

The Feasibility of a Motivational Enhancement Approach to Skin Cancer Prevention
in a Sample of Young Adult Patients

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ABSTRACT

TITLE: The Feasibility of a Motivational Enhancement Approach to Skin Cancer Prevention in a Sample of Young Adult Patients

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Background

Although skin cancer is the most common form of cancer in the United States, it is highly preventable by reducing exposure to ultraviolet (UV) radiation. However, recent primary prevention efforts have been inadequate in reducing UV exposure in young adults. This randomized controlled trial investigates the feasibility of utilizing a brief motivational enhancement approach to skin cancer prevention counseling in a sample of young adults.

Methods

The sample consisted of 82 dermatology patients age 18-30. Participants were randomized to either the intervention group (brochure and 5-8 minute motivational enhancement intervention) or control group (brochure only). An investigator developed questionnaire was completed initially in the fall and, 6 months later, in the spring.

Results

The initial 82 participants reported that they were in the preparation stage, had positive UV protection attitudes, and felt it was neither easy nor difficult to use UV protection measures. Individuals who were older, more educated, had more sun sensitive skin types, and spent less time outdoors on non-work days had more responsible UV protection behaviors and beliefs. For the 76 (93%) participants who completed the follow-up questionnaire, the control and intervention groups did not demonstrate any significant differences in improvement for any of the quantitative outcome measures. In the qualitative responses, several participants reported favorable changes in their UV protection behaviors and beliefs.

Conclusion

The feasibility of utilizing and researching a motivational enhancement approach to skin cancer prevention was clearly supported. Although the intervention was not found to be effective, this study provides support for the continued investigation of both health care provider counseling and motivational enhancement techniques for skin cancer prevention.

PREFACE

In addition to being one of the researchers involved in the development of this research study, I am a Nurse Practitioner in a dermatology clinic. In my clinical work I draw great satisfaction from helping individuals with their medical problems. There are occasional, challenging cases that are difficult to treat; however the most common source of frustration for me used to be that I felt like I knew what would be the best action for my patients to take, but after I told them my recommendation, they did not seem to listen. I commonly found myself thinking that if they would just follow my advice they would be happier in the long run. In these situations, I consciously tried not to sound condescending, but this effort on my part seemed to make me feel even more frustrated when patients did not seem to listen.

These clinical experiences lead me to seek out a better way of communicating with my patients. When I first read about motivational enhancement techniques, I was immediately hooked. These techniques seemed to be specifically tailored to the clinical challenges I was facing. As I trained to be the interventionist in this study, I was both excited to learn new communication skills and nervous because I did not know if I would be “good enough” to promote change within this study. Once I started practicing these techniques with my patients, however, these self-doubts soon dissipated. As I used a more patient-centered approach with my patients I could see a definite difference. The frustration that I had often felt during my previous attempts to educate my patients was

nearly absent and it was actually exciting to see that my patients appeared to be absorbing information that would likely be helpful to them.

During the recruitment and intervention phase of this study, I occasionally could not help making quick judgments about the research participants before I began the motivational enhancement consultation. In a few instances I thought to myself “I don’t think this is going to be a good person for the intervention group”. These thoughts were based on either their very tan skin or my perception that their body language did not convey a desire to become engaged in a conversation. However, I always maintained participants’ group assignment and was often surprised to find that even though it did not happen right away, these participants generally opened up and we were able to engage in what appeared to be a productive discussion. These situations were particularly impactful for me because it is likely that if I had seen these individuals before I learned to use motivational enhancement techniques, I would have either not bothered to address the topic of UV protection or I would have done so half-heartedly.

Another rewarding experience for me occurred during the portion of the discussion that focused on what the participant already knew about tanning beds and sun exposure. It was refreshing to hear how much participants knew about the dangers of tanning beds and sunlight exposure. Several participants even volunteered information about ultraviolet protection behaviors that they were thinking about doing or thought that they should be doing. Instead of me trying to guess what advice a particular participant

needed, it was a relief to have him/her leading the discussion in the direction that they felt would be helpful.

