiveness. Bem (1981) cited empirical
evidence that the BSRI taps different sex role identifications for
different people, not merely expressiveness (supportiveness) or
instrumentality (dominance). Furthermore, since the two most useful
scales come directly from the BSRI, it seems logical to employ the BSRI
itself.

In addition, it is noteworthy that of the four MSRI-R scales
useful in research with a well-adjusted population, the conceptual
underpinnings of Aesthetic and Mechanical Interests and the
Dominant and Supportive scales are diametrically opposed. The BSRI
was developed under the theoretical assumptions that masculinity and
femininity are two different dimensions, while the more traditional
instruments were founded on the assumption that masculinity and
femininity are unidimensional.

Clearly, the new and more "appropriate" sex role identity
measure that Spence and Helmreich (1979) called for has yet to be
developed. In fact, Beere (1990a, 1990b) only reported two
instruments that specifically provide a scoring method to calculate
androgyny, the BSRI and the PRF ANDRO (Berzins, Welling, & Wetter,
1978). The PRF ANDRO consists of 56 items from the Personality
Research Form (PRF) (Jackson, 1974). For the present study the
PRFANDRO is not an option to use because both the Jackson
Personality Inventory (JPI) (Jackson, 1976) and the PRFANDRO
originate from the PRF. It seems highly probable that using these
instruments to explore relationships among variables would yield
spurious results due to the shared item pool.
In conclusion, while questions have been raised concerning psychometric properties of the BSRI, there is ample evidence in the literature to support its use in gender role research. Because the present study was interested in exploring the existence and characteristics of relationships between gender role identity variables (in particular Masculinity, Femininity, and Androgyny) and tanning behaviors the BSRI appears to be the best tool available.

**Body Consciousness Questionnaire.** Appearance motivation was measured using the Public Body Consciousness (PBC) (Miller, Murphy, & Buss, 1981) scale from the Body Consciousness Questionnaire (Appendix B). The other two scales on the questionnaire are Private Body Consciousness and Body Competence. Note that in order to preserve the scale’s validity, the entire questionnaire was administered.

The PBC consists of six items measuring people’s concern about maintaining an attractive appearance in public. Subjects respond to the items using five-point rating scales ranging from “0 (extremely uncharacteristic)” to “4 (extremely characteristic)”. Items include: 1) When with others, I want my hands to be clean and look nice, 2) It’s important for me that my skin looks nice...for example, has no blemishes, 3) I am very aware of my best and worst facial features, 4) I like to make sure that my hair looks right, 5) I think a lot about my body build, and 6) I’m concerned about my posture.

Miller, Murphy, and Buss developed the questionnaire with a large item pool which they reduced to 15 items based on pilot testing.
Once the pilot work was finished, they administered the instrument to 561 undergraduate men and 720 undergraduate women to obtain a matrix of item intercorrelations. The results indicated suitability for factor analysis. They used a maximum likelihood solution with varimax rotation. Because factor patterns for men and women were similar, they combined the data for subsequent analyses. As a reliability check, they tested two additional samples of college students (n=460 and 680) and replicated the basic three factor structure.

To determine test-retest reliability, the experimenters administered the questionnaire to 130 college students in a two month interval. PBC yielded a .73 test-retest reliability score.

Based on norms from 568 men and 731 women, women scored significantly higher on the PBC scale than men. No significant difference was found for gender on the other two scales.

Miller et al. correlated scores from the Body Consciousness Questionnaire with the Self-Consciousness Inventory (Fenigstein, Scheier, & Buss, 1975), the Hypochondriasis scale of the Minnesota Multiphasic Personality Inventory (Hathaway & McKinley, 1967), and the Emotionality scale of the EASI (Emotionality, Activity, Sociability, Impulsivity) Temperament Survey (Buss & Plomin, 1975). Miller et al. concluded that self-consciousness is associated with an interest in one's private and public body. They also stated that private body consciousness and private self-consciousness are related, but different personality traits. However, public body consciousness and public
self-consciousness are the same entity. Finally, neither body
consciousness seems to be related to social anxiety, hypochondriasis,
or emotionality.

The Jackson Personality Inventory (JPI). Personality traits were
measured using the JPI (Jackson, 1976). The JPI was developed for
use with the non-psychopathological population with average to
above-average intelligence. The scales, derived from research
findings in personality and social psychology research, assess a variety
of interpersonal, cognitive, and value orientations important to a
person's functioning (Jackson, 1976).

The JPI consists of 320 true/false questions yielding scores on
15 scales: Anxiety, Breadth of Interest, Complexity, Conformity, Energy
Level, Innovation, Interpersonal Affect, Organization, Responsibility,
Risk Taking, Self-esteem, Social Adroitness, Social Participation,
Tolerance, and Value Orthodoxy. Each scale consists of 10 true-keyed
and 10 false-keyed items. The JPI also contains a validity scale,
Infrequency, to assess faked or carelessly completed profiles.

A construct approach was used in the development of the JPI.
The scales, designed to be bipolar, were constructed from large item
pools based upon explicit definitions for each scale.

Norms are based on data obtained from 2,000 female and 2,000
male respondents from 43 North American colleges and universities.

Jackson (1977) examined the scale reliability of the JPI using an
internal consistency procedure and two samples of college students.
The California sample (N=82) yielded coefficients ranging from 0.84 to
0.95, with a median of 0.93. The Pennsylvania sample (N=307) yielded coefficients ranging from 0.75 to 0.93, with a median of 0.90. As such, the coefficients tend to suggest that the scales are internally consistent.

Jackson provided concurrent validity data in the JPI manual (Jackson, 1976). JPI scales were correlated with selected psychological tests and assessment tools. The tests included the Personality Research Form (PRF) (Jackson, 1974) and the Minnesota Multiphasic Personality Inventory (MMPI) (Hathaway & McKinley, 1967). Results indicated that the correlations between the JPI and other tests were consistent with expectations.

Jackson and Skinner (1975) reported finding five factors, accounting for 65% of the variance, from the 16 JPI scales. The sample for their factor analysis comprised of 215 college students, 115 females and 100 males.

Factor 1 consists of Breadth of Interest, Complexity, Energy Level, Innovation, Risk Taking, Self-esteem, and Tolerance. A high score on this factor indicates broad interests, a preference for intricate solutions to problems, high energy, motivation to be creative, willingness to take risks, self confidence, acceptance of a diversity of people and ideas, and independent thoughts and actions.

Factor 2 includes Anxiety, Interpersonal Affect, and Social Participation. A person scoring high on this factor would exhibit a preference for warm interpersonal relationships and experience anxiety.
Factor 3 is comprised of Self-esteem and Social Adroitness. This factor suggests an ease with others and attempting to influence others.

Factor 4 consists of Organization, Responsibility, and Value Orthodoxy. A person scoring high on this factor would tend to be planful and orderly, honest and law-abiding, and relatively conservative in terms of social values.

Factor 5 loads only the Infrequency scale. A person scoring high on this factor would tend to display carelessness or be faking bad while completing the inventory.

Results were also reported from multitrait-multimethod studies reflecting convergent and discriminant validities of the scales. A majority of the time, predicted measures loaded highly on their respective factors, supporting the convergent and discriminant validity of the JPI scales. Individual matrices are provided in the JPI manual (Jackson, 1976).

Walsh and Betz (1985) noted that, currently, the "most reasonable use" of the JPI is for personality research. Also, because the norm, validity, and reliability studies have all used college populations, Walsh and Betz caution about using the JPI in applied settings. However, they support its use in educational environments. The JPI was chosen for the present study for three primary reasons. First, in their groundbreaking study exploring psychosocial factors, tanning behaviors, and sunscreen use Keesling and Friedman (1987) used three scales from the PRF: Need for Achievement, Need for Harmavoidance, and Need for Aggression. Their results supported
their predictions that low Need for Achievement, high Need for Aggression, and low Need for Harmavoidance would be related to sun exposure. Jackson (1976) wrote that the JPI "represents a further refinement and development of substantive, psychometric, and computer-based strategies initially employed in the development of the PRF". Therefore, to facilitate comparisons of present findings with past research results, the more psychometrically sound JPI was used in place of the PRF scales used by Keesling and Friedman. Moreover, in order to preserve the validity of the scaling, the entire JPI was given to participants.

The JPI was also chosen because traditional-aged college students, along with younger adolescents, make up the population exhibiting the highest degree of tanning behaviors. As such, many well-adjusted individuals participate in the pursuit of suntans. In studying this population, it is important to use appropriately designed instruments for research with a collegiate population, especially with regard to subjects being of average to above-average intelligence and non-psychiatrically disturbed.