Admittedly, there were varying levels of engagement among participants, but I did not encounter any lasting problems with resistance. This outcome by itself is quite impressive and distinctly contrasts with my previous clinical work wherein my standard medical advice seemed to be commonly met with a stone wall of patient resistance. Perhaps because of my prior frustration, I found it very rewarding to talk with the many patients that actively asked questions and expressed appreciation for the new information they learned. There were even a few patients who volunteered commitment to take specific steps toward better protecting their skin from ultraviolet rays.

When the recruitment and treatment phase of the study drew to a close, I found myself wondering what would happen in 6 months when the follow-up data was collected. Of course as a researcher I hoped for significant results so that I could have data to share with the medical and research community that would help other clinicians to become aware of the benefits of utilizing motivational enhancement techniques in a clinical practice. My feelings of nervousness again returned as I wondered if my use of motivational enhancement had been “good enough” to promote statistically significant change within the participants.

As I reflected back on my experiences, I concluded that using motivational enhancement techniques had not only helped me to see more positive responses from my patients, but had also helped me to have more personally rewarding experiences. This

emotional response lead the clinician in me to conclude that regardless of the research findings, I would continue to use motivational enhancement techniques in my clinical practice. Since that time I have applied these techniques not only in behavior change conversations, but also in many of my other patient interactions. The results of these encounters continue to be predominantly positive and, consequently, I have found that I am now more willing to initiate behavior change discussions than I was before I learned to use motivational enhancement techniques.

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Chapter 1: Introduction

Skin cancer is the most common form of cancer in the United States (U.S.), with an incidence of approximately 1.1 million new cases per year (Centers for Disease Control and Prevention [CDC], 2004; World Health Organization [WHO], 2005). When examined by cancer type, it is estimated that in 2007 there will be more than 1 million new basal cell and squamous cell carcinomas diagnosed and over 108,000 new cases of invasive and in situ melanoma (American Academy of Dermatology [AAD], 2007; American Cancer Society [ACS], 2007). When considered together, the incidence rates for these three types of skin cancer surpass the combined incidence rate of breast, prostate, lung/bronchus, and colon/rectal cancers combined (ACS, 2007; Housman et al., 2003).

Furthermore, cutaneous malignant melanoma is the most rapidly increasing cancer in White populations (Diepgen & Mahler, 2002). According to the World Health Organization (2005), the incidence of malignant melanoma has doubled in the U. S. within the last 30 years. Another study found that the age-adjusted incidence of invasive melanoma more than doubled in females (5.9 to 13.8 per 100,000) and nearly tripled among males (6.7 to 19.3 per 100,000) between 1973 and 1997 (Jemal, Devesa, Hartge, & Tucker, 2001). The incidence of non-melanoma skin cancer has also been increasing, with a rate of increase between 4% and 8% per year since the 1960s (Housman et al., 2003).

An examination of the current evidence regarding the age of diagnosis, the stage of cancer diagnosed, and the location of cancerous tumors supports that the recent increases in skin cancer incidence rates reflect true change, as opposed to increased surveillance or increasing population longevity. This conclusion has been supported for melanoma (Jemal et al., 2001), as well as basal cell and squamous cell carcinomas (Christenson et al., 2005).

In addition to the physical and emotional burden that patients experience after being diagnosed with skin cancer, the high incidence of skin cancer translates into high medical treatment costs. The estimated total direct cost of treating non-melanoma skin cancer in 2004 was \$1.5 billion, of which \$1.2 billion was attributed to office care. For the same year, the total direct cost associated with the treatment of melanoma was \$291 million (Bickers et al., 2006). Furthermore, within the Medicare population, non-melanoma skin cancer is considered to be the fifth most costly cancer to treat (Housman et al., 2003). These findings are particularly concerning because skin cancer is largely preventable. In fact, melanoma is likely second only to lung cancer in terms of potential for primary prevention (Poochareon, Federman, & Kirsner, 2004).

Unfortunately, primary prevention efforts thus far have been inadequate in evoking behavior change, as manifested by increasing rates of ultraviolet (UV) radiation exposure, particularly among young adults (AAD, 2004). For this reason, the present study investigates the feasibility of a motivational enhancement approach to skin cancer prevention in a sample of young adult patients. The specific aims of this research are:

Aim 1 - To describe the UV protection behaviors and beliefs of young adult patients in a dermatology clinic.

Aim 2 - To examine whether or not the UV protection behaviors and beliefs of young adult dermatology patients are associated with age, gender, level of education, marital status, contact with skin cancer, time outdoors, skin type, the reason for their visit, and the date of data collection.

Aim 3 - To test the efficacy of a motivational enhancement approach to UV protection counseling for young adult dermatology patients, as manifested by favorable changes in UV protection stages of change, UV protection self-efficacy, and UV protection attitudes.

The investigation of a motivational enhancement approach to UV protection counseling for young adults is a much needed addition to the currently sparse literature on skin cancer prevention efforts by health care providers. To this author's knowledge, this will be the first intervention study on UV protection counseling in a dermatology setting that is theory driven. The significance of this research to health care providers is potentially far reaching, as motivational enhancement techniques can be utilized in various settings by a spectrum of providers including, but not limited to: registered nurses, advanced practice nurses, physician assistants, and physicians. The results of the present study will contribute to the current knowledge base of ways in which health care providers can better help their patients to avoid harmful behaviors, as well as inform the development of future practice guidelines.

Chapter 2: Review of the Literature

Skin cancer

Of the more than 1 million non-melanoma skin cancers that are diagnosed annually, over 75% are basal cell carcinomas (ACS, 2007; Diepgen & Mahler, 2002; Saladi & Persaud, 2005). Fortunately, when compared to other types of skin cancer, basal cell carcinomas are the least likely to metastasize to other areas of the body. Metastasis is more likely with squamous cell carcinomas, although the spread of these cancers is still relatively slow. Because of these growth features, both basal cell and squamous cell carcinomas have a greater than 95% five-year cure rate if detected and treated early (AAD, 2007). In most cases, basal and squamous cell carcinomas can be completely removed by one of the following methods: surgical excision, curettage and electrodesiccation, or cryosurgery (ACS, 2007).

If detected in the earliest stages and treated properly, melanoma is also highly curable. However, in addition to adequately excising the primary growth, the treatment of melanoma must also include the biopsy of one or more nearby lymph nodes for staging. About 80% of melanomas are diagnosed at a localized stage and have a 5-year relative survival rate of 99% (ACS, 2007). For melanomas that have spread regionally, the 5-year relative survival rate is 65%, while the survival rate for melanomas that have spread distantly is only 15% (ACS, 2007). Because of its potential for metastasis, melanoma is expected to be responsible for approximately 8,000 of the estimated 10,710 annual skin

cancer deaths (ACS, 2007; Ries et al., 2006). Furthermore, it has been estimated that the average years of life lost per person dying of melanoma is 18.8 years (Ries et al., 2006).

General risk factors for all types of skin cancer include exposure to UV radiation, proximity to the equator, high altitudes, and having a personal or family history of skin cancer (ACS, 2007; Diepgen & Mahler, 2002; Geller & Annas, 2003; Saladi & Persaud, 2005). Skin cancer is also more common in light-skinned persons who burn rather than tan, particularly those with blue eyes and blonde or red hair. Specifically, Fitzpatrick skin types I and II are considered to be at higher risk for developing skin cancer (ACS, 2007; Diepgen & Mahler, 2002; Geller & Annas, 2003). Risk factors that are more specific to basal cell and squamous cell carcinomas include: increasing age, immunosuppression, chemical carcinogens, ionizing radiation, and various genetic syndromes. Risk factors that are specific for melanoma include the presence of many moles or freckles and the presence of atypical or large moles. Regarding age at diagnosis, the frequency of melanoma peaks in individuals 20-45 years old with approximately 50% of melanomas occurring in individuals under 55 years of age (Diepgen & Mahler, 2002). Finally, two specific gene mutations have been implicated in melanoma development. However, there are numerous cases of melanoma that occur without these specific mutations (Geller & Annas, 2003).