The final reason for using the JPI was the variety of scales provided by which to measure both interpersonal and intrapersonal personality traits. Of the 15 substantive scales, five were considered to hold the most promise of being related to tanning behaviors based on theory and past research. Of those five scales 1) Anxiety measures an individual's experiences with moderate fears and uncertainties, 2) Conformity gauges one's sensitivity and responsiveness to social
pressures and social norms, especially as expressed by key people in one's social environment, 3) Risk Taking is assessed along the domains of ethical, financial, physical, and social risk taking, 4) Self-esteem assesses an individual's social self-confidence, and 5) Social Adroitness measures a person's social intelligence especially with respect to her/his ability to persuade others (sometimes to the extent of manipulation).

**Questionnaire.** A 19 item questionnaire was designed to assess subjects' tanning behaviors, skin sensitivity, illusions of unique invulnerability, and skin cancer knowledge (Appendix C).

**Winter tanning behaviors.** Respondents were asked the degree to which they engaged in tanning behaviors from September 1991-April 1992. The questions asked (a) how often during the month they used a tanning bed/booth/column/lamp, (b) how much time per visit they spent using an artificial tanning device, and (c) whether or not they pursued a tan if they took a vacation.

The first question was the criterion question. If subjects responded that, on average, they used an artificial tanning device every other week or more, they were included in the group of people defined as *year round tanners* (YRT). The other questions were used primarily to gather frequency of tanning data.

**Summer tanning behaviors.** Questions 4-6 assessed subjects' tanning behaviors from May-August 1992. Subjects who responded that they intentionally acquired a tan were classified as *intentional summer tanners* (IST). Subjects who answered that they
acquired a tan, but did not intentionally pursue one, were classified as
unintentional summer tanners (UST). Finally, those who responded
that they avoided acquiring a tan were placed in the avoided tanning
(AT) group.

Skin burns. Subjects' reported if their skin burns before
tanning on question 8.

Illusion of unique invulnerability. The two questions used
to determine subjects' illusions of unique invulnerability were from
Miller et al.'s (1990) questionnaire. Participants were asked to
compare themselves to similar OSU students and rate (a) their chances
of getting skin cancer (1 = very likely, 7 = very unlikely) and (b) the
chances of their skin prematurely aging (sun-related drying,
wrinkling, spots). The responses were added together with a score of
8 indicating a lack of bias. Scores lower than 8 displayed pessimism
while scores higher than 8 displayed optimism or an illusion of unique
invulnerability.

Skin cancer knowledge. Nine items consisting of multiple
choice, short answer, fill in the blanks, and true-false questions were
used to assess skin cancer knowledge. The items probed knowledge
about skin cancer causes, incidence rates, mortality rates, preventions,
and treatment modalities. The questions were modified from
(signs of skin cancer), 9 (major causes), and 14 (name specific
preventions) were also used in Keesling's (1988) questionnaire.
The short multiple-answer questions were scored to be equivalent in weight to the other items. When summed, scores ranged from 0-9 with higher scores indicating higher levels of skin cancer knowledge.

It was necessary to design a new skin cancer knowledge questionnaire because neither of the two questionnaires used in past research have reported solid psychometric data. Keesling used a skin cancer questionnaire in three of her studies (1987, 1988, submitted for publication) and did not report reliability or validity scores on the items. In her article with Friedman (submitted for publication, p. 11), she stated that her skin cancer questionnaire provided a "well-behaved distribution and an excellent range of scores", yet did not provide any other information. Leary and Jones' (submitted for publication) 15 items did not yield interitem reliabilities over .70 using Cronbach's alpha.

Analyses in the present study examined interitem reliabilities for the skin cancer knowledge items. It is understood that generalizations about the skin cancer knowledge variable will be limited to the sample from this study until further psychometric information can be gathered.

Research Questions and Analyses of Data

A direct discriminant function analysis was performed using the seven impression management and five risk assessment variables as discriminators of membership in four suntanning groups. Impression management variables were: androgyny, conformity, femininity, masculinity, public body consciousness, self-esteem, and social
adroitness. Risk assessment variables were: anxiety, illusion of unique invulnerability, risk taking, skin burns, and skin cancer knowledge. Groups were year round tanners (YRT), intentional summer tanners (IST), unintentional summer tanners (UST), and people who avoided tanning (AT).

Six research questions were analyzed using a direct discriminant analysis. The questions explored:

1. Significance of Discriminator Variables: Could suntanning group membership be reliably discriminated from the set of twelve variables?

2. Number of Significant Discriminant Functions: Along how many dimensions did the suntanning groups reliably differ?

3. Strength of Association: What was the proportion of variance shared between the suntanning groups and twelve predictor variables?

4. Importance of Discriminator Variables: Which discriminator variables were significant in differentiating between subjects' membership into one of the four suntanning groups?

5. Linear Classification Equation: What was the best linear classification equation for the data?

6. Adequacy of Classification: What was the proportion of subjects correctly classified into suntanning groups when using the linear classification equation?
In addition, Cronbach’s alpha was employed to determine interitem reliabilities for the Public Body Consciousness scale and skin cancer knowledge items.

A chi-square was conducted to determine if the frequencies of Bem types in the different suntanning groups were statistically significant.

Finally, correlations were generated between scores on the JPI scales, illusion of unique invulnerability, the Public Body Consciousness scale, skin cancer knowledge, and Masculinity and Femininity scales of the BSRI.
CHAPTER IV
RESULTS

A direct discriminant function analysis was performed using the seven impression management and five risk assessment variables as discriminators of membership in four groups. Impression management variables were: androgyny, conformity, femininity, masculinity, public body consciousness, self-esteem, and social adroitness. Risk assessment variables were: anxiety, illusion of unique invulnerability, risk taking, skin burns, and skin cancer knowledge. Groups were year round tanners (YRT), intentional summer tanners (IST), unintentional summer tanners (UST), and people who avoided tanning (AT).

Of the original 300 respondents, 43 were dropped from analysis because subjects did not fit the criteria of being raised in the United States, having opportunities to go outside during the summer months, and receiving valid scores on the assessments (e.g. The Jackson Personality Inventory). In addition, 47 minority students participated. While their data were not included in the main analyses, descriptive and exploratory data were gathered. Of the remaining 210 Caucasian subjects, one was dropped in the discriminant analysis.
owing to missing data. Therefore, the majority of the results reported in this chapter were based on a sample of 209 Caucasian undergraduates.

**Interitem reliabilities**

Cronbach’s alpha was .73 for the public body consciousness and .23 for the skin cancer items.

**Gender**

Of the 113 female subjects, there were 43 year round tanners (YRT), 57 intentional summer tanners (IST), 11 unintentional summer tanners (UST), and two avoided tanning (AT).

Suntanning group membership for the 95 male subjects consisted of six YRTs, 37 ISTs, 48 USTs, and four ATs.

**Descriptive Statistics**

Means and standard deviations for the continuous discriminator variables by suntanning groups are shown in Table 1. In order to avoid confusion, the two dichotomous variables (androgyny and skin burns) were not included in the table.

The percentages for androgynous subjects by suntanning group are reported in Table 2. Percentages for femininity, masculinity, and undifferentiated subjects were included to facilitate the understanding of group composites.

33 out of the 210 subjects reported that their skin burns before tanning. Only three of the thirty three (9%) burners took precautions by avoiding the sun. Eighteen percent of the 49 YRTs, 42% of the ISTs, and 30% of the USTs reported that their skin burns before tanning.
<table>
<thead>
<tr>
<th>Continuous Discriminator Variables</th>
<th>Suntanning Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Year Rnd Tanners (N=49)</td>
</tr>
<tr>
<td>Conformity</td>
<td>51.42 (10.01)</td>
</tr>
<tr>
<td>Femininity</td>
<td>55.12 (8.46)</td>
</tr>
<tr>
<td>Masculinity</td>
<td>46.76 (11.22)</td>
</tr>
<tr>
<td>Public Body Consciousness</td>
<td>19.47 (3.10)</td>
</tr>
<tr>
<td>Self-esteem</td>
<td>52.52 (8.21)</td>
</tr>
<tr>
<td>Social Adroitness</td>
<td>51.15 (8.79)</td>
</tr>
<tr>
<td>Anxiety</td>
<td>56.15 (6.14)</td>
</tr>
<tr>
<td>Illus. of Unique Invulnerability</td>
<td>8.65 (2.32)</td>
</tr>
<tr>
<td>Risk Taking</td>
<td>52.46 (10.65)</td>
</tr>
<tr>
<td>Skin Cancer Knowledge</td>
<td>4.42 (1.25)</td>
</tr>
</tbody>
</table>

Note. Year Rnd = Year Round. Standard deviations are in parentheses.
### Table 2

**Percentages for Gender Identity Discriminator Variables by Suntanning Groups (N = 210)**

<table>
<thead>
<tr>
<th>Dichotomous Discriminator Variables</th>
<th>Suntanning Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Year Rnd Tanners (N=49)</td>
</tr>
<tr>
<td>Androgyny</td>
<td>25</td>
</tr>
<tr>
<td>Femininity</td>
<td>47</td>
</tr>
<tr>
<td>Masculinity</td>
<td>14</td>
</tr>
<tr>
<td>Undifferentiated</td>
<td>14</td>
</tr>
</tbody>
</table>
Centroids are the multivariate means for each of the suntanning groups on the significant function. Centroids are useful in understanding how the groups differ on the functions and are needed for classifying cases of unknown group membership (Brown & Tinsley, 1983). The centroids for the suntanning groups were: year round tanners = 0.816, intentional summer tanners = 0.158, unintentional summer tanners = -0.762, and subjects who avoided tanning = -1.249.