A good example of a location where several skin cancer risk factors occur in one region is the state of Utah. The incidence of cutaneous melanoma in Utah is 20.7 per 100,000 while the incidence rate for the general U.S. population is only 16.6 per 100,000

(U.S. Cancer Statistics Working Group, 2005). In addition, Utah's prevalence rate of sunburn among Whites (48%) has been reported to be the second highest in the nation (Saraiya, Hall, & Uhler, 2002). One reason for this increased incidence of skin damage and skin cancer is the fact that Utah ranks third among the 50 states in average elevation (6100 ft). Furthermore, in 2005 94% of the Utah population reported their ethnicity to be White, while only 80% of the average U.S. population is White (U.S. Census Bureau, 2007). Utah also has approximately 241 sunny days per year while the national average is only 213 sunny days per year (Broadwater, Heins, Hoelscher, Mangone, & Rozanas, 2004). These sunny days are spread through the year, with an average of 20-21 sunny days in the months of September, October, and November and an average of 16-18 sunny days in the months of March, April, and May (National Weather Service, n.d.; Western Regional Climate Center, n.d.). This distribution of sunny days is one of the reasons for the prevalence of year-round, outdoor recreation in Utah and, thus, year-round UV radiation exposure.

Ultraviolet radiation

There is currently compelling epidemiological evidence for the causative role of natural UV radiation (sunlight) in the onset of melanoma, (Armstrong & Krickler, 2001; Fears et al., 2002; Geller & Annas, 2003; Jhappan, Noonan, & Merlino, 2003; Ortonne, 2002b; Rivers, 2004; Siskind, Aitken, Green, & Martin, 2002; Veierod, Weiderpass, Thorn, & Hansson, 2003) basal cell carcinoma, (Almahroos & Kurban, 2004; Geller & Annas, 2003; Lacour, 2002) and squamous cell carcinoma (Almahroos & Kurban, 2004;

Armstrong & Krickler, 2001; Ortonne, 2002a). Similar associations have been demonstrated between each of the three main forms of skin cancer and artificial UV radiation sources, such as tanning beds (AAD, 2004; CDC, 2004; Gallagher, Spinelli, & Lee, 2005; Karagas et al., 2002; Levine, Sorace, Spencer, & Siegel, 2005; Veierod et al., 2003; Westerdahl, Ingvar, Masback, Jonsson, & Olsson, 2000).

Based on these findings, the U.S. Department of Health and Human Services (2005) has declared that solar radiation and tanning beds are known to be human carcinogens. Furthermore, national and international organizations currently consider exposure to UV radiation to be the most important environmental factor in the development of skin cancer and have recommended the use of the UV protection measures listed in Table 1 (AAD, 2003b; ACS, 2007; CDC, 2004; WHO, 2005). Historically, these UV protection recommendations have been focused on children because childhood was considered to be a critical period for UV radiation exposure. However, recent research supports that for many individuals UV exposure throughout the lifetime, not just in childhood, plays a role in the development of both melanoma and nonmelanoma skin cancer (Almahroos & Kurban, 2004; Diepgen & Mahler, 2002; Godar, Urbach, Gasparro, & van der Leun, 2003; Pfahlberg, Kolmel, & Gefeller, 2001; Rivers, 2004; Siskind et al., 2002; Whiteman, Whiteman, & Green, 2001).

Based on these findings, it was concluded by the American Academy of Dermatology, the American Society for Photobiology, and the Food and Drug Administration that there is a need to strengthen photoprotection education for adults in

the United States (AAD, 2004). In addition, Healthy People 2010 includes the goal of having 75% of adults over the age of 18 use at least one UV protective measure to reduce their risk of skin cancer (U. S. Department of Health and Human Services, 2000).

Currently, 61% of U.S. adults meet the UV protection goal set forth by Healthy People 2010. Although this rate represents an increase from previous years, the current rate of improvement is insufficient to reach the desired goal by 2010 (National Cancer Institute, 2005).

In addition to the data available on the infrequent use of UV protection behaviors, it is interesting to note that there is definitive evidence supporting the assertion that more solar UV radiation is reaching the surface of the earth as a result of stratospheric ozone depletion (Abarca & Casiccia, 2002; De Fabo, 2005; de Gruijl et al., 2003; de Gruijl & van der Leun, 2000; Diepgen & Mahler, 2002; Diffey, 2004; Mettlin, 2001; Saladi & Persaud, 2005). More specifically, the thickness of the ozone layer over the northern hemisphere has declined by 10-40% during the winter and spring months (Diepgen & Mahler, 2002). A 10% reduction in ozone layer thickness is associated with a 20% increase in UV radiation and a 40% increase in skin cancers (Diepgen & Mahler, 2002; Saladi & Persaud, 2005).

Although some evidence supports that the rate at which the ozone layer is being destroyed may be slowing, the process of ozone recovery is very slow (Abarca & Casiccia, 2002; De Fabo, 2005; de Gruijl et al., 2003; Diffey, 2004). Consequently, it has been predicted that even if full compliance is achieved in banning ozone-depleting

substances, the incidence of skin cancer attributed to ozone depletion will continue to increase for at least another 50 years (de Gruijl et al., 2003; de Gruijl & van der Leun, 2000; Diffey, 2004; Mettlin, 2001). Based on the current and predicted impact of the ozone layer on solar UV radiation exposure, individuals need to do more now to protect their skin than has been necessary in the past. This finding makes the present inadequate use of UV protection behaviors all the more alarming and underscores the need for better methods of providing education about the importance of UV protection.

Demographic and clinical factors

A closer inspection of specific age groups reveals that while adults 35 years old and older appear to be changing their UV protection behaviors for the better, unprotected exposure to UV radiation in young adults has been increasing (AAD, 2003a; AAD, 2004). When examining sunburns, a recent national survey revealed that while 39% of adults age 18 years old and older reported one or more sunburns in the past year, in the 18 to 24 year old age group this figure was 61% (Brown, Quain, Troxel, & Gelfand, 2006). Regarding sun protection, between 1996 and 2003 the rate of sunscreen use (the most commonly used form of UV protection) decreased 15% for those under the age of 25, bringing the rate of sunscreen use down to 34% (AAD, 2003a; AAD, 2004). In addition, tanning bed use by young adults is increasing at an alarming rate. Overall, tanning salon use in those under age 25 increased from 8% in 1996 to 26% in 2003 (AAD, 2004). Among 18 and 19 year olds specifically, 47% reported using tanning beds 3 or more times in their lives (Demko, Borawski, Debanne, Cooper, & Stange, 2003).

Another study of female college students found 32% to 55% usage rates, with more than 80% of these individuals reporting their tanning salon use to be consistent (AAD, 2004).

It is also concerning to note that in one study of 19 to 30 year old individuals, only 47% reported thinking about skin protection often or every day, while 19% never or rarely thought about protecting their skin from UV radiation (Bernhardt, 2001).

Furthermore, there is a documented tendency for young adults to minimize their risk of skin cancer. This tendency is poignantly illustrated in a study of 18-30 year old individuals who were attending a specialty clinic because of their family history of melanoma and personal history of atypical moles (Bergenmar & Brandberg, 2001). Despite the regular reminders that were provided to these patients about their increased risk of melanoma and the importance of decreasing their UV exposure, more than two thirds of these individuals reported that their risk of developing malignant melanoma was equal to or lower than that of the general population. Likewise, a similar proportion felt that the hazards of the sun exposure were no more dangerous for themselves when compared to the general population.