Inferential Statistics

Question 1. The first research question explored whether the twelve discriminator variables (androgyne, conformity, femininity, masculinity, public body consciousness, self-esteem, social adroitness, anxiety, illusion of unique invulnerability, risk taking, skin burns, and skin cancer knowledge) reliably separated subjects into one of the four suntanning groups (year round, intentional summer, and unintentional summer tanners, plus subjects who avoided tanning). Table 3 provides the results of the discriminant analysis wherein one significant function emerged by which subjects' group membership could be discriminated. The function was significant as indicated by the overall Wilks' lambda = .63, distributed as a $\chi^2(36, N=209) = 93.12, p < .00001$. Therefore, the null hypothesis of equality of group means was rejected at the .00001 level (Betz, 1987). Furthermore, the eigenvalue = .39, which represents the ratio of between-groups to within-groups sum of squares, indicated the extraction of a good function.
**Question 2.** The second research question explored whether the groups were different along multiple dimensions. A maximum of three significant functions could have been derived from the data. The analysis yielded one significant discriminant function, signifying that the data had an underlying unidimensional structure.

Discriminant analysis weighs and linearly combines scores on the discriminator variables in order to maximally differentiate between the membership in the suntanning groups. **Discriminant function coefficients** are the weights calculated for each discriminator variable and are based on the relationship between group differences and subjects' scores on the discriminator variables. Table 3 reports the standardized discriminant coefficients from the one significant function. Only the standardized coefficients can be compared in absolute size and are useful for the present study (Betz, 1987). While the unstandardized coefficients were not employed in the present study, Brown and Tinsley (1983) stated that these weights are useful in research replication, cross-validating, or in classifying future subjects. Therefore, the unstandardized coefficients were included in Table 3. If the unstandardized coefficients are used in future research, it is important to note that the constant to be used with the unstandardized coefficients equals -4.34.

**Question 3.** The third research question explored the strength of association between the suntanning groups and discriminator variables. In other words, the proportion of variance between the groups and discriminator variables was determined. In comparison to
the two nonsignificant functions the relative percentage of variance accounted for by the significant function equaled 72.7%. The canonical correlation, $R^2 = .53$, measured the degree of association between discriminant scores and group membership. Therefore, the overall percentage of variance accounted for by the significant function equaled 28%.

**Question 4.** The fourth research question investigated which of the twelve discriminator variables were significant in discriminating subjects into the suntanning groups. Table 3 provides univariate Fs and Wilks' lambdas which have been calculated for each discriminator variable. Femininity, masculinity, public body consciousness, social adroitness, illusion of unique invulnerability, and skin cancer knowledge had significant univariate Fs indicating that they were the most important discriminators of group membership. It is interesting to note that the smaller univariate Wilks' lambdas, which are the ratios of within-groups to total sum of squares (Betz, 1987), corresponded to the same variables for which the Fs were statistically significant, thereby providing further support that these six variables better differentiated between the groups than the other variables.

The variable which contributes the most to group differentiation is indicated by the higher discriminant function coefficient. Thus, femininity seemed to be the strongest in terms of group differentiation, followed respectively by skin cancer knowledge, masculinity, illusion of unique invulnerability, public body consciousness, and social adroitness.
<table>
<thead>
<tr>
<th>Discriminator Variable</th>
<th>Standardized function coefficient</th>
<th>Unstandardized function coefficient</th>
<th>Wilks' lambda</th>
<th>F (3, 205)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Androgynty</td>
<td>0.003</td>
<td>0.692</td>
<td>.99</td>
<td>0.46</td>
</tr>
<tr>
<td>Conformity</td>
<td>-0.04</td>
<td>-0.401</td>
<td>.99</td>
<td>0.87</td>
</tr>
<tr>
<td>Femininity</td>
<td>0.51</td>
<td>1.16</td>
<td>.94</td>
<td><strong>4.61</strong></td>
</tr>
<tr>
<td>Masculinity</td>
<td>-0.39</td>
<td>-0.901</td>
<td>.93</td>
<td><strong>5.53</strong></td>
</tr>
</tbody>
</table>
| Public Body
Consciousness   | 0.27                              | 0.740                               | .93           | **4.88**   |
| Self-esteem                 | 0.40                              | 0.455                               | .98           | 1.30       |
| Social Adroitness           | 0.18                              | 0.190                               | .93           | **5.18**   |
| Anxiety                     | 0.11                              | 0.151                               | .96           | 2.61       |
| Illusion of Unique
Invulnerability | -0.34                             | -0.150                              | .92           | **6.05**   |
| Risk Taking                 | 0.28                              | 0.277                               | .99           | 0.81       |
| Skin Burns                  | 0.21                              | 0.589                               | .97           | 2.20       |
| Skin Cancer Knowledge       | -0.42                             | -0.314                              | .95           | **3.71**   |

**Note.** Skin that burns before tanning was coded 0, whereas skin that did not burn was coded 1. Androgynous subjects were coded 1 and non-androgynous subjects were 0. For the whole function, Wilks’ lambda = .63 distributed as a χ² statistic with 36 degrees of freedom and equal to 93.15, p < .00001, the eigenvalue = .39, and R² = .53.

*p < .01    **p < .001
Tabachnick and Fidell (1983) noted that if intercorrelations exist between the discriminator variables, the discriminatory power of the analysis is not altered, but the discriminant coefficients may be affected. If two variables are intercorrelated and both are related to the differences among the groups, because the analysis is a maximization procedure, the variable with the stronger relationship will be weighed more heavily. As such, the weight attributed to the second variable may be deceptively low.

Table 4 shows the Pearson correlation coefficients for the original twelve discriminator variables. As can be seen in the table, many of the variables were nonorthogonal (intercorrelated). Therefore, social adroitness, public body consciousness, and the illusion of unique invulnerability may be more strongly related to group differences than indicated by the function.

Question 5. The fifth research question asked if a superior linear equation exists for classifying cases into groups. A discriminant function analysis maximizes group differences by weighing and combining subjects' scores on the discriminator variables. This is conceptually similar to regression in which the standardized discriminant function coefficients are analogous to the beta weights. The standardized coefficients (weights) along with subjects' scores can be combined in an equation to yield a discriminant score which is like the predictor (Y) value in a regression equation.
<table>
<thead>
<tr>
<th>Variable</th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
<th>7.</th>
<th>8.</th>
<th>9.</th>
<th>10.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Conform</td>
<td>1.00</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2. Fem</td>
<td>.17</td>
<td>1.00</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3. Masc</td>
<td>-.26***-.20*</td>
<td>1.00</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4. Public Bdy Conc</td>
<td>.33***</td>
<td>.21*</td>
<td>.05</td>
<td>1.00</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5. Self-esteem</td>
<td>-.32***-.03</td>
<td>.53***</td>
<td>.05</td>
<td>1.00</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6. Soc Adroit</td>
<td>.29***</td>
<td>.08</td>
<td>.12</td>
<td>.21*</td>
<td>.10</td>
<td>1.00</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7. Anxty</td>
<td>-.26***</td>
<td>.27***-.19</td>
<td>.23**-.19*</td>
<td>.17*</td>
<td>1.00</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8. Illus of Uniq Invuln</td>
<td>-.13</td>
<td>-.18*</td>
<td>.18*</td>
<td>-.16</td>
<td>.10</td>
<td>-.05</td>
<td>-.10</td>
<td>1.00</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>9. Risk Tkg</td>
<td>-.17*</td>
<td>-.11*</td>
<td>.39***</td>
<td>.02</td>
<td>.35***</td>
<td>.28***-.08</td>
<td>.00</td>
<td>1.00</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>10. Skn Cnr Knwld</td>
<td>-.13</td>
<td>.13</td>
<td>-.02</td>
<td>.01</td>
<td>.03</td>
<td>.04</td>
<td>-.16</td>
<td>.07</td>
<td>-.08</td>
<td>1.00</td>
</tr>
</tbody>
</table>

**Note.** Conform = Conformity; Fem = Femininity; Masc = Masculinity; Public Bdy Conc = Public Body Consciousness; Soc Adroit = Social Adroitness; Anxty = Anxiety; Illus of Uniq Invuln = Illusion of Unique Invulnerability; Risk Tkg = Risk Taking; Skn Cnr Knwld = Skin Cancer Knowledge.

*p<.01  **p<.001  ***p<.0001
Therefore, the best linear equation for the present study was:

\[ D = b_1x_1 + b_2x_2 + \ldots + b_{12}x_{12}. \]  \hspace{1cm} (1)

where \( D \) is the discriminant score, 12 is the number of discriminator variables, \( b_1 \ldots b_{12} \) are the standard discriminant function coefficients, and \( x_1 \ldots x_{12} \) are the individual's scores on the twelve discriminator variables.

**Question 6.** The sixth research question explored the functions' usefulness for classifying subjects into the suntanning groups. Subjects' discriminant scores were compared with the centroids for each of the four suntanning groups. The centroid which matched closest to an individual's discriminant score determined the group into which the subject was classified. Subjects' actual group memberships were compared to their predicted groups. Table 5 shows the "hit rates" (i.e., correct classifications) and misses when the discriminant function was used to classify subjects into the suntanning groups.

As shown in the table, the function resulted in correct predictions being made 47% of the time; 58%, 39%, 48%, and 83% for the year round tanners, intentional summer tanners, unintentional summer tanners, and those who avoided tanning, respectively. The significance of the 47% of correct function-based predictions was tested by comparing it to an alternate classification strategy, the proportion of cases which might be correctly classified due to chance.
Table 5
Hit Rates and Misses Using a Discriminant Function to Predict Sun-tanning Group Membership (N=209)

<table>
<thead>
<tr>
<th>Actual Group</th>
<th>Predicted Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>YRT</td>
</tr>
<tr>
<td>Year Round Tanners (YRT)</td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>28</td>
</tr>
<tr>
<td>%</td>
<td>58%</td>
</tr>
<tr>
<td>Intentional Summer Tanners (IST)</td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>32</td>
</tr>
<tr>
<td>%</td>
<td>34%</td>
</tr>
<tr>
<td>Unintentional Summer Tanners (UST)</td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>9</td>
</tr>
<tr>
<td>%</td>
<td>15%</td>
</tr>
<tr>
<td>Avoided Tanning (AT)</td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>0</td>
</tr>
<tr>
<td>%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Note. Values on the diagonal are "hits" (correct predictions) and are underlined. There are a total of 99 hits for 47%.
Because the sample sizes were unequal, a formula considering the proportion of the total sample in each group was employed (Morrison, 1974):

\[ p_1^{a_1} + p_2^{a_2} + \ldots + p_k^{a_k} \]  

(2)

In the formula, the \( p \) values are the proportion of cases in the sample belonging to each group; the \( a \) values are the proportion of cases in the sample classified as belonging to each group. The total number of groups is represented by the \( k \) values.

Application of formula 2 yielded a 28% chance rate of correct prediction. A \( z \)-test of proportions (Glass & Stanley, 1970) was used to determine the statistical significance of the difference between the function-based (47%) and chance (28%) classification strategies. The results (\( Z = 6.325, p < .001 \)) showed that the difference between the effectiveness of the two strategies is statistically significant. Therefore, while a number of subjects were misclassified, using the function-based strategy is considerably better than chance.

**Additional Analyses**

Chi-squares Chi-squares were conducted in order to determine if the differences in sizes between the year round tanners (YRT), intentional summer tanners (IST), unintentional summer tanners (UST), and subjects who avoided tanning (AT) were significant. The overall \( \chi^2 = 75.59 \) with 3 degrees of freedom showed significance at the .001 level.
Subsequent analyses indicated that comparisons of all the groups were significantly different except for the difference in size between the YRTs (n=49) and USTs (n=61) ($\chi^2 = 1.30$). Therefore, there were significantly more ISTs (n=94) than YRTs (n=49), USTs (n=61), and ATs (n=6). In addition, there were significantly fewer ATs (n=6) than YRTs (n=49) and USTs (n=61).

Chi-squares were also performed in order to determine if significant differences existed between the suntanning groups and Bem types. All comparisons were nonsignificant except for the year round tanners and the unintentional summer tanners ($\chi^2 = 20.13$, $p < .01$) in which androgyny (n=22) and masculinity (n=35) discriminated between the groups ($\chi^2 = 7.36$, $p < .01$), as did femininity (n=32) and masculinity (n=35) ($\chi^2 = 18.32$, $p < .001$).
Exploratory Discriminant Analysis. Data from a total of 47 minorities were gathered. A separate exploratory discriminant analysis in which all ethnic variables were included as a discriminator variables was performed in order to look at trends in the data when minority data was included. Table 6 shows the percentage of membership in the suntanning groups by ethnicity. For example, African Americans comprised 2% of the total of year round tanners and 53% of all the people who avoided tanning.

<table>
<thead>
<tr>
<th>Ethnic Group</th>
<th>Year Rnd Tanners (N=54)</th>
<th>Intentional Summer Tanners (N=103)</th>
<th>Unintentional Summer Tanners (N=81)</th>
<th>Avoid Tanning (N=19)</th>
</tr>
</thead>
<tbody>
<tr>
<td>African Americans</td>
<td>02</td>
<td>01</td>
<td>11</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td>(.14)</td>
<td>(.10)</td>
<td>(.32)</td>
<td>(.51)</td>
</tr>
<tr>
<td>No.</td>
<td>1</td>
<td>1</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>Asian Americans</td>
<td>06</td>
<td>04</td>
<td>07</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>(.23)</td>
<td>(.19)</td>
<td>(.26)</td>
<td>(.37)</td>
</tr>
<tr>
<td>No.</td>
<td>3</td>
<td>4</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Caucasian Americans</td>
<td>90</td>
<td>91</td>
<td>75</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>(.30)</td>
<td>(.28)</td>
<td>(.43)</td>
<td>(.48)</td>
</tr>
<tr>
<td>No.</td>
<td>49</td>
<td>94</td>
<td>61</td>
<td>6</td>
</tr>
<tr>
<td>Hispanic Americans</td>
<td>02</td>
<td>04</td>
<td>06</td>
<td>00</td>
</tr>
<tr>
<td></td>
<td>(.14)</td>
<td>(.19)</td>
<td>(.24)</td>
<td>(.00)</td>
</tr>
<tr>
<td>No.</td>
<td>1</td>
<td>4</td>
<td>5</td>
<td>0</td>
</tr>
</tbody>
</table>

Note. Standard deviations are in parentheses.
Table 7 shows the standardized discriminant function coefficients for the ethnic groups. As indicated by the discriminant function coefficients, African Americans and Caucasian Americans were the strongest of the ethnicity variables in differentiating between suntanning group membership. Because of the limited number of minority subjects, caution must be used in interpreting trends from the data set.

### Table 7
**Results of Discriminant Analysis of Ethnicity Variables Related to Suntanning Behavior Among Undergraduates (N=257)**

<table>
<thead>
<tr>
<th>Ethnicity Variable</th>
<th>Standardized function coefficient</th>
<th>Unstandardized function coefficient</th>
<th>Wilks’ lambda</th>
<th>F (3, 252)</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American</td>
<td>0.642</td>
<td>2.66</td>
<td>.76</td>
<td>26.09****</td>
</tr>
<tr>
<td>Asian American</td>
<td>0.195</td>
<td>.805</td>
<td>.98</td>
<td>1.38</td>
</tr>
<tr>
<td>Caucasian American</td>
<td>-0.204</td>
<td>-.573</td>
<td>.83</td>
<td>17.01****</td>
</tr>
<tr>
<td>Hispanic American</td>
<td>0.012</td>
<td>.035</td>
<td>.99</td>
<td>.81</td>
</tr>
</tbody>
</table>

****p<.00001
CHAPTER V
DISCUSSION

Medical experts report that depending on levels of exposure and skin types, ultraviolet radiation exposure causes sunburn, sunpoisoning, erythema, chemical hypersensitivity, photoaging, eye damage, photocarcinogenisis, and alteration of the immune system of the skin leading to skin cancer (Council on Scientific Affairs, 1989). Awareness of the hazards of sun exposure seems to be increasing. In fact, the Food and Drug Administration's recently proposed warning label for all suntanning and skin care products reads, "Sun Alert: The sun causes skin damage. Regular use of sunscreens over the years may reduce the chance of skin damage, some types of skin cancer and other harmful effects of the sun" (Akron Beacon Journal, May 13, 1993, p. A1.). Beauty consultants are also dispensing advice about reducing sun exposure to reduce early skin aging (Gaynor, 1993). And screen stars (e.g. Kim Bassinger) are beginning to display an unwillingness to acquire tans in order to appear "fashionable" (Leary & Jones, submitted for publication).