Although the use of UV protection behaviors has been found to increase with age (Branstrom, Ullen, & Brandberg, 2004; Saraiya et al., 2002; Weinstock, Rossi, Redding, & Maddock, 2002), no studies were identified for inclusion in this literature review that examined the relationship between UV protection behaviors and marital status. This is surprising because it is suspected that within the young adult population, UV protection

behaviors would differ between single and married individuals because of factors such as maturity, differing priorities, etc.

Education has also not been a commonly studied variable in UV protection research to date. In two previous studies the findings have been similar: higher education and greater cognitive ability are associated with reduced tanning bed use and increased use of recommended UV protection measures (Branstrom et al., 2004; Demko et al., 2003). Conversely, one national survey found that individuals with a college degree had higher rates of sunburn when compared to those without a high school degree (Brown et al., 2006).

Among the numerous studies that have examined the relationship between UV protection behaviors and gender, the results have been inconsistent. Several studies have found that females are more likely than males to sunbathe and use tanning beds (Branstrom et al., 2004; Demko et al., 2003; Knight, Kirincich, Farmer, & Hood, 2002; Kristjansson, Branstrom, Ullen, & Helgason, 2003a; Lazovich & Forster, 2005). Ironically, research on UV protection has also found that females are more likely to use UV protection behaviors (Branstrom et al., 2004; Cottrell, McClamroch, & Bernard, 2005; de Vries, Lezwijn, Hol, & Honing, 2005; Weinstock et al., 2002; Weinstock, Rossi, Redding, Maddock, & Cottrill, 2000).

Prior research on having a personal history of skin cancer or knowing someone with skin cancer has also produced mixed results. Perhaps the most surprising finding is that two separate studies found that having a personal history of skin cancer had no effect

on the desire for a suntan or use of UV protection measures (Jackson et al., 2000; Weinstock et al., 2000). For individuals with a family history of skin cancer, some have reported higher rates of UV protection measures (Weinstock et al., 2000), while others have reported lower rates of such behaviors (Jackson et al., 2000; Knight et al., 2002; Manne et al., 2004). Finally, in two studies, having a personal knowledge of someone with skin cancer was associated with higher rates of UV protection behaviors (Weinstock et al., 2002; Weinstock et al., 2000).

In the current body of UV protection literature, the personal characteristic most consistently related to the use of UV protection behaviors is having a sun sensitive skin type (Branstrom et al., 2004; Cottrell et al., 2005; de Vries et al., 2005; Demko et al., 2003; Kristjansson, Helgason, Rosdahl, Holm, & Ullen, 2001; Mahler, Kulik, Gibbons, Gerrard, & Harrell, 2003; Weinstock et al., 2002; Weinstock et al., 2000). Additionally, UV protection beliefs have been repeatedly correlated with UV protection behaviors. Regardless of the specific item used to assess UV protection attitudes, the relationship between this variable and UV protection behaviors is constant: positive attitudes toward UV exposure and being tan are associated with more tanning bed use and less use of sun protection behaviors (Branstrom et al., 2004; de Vries et al., 2005; Grunfeld, 2004; Jackson & Aiken, 2000; Knight et al., 2002; Kristjansson et al., 2001; Lazovich & Forster, 2005; Manne et al., 2004). This relationship remains significant even when age and gender are controlled for (Lazovich & Forster, 2005).