Yet, even with the increase of awareness that sun exposure is harmful, many people tenaciously believe that having a suntan causes
them to look healthier and more attractive. For example, in a 1989 survey of 500 women whose ages ranged from 25 to 35, *Self* magazine reported an increase in agreement that tanning is harmful to the skin, but 68% still believed they looked better and approximately 75% felt that they looked healthier when tanned (*Self*, May 1989).

Furthermore, Broadstock, Borland and Gason (1992) found that adolescents, from a geographical area that had been the target of skin cancer interventions, perceived very dark tans as not being as attractive or healthy looking as medium tans. However, pictures of targets with no tans were rated as being both least healthy-looking and attractive. Thus, having a tan, but not being ultra-tanned, was seen as the ideal.

Two types of suntanning behavior interventions have been implemented and evaluated. Health interventions simply provide information to people about the risks involved in suntanning and psychological interventions have tended to combine health information with persuasion principles. Health interventions have not been particularly effective in changing individuals’ tanning behaviors. (Brannon & Wagstaff, 1983; Dobes, 1986; Johnson & Lookingbill, 1984; King, Murfin, Yanagisko, Wagstaff, Putnam, Hajas, & Berger, 1983; Putnam & Yanagisko, 1985; Robinson, 1990; Schreiber, Moon, Meyskens, & Murdon, 1983; Smith, 1979).

While the psychology-based interventions (Cody & Lee; Jones & Leary, 1992; Keesling, 1988; Keesling & Friedman, submitted for publication; Miller, Ashton, McHoskey & Gimbel, 1990) have provided
information about the effectiveness of fear-based versus informational interventions, only Jones and Leary's (1992) intervention implemented existing findings about psychological characteristics of suntanners in its design. Granted, the persuasion-oriented interventions have provided interesting auxiliary information about tanners, yet, in order to increase the effectiveness of the interventions, more information about the tanners themselves is needed. As a result, the aims of this study were to cross-validate and extend past findings which focused specifically on psychological variables of suntanners (Keesling & Friedman, 1987; Leary & Jones, submitted for publication; Miller, Ashton, McHoskey & Gimbel, 1990).

The present study employed a direct discriminant analysis to determine the significance of twelve specific discriminator variables in differentiating between four levels of suntanning groups (year round, intentional summer, and unintentional summer tanners, plus people who chose to avoid tanning). Several of the discriminator variables were chosen from past research in an attempt to cross-validate their significance.

Keesling and Friedman (1987) found that anxiety was positively related to sunscreen use. They also found that skin cancer knowledge was negatively related to the depth of subjects' tans while risk taking and image-related variables (e.g. belonging to a health club, exercising, percentage of friends who sunbathe) were positively related to tan ratings. It is interesting to note that Keesling and Friedman's measure of concern about appearance was not significant, especially given the
significance of the image-oriented variables. They measured concern about appearance based on a scale derived from the Tennessee Self-Concept Scale (Fitts, 1965) which may have been measuring an entity such as self-esteem.

Leary and Jones (submitted for publication) used the Public Body Consciousness Scale from Miller, Murphy, and Buss’s Body Consciousness Questionnaire (1981) instead of the Tennessee Self-Concept Scale to operationally define what they termed as appearance motivation. They found a strong positive relationship between appearance motivation and self-reported levels of high risk sun exposure. Leary and Jones did not find a significant relationship between self-esteem or skin cancer knowledge and sun exposure, however, they did find that people who were more likely to burn tended to use sunscreen.

Miller et al. (1990) measured two psychological variables of suntanners, the illusion of unique invulnerability and attitudes about themselves and others when tanned. They found that the darker the subjects’ self-reported tans, the less they believed themselves to be at risk for developing skin problems (photoaging and skin cancer) associated with sun exposure. Results also indicated that the higher the subjects’ tan level, the stronger they believed that tanning enhanced attractiveness.

In order to provide theoretical and conceptual cohesiveness, the psychological variables from past empirical studies were organized according to impression management theory or the field risk
assessment. Thus, the two impression management variables based on past research were appearance motivation (public body consciousness) and self-esteem. The five risk assessment variables were anxiety, illusion of unique vulnerability, risk taking, skin burns, and skin cancer knowledge.

Five new impression management variables were added to the present study in order to extend the research base. Those variables were: androgyny, conformity, femininity, masculinity, and social adroitness.

In the present study, six research questions were analyzed using a direct discriminant analysis. The questions explored the: 1) significance of the discriminator variables, 2) number of significant functions, 3) strength of association between the groups and variables, 4) importance of individual discriminator variables, 5) best linear classification equation, and 6) classification percentages when the linear equation was utilized. In addition, exploratory data from minority subjects were reported.

**Question 1.**

The first question was answered by the emergence of one significant discriminant function as indicated by Wilks' $\lambda = .63$, distributed as $\chi^2(36, N=209) = 93.12, p<.00001$. Thus, the twelve discriminator variables did reliably separate subjects into suntanning groups.
Question 2.

One significant function emerged from the possible three signifying that the data was unidimensional. If the data had been multidimensional, two dimensional graphics would have been needed to interpret the data. Since the data were unidimensional, they could be compared by observing the differences among their centroids (multivariate means). Therefore, mean scores for the year round tanners (YRT) cluster around 0.816, while intentional summer tanner's (IST) scores grouped around 0.158. Unintentional summer tanners (UST) scores clustered around -0.762 and people who avoided tanning (AT) scores averaged to -1.249. The data were definitely linear in nature, thereby suggesting exclusiveness among the groups. Also, the subjects who intentionally pursued tans (YRT and IST) had positive means whereas, subjects who did not pursue tans (UST) and who actively chose to avoid tans (AT) had overall multivariate means that were negative. This finding suggests that the intentional tanners (YRT and IST) were more psychologically alike, likewise the people who did not purposely pursue tans (UST and AT) scores were closer on the psychological measures. The following sections include descriptions of the nature of these similarities and differences.

Question 3.

The third research question explored the strength of association between the suntanning groups and discriminator variables. In further support of the strength of the one significant function, it
accounted for 72.7% of the relative variance while the combination of the two nonsignificant functions accounted for 27.3%.

The canonical correlation, $R_c = .53$, measured the degree of variance accounted for by the variables in differentiating between the suntanning groups. The overall percentage of variance accounted for by the significant function was 28%. Results from some studies achieve statistical significance because of having a large $N$ size, but the practical significance is questionable. In the present study, with $R_c = .58$, evidence was provided that the function was statistically significant as well as having practical significance. Practical applications can be derived from exploration of the individual contributions of variables and the function's ability to classify individuals into groups. The significance of individual variables will be explored in the following subsection, while classification usefulness will be discussed with regards to research questions 5 and 6.

**Question 4.**

The fourth research question explored which of the twelve discriminator variables were significant in discriminating subjects into the suntanning groups. The impression management variables of androgyny, conformity, femininity, masculinity, public body consciousness, self-esteem, and social adroitness will be reviewed first. Then, interpretation of the five risk assessment variables, anxiety, illusion of unique invulnerability, risk taking, skin burns, and skin cancer knowledge will follow.
Androgyny. Androgyny was not a significant discriminator variable in the function. This finding is consistent with parallel findings by Cash, Rissi, and Chapman (1985). In their results, androgyny was not correlated with lower quantities of makeup use, neither was it a factor in group differences between situational and dispositional cosmetics use. Cash et al. did find that pro-feminist sex-role attitudes were negatively correlated with makeup use.

In another parallel study, Jackson, Sullivan, and Hymes' (1987) results indicated that traditionally sex-typed participants were more interested in changing attributes of their facial appearance than androgynous participants who rated their facial attributes as more attractive than sex-typed subjects.

Therefore, past parallel findings appear to be contradictory because Cash, et al., (1985) found androgynous women were not different from traditional women in makeup use, but Jackson, et al. (1987) found androgynous subjects felt more satisfied with their facial appearance and reported less desire to change their facial attributes. The present findings seem to support Cash et al.'s results because androgynous people were not less involved than traditionally feminine and masculine subjects in altering their appearances by tanning. In fact, 25% of all the year round tanners were androgynous as compared to 47% and 14% respectively categorized as feminine and masculine. Of all the intentional summer tanners 22% were androgynous as compared to 29% and 22% respectively categorized as feminine and masculine. Statistically substantiating that androgynous
subjects were equally present in the intentional tanning groups (YRT and IST), the chi-square comparing differences in percentages of group membership between Bem types in the YRT and IST groups was nonsignificant at the .01 level.

Conformity. While the means showed a positive linear relationship between tanning groups and scores on the conformity scale, this variable was not significant in the discriminant function. Failure to gain significance may have been due to its being interrelated with masculinity (r = -.26, p < .001), public body consciousness (r = .33, p < .0001), self-esteem (r = -.32, p < .0001), social adroitness (r = .29, p < .0001), anxiety (r = -.26, p < .0001), and risk taking (r = -.17, p < .01).

Femininity. With a standardized coefficient equal to .51 femininity was the strongest discriminant variable in the function. The femininity means were as follows: year round tanners (M = 55.12), intentional summer tanners (M = 51.14), unintentional summer tanners (M = 48.62), and people who avoided tanning (M = 48.33). Thus, the differences in the means indicated a positive linear relationship between the tanning groups and femininity.

Results from this study coincide with Cash et al.'s (1985) parallel finding that subjects with higher femininity scores used higher quantities of makeup.

Freedman (1986) and Brownmiller (1984) believe that one's femininity is largely defined by society's beauty standards. If their statement is true, then people may be tanning in order to increase
their attractiveness levels because a tan is perceived as making a person look more attractive (e.g. Broadstock, Borland, & Gason, 1992; Miller et al., 1990) and adolescents viewed women sunbathers as being the ideally feminine woman (Stiles, Gibbons, & Schnellmann, 1987). Freedman and Brownmiller's belief is further supported by the finding that the intentionally tanning groups (YRT and IST) scored higher on the appearance motivation scale (public body consciousness) and because femininity and public body consciousness are correlated, r = .21, p<.01.

**Masculinity** Masculinity was the third strongest discriminant variable with a standardized coefficient equal to -.39. The negative coefficient indicated a negative relationship between suntanning groups and masculinity. The direction of the means confirmed such a relationship except that the avoid tanners scored lower than the unintentional and intentional summer tanners.

Freedman (1986) believes that one's masculinity is largely defined by society's standards of strength. This notion was supported by subjects describing the ideal masculine man as being a chivalrous football player (Stiles, Gibbons, & Schnellmann, 1987). Likewise, Miller et al. (1990) found that people with tans were perceived as looking more athletic. This was further supported by the present finding that the body competence scale of the body consciousness questionnaire (Miller, Murphy, & Buss, 1981) correlated with masculinity (r= .41, p<.0001). In addition, unlike femininity, masculinity and public body consciousness were not correlated.
If Freedman's belief is correct, then the higher masculine scoring people may have "unintentionally" acquired tans in order to increase an image of athleticism. A tan would be a cue that subjects were participating in some sort of outside activity. Intentional tanning behaviors, which are linked to more passively lying out, would then be less linked to masculinity.

Additionally, subjects perceived targets as being more vain when informed that there was an intention to tan (Miller et al., 1990). Society seems to be more accepting of vanity in women. As such, traditionally masculine subjects would not want an association between vanity and their behaviors.

Public Body Consciousness. Public body consciousness was the fifth strongest discriminator variable with its standardized coefficient equal to .27. The positive coefficient indicates a positive relationship between suntanning groups and appearance motivation. Again, the direction of the means confirms such a relationship, except for the avoids tanning group (M = 17.67) which was slightly higher than the unintentional summer tanners group (M = 17.21). The small number of members in this group (N = 6) may be the difference.

Nevertheless, higher scores on the public body consciousness scale were related to membership in the two intentional tanning groups. This finding supports Leary and Jones' (submitted for publication) finding that subjects who exposed themselves to more sun risks evidenced a positive relationship (r = .25, p<.001) with appearance motivation. In other words, in both the present and Leary
and Jones' studies, people who were more concerned with the image they present in public were the higher tanners.

Keesling and Friedman (1987) did not find a relationship between concern with appearance and level of tanning even though they found positive relationships between tanning and image-related variables (percentage of friends who sunbathe, belonging to a health club). They did not identify the scale on the Tennessee Self-Concept Scale from which they derived the concern with appearance, but it was probably the physical self-concept scale. If Keesling and Friedman's scale is used in future research to operationalize appearance concern, it would be important to gather psychometric data to insure that it is a valid measure of the concept. With results from Leary and Jones' (submitted for publication) and the present study, showing a positive relationship with tanning and public body consciousness, it would seem as though Keesling and Friedman's scale was measuring something other than concern with appearance.

**Self-esteem** Even though the means for this variable indicated a positive linear relationship with tanning, self-esteem was not significant in the discriminant function. This finding is consistent with Leary and Jones (submitted for publication) and parallel research in the physical attractiveness literature (Adams, 1977; Cash, et al., 1985; Major, Carrington, and Carnevale, 1984; Mathes & Kahn, 1975; Walster Aronson, Abrahams, & Rotterman, 1966) where no significant relationship has been found between self-esteem and cosmetics use, physical attractiveness, or suntanning. Perhaps the measures used
thus far in research have tapped into externally-based self-esteem, whereas, a measure that would tap into more intrinsic or core self-esteem might provide more stable findings.

**Social Adroitness** Social adroitness was the sixth strongest discriminator variable with its standardized coefficient equal to .18. The positive coefficient indicates a positive relationship between suntanning groups and social adroitness. The direction of the means confirms such a relationship except for the year round tanning group (M = 51.15) which was slightly lower than the intentional summer tanners group (M = 54.61). Miller et al. (1990) found that when subjects knew that targets had intentionally pursued tans the targets were viewed somewhat negatively as being vain. All year round tanners had to use artificial tanning devices in the winter, thus displaying their intentions to acquire tans. Socially adroit people may be more aware of the potential judgements that the artificial tanners would receive and decided not to tan in the winter. Clearly, more research is needed to explore this explanation further.

**Anxiety** While the means indicated a positive linear relationship between suntanning and anxiety, it was not a significant discriminator variable in the equation. Keesling and Friedman (1987) did not find a significant relationship between tanning and anxiety, either. They did report a relationship (r = .20, p<.05) between anxiety and sunscreen use. However, if one adjusts the α to .01 to account for the 16 multiple comparisons, the finding is nonsignificant.
Illusion of Unique Invulnerability  With a standardized coefficient equal to -.34, the illusion of unique invulnerability was the fourth strongest variable in the function. The negative coefficient indicates a negative relationship between the tanning groups and illusion of unique invulnerability. Except for the avoided tanning group (M = 10.33), which was slightly lower than the unintentional summer tanners group (M = 10.52), the means support such a relationship. The small number of members in the AT group (N = 6) may account for the difference or perhaps the people who avoided tanning felt they were taking precautions and actually were less at risk for developing skin cancer and premature aging of the skin.

Nevertheless, the direction of the means indicated that intentional tanners (YRT and IST) believed that they were more at risk than cohorts for experiencing negative consequences related to sun exposure. These surprise findings indicated that higher-risk subjects were aware of the risks and continued to pursue tanning. This finding is not consistent with Miller et al.’s study in which subjects with higher tan levels were more likely to believe that they were less at risk for negative consequences, also.

In both the present and Miller et al.’s studies, the illusion of unique invulnerability was measured by asking two questions concerning subjects perceived chances of getting skin cancer or experiencing photoaging in comparison with cohorts on campus. It would be beneficial to measure the concept with a more all-
encompassing scale in future research and compare the results with those from this study and Miller et al.'s experiment.

**Risk Taking** This variable was not significant in the function. Keesling and Friedman (1987) found a positive relationship ($r = .30$, $p < .01$) between tan level and risk taking. The differences in the findings may be due to the instruments used to measure risk taking. The scale they used was extracted from the Personality Research Form (Jackson, 1974), the precursor to the Jackson Personality Inventory (JPI) (Jackson, 1976) used in this study. Jackson (1976) wrote that the JPI "represents a further refinement and development of substantive, psychometric, and computer-based strategies initially employed in the development of the PRF". Moreover, in order to preserve the validity of the scaling, the entire JPI was given to participants, whereas, Keesling and Friedman (1987) administered only a few scales from the PRF. Therefore, the present study's findings would seem to nullify Keesling and Friedman's findings about risk taking.