Another personal characteristic consistently associated with the use of UV protection behaviors is self-efficacy. The concept of self-efficacy refers to an individual's belief in his or her ability to demonstrate certain behaviors or accomplish certain tasks successfully (Bandura, 1977). In the previous research on self-efficacy and UV protection, higher self-efficacy for implementing UV protection behaviors has been consistently associated with higher rates of using these behaviors, even after nonpsychological factors are controlled for (de Vries et al., 2005; Grunfeld, 2004; Mahler et al., 2003; Manne et al., 2004). This finding is particularly interesting in light of the fact that it has been proposed that the patient centered nature of motivational enhancement techniques is well suited for influencing individuals' self-efficacy for initiating health behavior change (Jones, Burckhardt, & Bennett, 2004; Miller & Rollnick, 2002). Furthermore, self-efficacy is considered to be a key element of health behavior change motivation and has been shown to be a reasonable predictor of motivational enhancement intervention outcomes (Miller & Rollnick, 2002).

Health Care Provider Counseling

Counseling by health care providers to prevent skin cancer is currently recommended by the American Cancer Society, the American Academy of Dermatology, and the National Institutes of Health (Berg, 2004). These recommendations are consistent with research demonstrating that young adults prefer discussing sun protection with a health care provider (Bernhardt, 2001). However, based on the current literature, it cannot be conclusively determined whether or not counseling by clinicians is effective in

changing patients' UV protection behaviors. Based on this paucity of evidence, the U.S. Preventive Services Task Force has concluded that there is currently insufficient evidence to recommend for or against routine counseling by health care providers to prevent skin cancer (Berg, 2004).

To date, several studies have been conducted that examine the prevalence and content of UV protection counseling by providers in specialty and primary care settings (Balk, O'Connor, & Saraiya, 2004; Davy, Boyett, Weathers, Campbell, & Roetzheim, 2002; Feldman & Fleischer, 2000; Gritz et al., 2003; Polster, Lasek, Quinn, & Chren, 1998; Saraiya, Frank, Elon, Baldwin, & McAlpine, 2000). However, all of these research studies have been exploratory and none of them have investigated specifically how health care providers present UV protection messages to their patients. Furthermore, it is surprising that there has not been more focus in the literature on the UV protection counseling that is provided to dermatology patients. Because of their training and frequent treatment of skin cancer, it would be expected that health care providers in these settings would be of particular interest in establishing the standard for skin cancer prevention counseling. However, only two research studies were identified for inclusion in this literature review which specifically examined the UV protection counseling provided in dermatology settings (Nash, 2004; Polster et al., 1998).

Polster et al. (1998) surveyed 14 dermatologists as well as 162 of their adult patients. They found that approximately 60% of these patients had ever received counseling about sun protection from any dermatologist and 55% reported that they

would like to learn more about skin cancer prevention. This finding suggests that the information provided was likely insufficient for the individual needs of these patients. When the dermatologists were polled, only about one third reported that they discussed specific sun protection measures with more than 75% of their patients. Despite this relatively low rate of counseling, all of the dermatologists agreed that ideally UV protection counseling should be provided by dermatologists to all patients. These dermatologists also expressed that the major barriers they face to providing routine UV protection counseling were lack of time and lack of interest on the part of patients. Regarding satisfaction, it is interesting to note that only 79% of dermatologists and 63% of patients reported that they were somewhat or extremely satisfied with the skin cancer prevention counseling provided in dermatologists' offices.

Nash's (2004) survey provides some insight on the typical counseling approaches used by dermatologists to discuss exposure to UV radiation with their patients. One doctor from Manhattan reported that he does not think his patients are using tanning booths. He states "If they are, they keep it secret from me. They know my views – I make them clear the first time I see a patient." Another physician explained that although she continually tells patients that tanning beds are not a good idea, the patients "just nod their head and say, 'I know, but I don't do it very often'". This physician uses the phrases, "I try to tell them..." and "It's hard to combat...", thus implying that she does most of the talking during these counseling moments. Another dermatologist uses the stories of younger patients that have developed skin cancers, which "usually scares them". "I tell

them if they do not want scars on their face from excising skin cancers, they have to avoid tanning, and the tanning beds.”