While it makes sense that physical and financial risk-taking, are not related to suntanning, the JPI risk taking scale also included social risk taking. Perhaps a future study could employ measures that separate the thrill-seeking risks from risks to obtain social rewards and determine if a relationship between tanning and social risk taking emerges.

**Skin Burns** This variable was not significant in differentiating subjects into groups. It's nonsignificance is interesting in that one would expect to find people whose skin tends to burn in the lower sun
exposure groups. Descriptive data indicate that 12% of the YRT and 15% of the IST reported skin that burns, yet they consciously chose to ignore the warning signals from their skin and pursued tans. This is another indication of the strong lure of image management through suntanning because people's skins are warning them that damage is occurring, yet, they persist in overriding the protective mechanism in order to eventually acquire a tan.

**Skin Cancer Knowledge** As the second strongest discriminator variable in the function skin cancer knowledge had a standardized coefficient equal to -.42. The negative coefficient indicates a negative relationship between the suntanning groups and skin cancer knowledge. The skin cancer knowledge means were as follows: year round tanners (M = 4.42), intentional summer tanners (M = 5.02), unintentional summer tanners (M = 5.09), and people who avoided tanning (M = 5.83). Thus, the differences in the means indicated that a negative linear relationship exists between the tanning groups and skin cancer knowledge. This finding is consistent with Keesling and Friedman's (1987) study in which a negative relationship was found to exist between tanning levels and skin cancer knowledge (r = -.25, p<.01). However, Leary and Jones (submitted for publication) did not find a relationship between skin cancer knowledge and risky sun exposure.

While skin cancer knowledge was the only variable which did not correlate with any other variables in the present study, its interitem reliability was low as measured by Cronbach's α = .23.
Because the interitem reliability indicated problems with the psychometric properties of the skin cancer knowledge questionnaire, the results should not be generalized outside of the study's population.

Psychometric comparisons could not be made with skin cancer knowledge scales used in previous research because Keesling and Friedman (1987) did not report psychometric data and Leary and Jones (submitted for publication) documented that their interitem reliability for skin cancer knowledge scales was less than .70, but they did not mention the reliability level they achieved. Clearly, skin cancer knowledge is an important variable in understanding subjects' risk assessments of sun exposure dangers. As such, there is a critical need for the development of a psychometrically sound questionnaire.

**Question 5.**

Results from the fifth research question provided a linear equation that was used to classify subjects into groups. The best linear equation for the present sample was:

$$ D = b_1X_1 + b_2X_2 + \ldots + b_{12}X_{12}. $$

(1)

where $D$ was the discriminant score, 12 was the number of discriminator variables, $b_1 \ldots b_{12}$ were the standard discriminant function coefficients, and $x_1 \ldots x_{12}$ were the individual's scores on the twelve discriminator variables.

If a researcher replicates this study, this equation will be important for predicting group membership from the new population.
Question 6.

The sixth research question explored the functions' usefulness for classifying subjects into the suntanning groups. The overall "hit rate" of 47% was found to be better than the 28% "hit rate" expected if subjects were classified based on chance ($Z = 6.325$, $p<.001$).

The function could be particularly useful in identifying individuals from the intentional tanning groups (year round and intentional summer tanners) for targeted interventions. The combined hit rate for correctly classifying individuals into either of these groups is 71%.

However, if the function were to be used to identify only the highest risk tanners (YRT) for interventions, the classification rate would drop to 58%. It is likely that future research will refine the function, perhaps by eliminating the highly intercorrelated variables from the present study and adding other important variables from impression management theory and the field of risk assessment. With a refined equation, the classification rate of YRT could very well be improved.

**Exploratory Discriminant Analysis.**

The results indicated that ethnicity could be used as a discriminator variable in differentiating between membership in suntanning groups. Specifically, knowing whether a subject is an African American or Caucasian American was found to be important. Belonging to the Asian or Hispanic American populations did not provide significance in differentiating between the groups. This could
be due to the small n sizes (16 Asian Americans and 10 Hispanic Americans).

African Americans comprised 53% of the avoided tanning group. Caucasian Americans, who are at higher risk for developing skin cancer due to the lightness of their skin, only comprised 16% of the avoided tanning group. Therefore, the difference does not seem to be based on medical reasons for avoiding the sun, but given the relationship between tanning and appearance motivation in the Caucasian American population, it is reasonable to assume that societal norms are contributing to the the lightest skinned individuals pursuing tans and the darkest skinned people avoiding tanning. No data has been gathered specifically exploring ethnic minorities' perceptions of people with suntans. Such data would be interesting to explore.

Applications of the Present Study

Knowing that the two intentional tanning levels (YRT and IST ) are psychologically similar should be helpful in designing future studies and suntanning interventions targeting these populations. The intentional tanners were more traditionally feminine or less masculine, displayed less skin cancer knowledge, believed they were less at risk for negative sun exposure consequences, were more conscious about their presentation of their bodies in public, and were more socially adroit than the unintentional tanners and subjects who avoided tanning. While the unintentional summer tanners may still need to hear a message encouraging them to take more precautions in
the sun, the more at risk populations are the ones who actively pursue tans. In fact, both Miller et al.'s (1990) and Keesling and Friedman's (1987) studies documented that people who were the higher tanners spent more time in the sun and got the deeper tans.

**Limitations of the Present Study**

One of the biggest limitations is the small number (N=6) of Caucasian subjects who avoided tanning. This small number limited interpretation of individual variables (masculinity, illusion of unique invulnerability, and public body consciousness) and prohibited cross-validation techniques from being performed on the data. Cross-validation for discriminant functions is important because the analysis maximizes variance in group differences and may produce functions too tailored to the sample to generalize the results. Performing a cross-validation would have entailed excluding 25% of the data from the original function. After the analyses were run, the excluded data could have been used as new data by which to test the stability of the function and classification equation. Tatsuoka (1970) recommended that the size of the smallest group have at least as many variables as discriminator variables. Brown and Tinsley (1983) suggested twice the minimum number that Tatsuoka recommended. As such, the present sample was six to eighteen subjects short of the recommended group membership in order to perform cross-validation techniques. Therefore, cross-validation of the present results will need to occur between subjects from a new sample pool. Actually, cross-validation results from a new sample pool will provide a purer cross-validation
because the new sample will have fewer chances of displaying the same idiosyncrasies as the original sample. If the future cross-validation indicates that the function is stable, generalizations can be made with more confidence than if the excluded-data technique had been employed.

Another limitation of the present study was the intercorrelatedness of the discriminator variables. As was discussed in an earlier section, this could have artificially lessened the reported strength of the weaker significant discriminators (illusion of unique invulnerability, public body consciousness, and social adroitness). As a solution for intercorrelatedness of the variables, Brown and Tinsley (1983) recommended using discriminant analysis and constructing a structure matrix. The information can be used to determine how each variable "relates to group differences as accounted for by the function" (Brown and Tinsley, 1983, p.309). They also suggested factor analyzing the variables first, then performing a discriminant analysis using the factors as the discriminant variables. Future researchers could use this study as a precursor for understanding beforehand which variables are strongly intercorrelated and choose to delete them in their design.

The low interitem reliability of skin cancer knowledge questionnaire is another limitation in this study. Cronbach’s alpha may have been low due to the design of the questions in evaluating subjects’ knowledge of signs of skin cancer, skin cancer precautions, prevalence, and sun exposure realities (death rates, treatments for
skin cancer). A new questionnaire may want to focus specifically on knowledge of one area such as skin cancer precautions.

Another limitation of the study may have been the data collection strategy. Data were collected in November, thereby relying on subjects' memories of previous suntanning behaviors. A more accurate study might collect data once at the beginning of autumn quarter to assess summer tanning behaviors and again at the end of the quarter to measure artificial tanning behaviors.

Finally, the illusion of unique invulnerability scale may have been a limitation for two reasons. First, the scale was comprised of two items. While these items were used to cross-validate Miller et al.'s (1990) findings, future studies using this variable may want to utilize a more comprehensive scale. Second, some subjects may have been rightfully scoring themselves lower on the items, because compared to their cohorts they have taken more precautions and are at less risk for photoaging or developing skin cancer. The new scale used in future research should check for this potential confound.

**Future Research**

Opportunities abound in designing studies focusing on the psychological characteristics of tanners. Many variables need to be explored before effective interventions can be designed, implemented, and assessed.

Keesling and Friedman (1987) noted anecdotal evidence that suntanning can become addictive. Robinson (1990) found that one year after 1042 patients who had been treated for non-malignant skin
cancer and provided with education about future skin cancer prevention, 62% reported using sunscreen and 56% had modified outdoor activities to reduce their amount of sun exposure. In other words, 38% of patients who had a lesion removed still were not using sunscreen and 44% had not modified their outdoor behaviors to reduce UV exposure. The actual percentages of noncompliance patients may have been higher if any "good patient" confounding occurred in the self-reported data. Therefore, intriguing questions to explore are: Are some people addicted to suntanning? How does a researcher define an addiction to tanning? (A suntanning addiction scale would have to be developed because none exist in the literature.) Is there a conceptual link to addictive behaviors such as eating disorders? What characteristics of subjects make them vulnerable to suntanning addiction?

Development and use of a standardized questionnaire for categorizing subjects into tanning categories would be useful for comparisons of future results.

As mentioned earlier, the development of a psychometrically sound skin cancer questionnaire is critical if results from the variable are going to be generalized.

Also, the public body consciousness scale (Miller, Murphy, & Buss, 1981) is the only tool for measuring appearance motivation. Some researchers may be hesitant to accept its validity because the scale only consists of six questions. Perhaps, a fuller scale could be
developed and refined in which subjects' concern about and willingness to invest energy into their appearance is measured.

If investigators are interested in comparing high tanners with lower tanners, and when gathering data they are aware that the number of people in their sample who avoid tanning is small, they should specifically screen for people who avoid tanning.

In order to better target the illusion of unique invulnerability in interventions, a future study could explore the stereotypes associated with people who develop skin cancer or signs of photoaging.

Care needs to be taken to not equate androgyyny with pro-feminist attitudes. While the nonsignificance of androgyyny as a discriminator variable provided useful information about subjects' gender role identity in the present study, future research will want to explore the relationship of pro-feminist attitudes to suntanning in order to extend the research knowledge base.

Cash et al. (1985) found that people who held pro-feminist attitudes were no different in their situational or dispositional use of cosmetics. If such were found to be true of subjects with pro-feminist attitudes and suntanning, it would be interesting to explore how they deal with the conflict in their value systems.

It is interesting that suntanning has not been investigated more in the psychology literature. A study could be conducted with researchers as the subjects in order to explore if experimenters simply do not realize the hazards involved in suntanning or if other reasons for the oversight were operating (i.e. "boring topic").
Finally, gender may be an important discriminator variable to include in future research. In this study, 43/113 female subjects were round tanners (YRT). There were 57 female intentional summer tanners (IST), 11 unintentional summer tanners (UST), and two who avoided tanning (AT). In comparison, 6/95 male subjects were YRTs, with 37 male ISTs, 48 USTs, and four ATs. It appears that the intentional tanning groups (YRT and IST) were comprised of more women than men. Also, because variables such as femininity, masculinity, and public body consciousness were significant, it may be helpful to develop separate discriminant functions for men and women. More research is needed to further understand the relationship between gender and intentions to suntan because such information would be useful in designing future interventions.
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APPENDIX A
DEBRIEFING HANDOUT
The goal of this study is to explore differences between people based on their tanning behaviors. Skin cancer knowledge is one variable of interest and was assessed by the final questions in your packet. The answers to those questions are provided below. Please do not share these answers (or discuss this study) with others who may be participating in this experiment.

Some signs of skin cancer or pre-cancerous growths are: a mole changing (color, size, etc.), tenderness, itchiness, pain, scaliness, a bump changing, shiny lumps, bleeding, and oozing.

The major cause of skin cancer is overexposure to ultraviolet radiation found in sunlight and artificial tanning devices. Other causes are overexposure to x-rays, certain chemicals (e.g. coal tar, pitch, creosote, arsenic, radium), and genetic conditions of the skin.

One severe sunburn in childhood or adolescence doubles the chance of developing skin cancer.

UVA rays, as found in tanning booths, are linked to skin cancer.

Skin cancer is the second most frequently diagnosed form of cancer in the USA and on the rise.

Approximately 8,500 Americans will die from skin cancer in 1992.

Some specific things to prevent the disease are: Protect your skin from the sun by not pursuing a tan, wearing sunscreen with a sun protection factor (SPF) of 15 or higher, reapply sunscreen according to directions, wear protective attire (hats, long-sleeved shirts), avoid the sun from 10 AM-2 PM, reduce exposure to harmful x-rays and
chemicals, protect from the sun's reflection off snow, and don't use artificial tanning devices.

90% of all skin cancer cases could be avoided by taking proper precautions.

The four treatments for skin cancer are: burning (electric current), freezing, radiation, and surgery.

If you have further questions about skin cancer contact a dermatologist or the American Cancer Society.

If you would like information about the results of this study (after May 1993), you may contact Lisa Amoroso-Johnson

2445 Echo Valley Drive
Stow, OH 44224.

Thank you for your participation.
APPENDIX B

BODY CONSCIOUSNESS QUESTIONNAIRE
- It is important that you answer **every question**.

- Please do not write on this questionnaire. Instead, mark your responses on section D of the computer sheet. (The other side should remain blank.)

- Indicate how well the 15 statements below describe you by ranking your response on the following scale:

  0_________1 _________ 2 _________ 3 _________ 4_____

  Extremely Uncharacteristic
  Characteristic

1.) I am sensitive to internal bodily tensions.

2.) I know immediately when my mouth or throat gets dry.

3.) I can often feel my heart beating.

4.) I am quick to sense the hunger contractions of my stomach.

5.) I’m very aware of changes in my body temperature.

6.) When with others, I want my hands to be clean and look nice.

7.) It’s important for me that my skin looks nice... for example, has no blemishes.

8.) I am very aware of my best and worst facial features.

9.) I like to make sure that my hair looks right.

10.) I think a lot about my body build.

11.) I’m concerned about my posture.

12.) For my size, I’m pretty strong.

13.) I’m better coordinated than most people.
14.) I’m light on my feet compared to most people.

15.) I’m capable of moving quickly.
APPENDIX C

QUESTIONNAIRE
- Please answer every question. You may write directly on this questionnaire.
- Check one indicating your ethnicity:
  ___ African-American  ___ Caucasian  ___ Native American
  ___ Asian-American  ___ Hispanic  ___ Other (Please specify) __________

Were you raised in the United States? (Circle one)  Yes or  No

Questions 1-3 refer to the months of September 1991 - April 1992.

1.) On average, how many times a month did you use an artificial tanning device (bed/booth/column/lamp)?
   a) Did not use  b) less than once every other week  c) once every other week
   d) once a week  e) twice a week  f) three times a week  g) four + times a week

2.) On average, how much time did you spend using the artificial tanning device per visit?
   a) Did not use  b) 1-10 minutes  c) 10-20 minutes
   d) 20-30 minutes  e) 30+ minutes

3.) Did you go on vacation to a sunny climate and intentionally pursue a tan?
   a) Did not vacation  b) Vacationed but did not tan  c) Vacationed and tanned

Questions 4-6 refer to the months of May 1992 - August 1992.

4.) Did you get a tan?  Yes or  No

5.) Did you intentionally pursue a tan?  Yes or  No

6.) Did you avoid getting a tan?  Yes or  No

7.) Are you currently pursuing or maintaining a tan?  Yes or  No

8.) Do you have the type of skin that burns and does not tan?  Yes or  No

9.) Compared to other OSU students your sex and age, what do you think the chances are that you will develop skin cancer?  (Circle one of the numbers below.)

   1  2  3  4  5  6  7
   Very likely  Very Unlikely
10.) Compared to other OSU students your sex and age, what do you think the chances are that your skin will prematurely age (sun-related wrinkles and spots)?

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<td>Very likely</td>
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<td>Very Unlikely</td>
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11.) What are some signs/symptoms of skin cancer or pre-cancerous growths?

a) 

b) 

c)

12.) What are two of the major causes of skin cancer?

a) 

b)

13.) One severe sunburn in childhood or adolescence doubles a person's chance of developing skin cancer? (Circle one) True or False

14.) Ultraviolet A rays, as found in tanning booths, are not linked to skin cancer. (Circle one) True or False

15.) Skin cancer is the ________ frequently diagnosed form of cancer in the USA.

a) most  
b) second most  
c) third most  
d) fourth most

16.) Approximately ________ Americans will die from skin cancer this year.

a) 500  
b) 2,500  
c) 5,000  
d) 8,500

17.) What are some specific things you can do to prevent skin cancer?

a) 

b) 

c)

18.) What percentage of all skin cancer incidences in 1991 could have been avoided by proper precautions?

a) 30%  
b) 50%  
c) 70%  
d) 90%

19.) There are four major types of treatment for skin cancer. Can you name them?

a) 

b) 

c) 

d)