The apparently prevalent use of factual discussions with the intent to persuade patients to increase their UV protection behaviors is concerning in light of the broader body of research on UV protection interventions. This is because it has been repeatedly demonstrated in both clinical and community studies that simply increasing individuals' awareness of the risks of UV exposure is insufficient to prompt behavior change (AAD, 2003a; Boggild & From, 2003; Guile & Nicholson, 2004; Helfand & Krages, 2003; Jungers, Guenther, Farmer, & Perkins, 2003; Knight et al., 2002; Kristjansson, Helgason, Mansson-Brahme, Widlund-Ivarson, & Ullen, 2003b; Murphy, 2002; Stanton, Moffatt, & Clavarino, 2005).

Based on the present body of research, it is apparent that there is a need for additional research on UV protection counseling by health care providers. In particular, there is a need for interventions in dermatology settings that are focused on young adult patients. These interventions should be flexible enough to fit individual knowledge levels and beliefs about the seriousness of skin cancer (i.e. thoughts about dying from melanoma vs. early detection and removal of a basal cell carcinoma). In addition, the method in which health care providers converse with patients about skin cancer prevention would ideally accommodate providers' limited amount of time during patient encounters, address patients' prevalent lack of interest, and focus on more than simply increasing knowledge.

Theoretical Framework

Motivational enhancement research

Health care providers frequently address health behavior change with their patients, though these interactions are seldom informed by a formal theoretical framework. In contrast, psychotherapists frequently utilize a guiding framework to aid them in helping individuals change. One such framework, Motivational Interviewing, has recently been adapted for use in relatively brief interventions by physicians (Butler et al., 1999; Ockene, Adams, Hurley, Wheeler, & Hebert, 1999; Reiff-Hekking, Ockene, Hurley, & Reed, 2005; Strang, McCambridge, Platts, & Groves, 2004; Tevyaw & Monti, 2004), nurses (Bennett et al., 2005; Curry et al., 2003; Dunn, Deroo, & Rivara, 2001; Smith, Hodgson, Bridgeman, & Shepherd, 2003; Tevyaw & Monti, 2004), nurse practitioners (Cowley, Farley, & Beamis, 2002; Ockene et al., 1999; Reiff-Hekking et al., 2005), and midwives (Hajek et al., 2001; Tappin et al., 2005). Adapted motivational enhancement techniques have also been investigated in numerous health care settings, including general medical practices and other outpatient clinics (Bernstein et al., 2005; Britt, Hudson, & Blampied, 2004; Burke, Arkowitz, & Menchola, 2003; Butler et al., 1999; Colby et al., 2005; Ockene et al., 1999; Reiff-Hekking et al., 2005; Smith et al., 2003; Strang et al., 2004).

In a recent review of these motivational enhancement techniques Rubak, Sandboek, Lauritzen and Christensen (2005) found that medical doctors obtained an effect from their motivational intervention in 19 of the 23 studies that were identified.

Other health care providers (nurses, midwives, and dieticians) obtained an effect in 5 of the 11 identified studies. Furthermore, these researchers found that when comparing psychologists, psychiatrists, physicians and general practitioners; the effectiveness of the intervention was not related to the counselor's educational background.

The use of motivational enhancement techniques for health behavior change in medical settings has thus far yielded encouraging results in the areas of pain management, cardiac rehabilitation, diabetes, diet and exercise, smoking cessation, alcohol reduction, seatbelt and helmet use, and hormonal contraceptive use (Britt et al., 2004; Burke et al., 2003; Burke, Dunn, Atkins, & Phelps, 2004; Butler et al., 1999; Colby et al., 2005; Cowley et al., 2002; Curry et al., 2003; Johnston, Rivara, Droesch, Dunn, & Copass, 2002; Ockene et al., 1999; Reiff-Hekking et al., 2005; Rubak et al., 2005; Scales & Miller, 2003). In addition to these positive outcomes, several studies have found that both patients and providers perceive motivational enhancement techniques to be acceptable and effective (Berg-Smith et al., 1999; Butler et al., 1999; Curry et al., 2003; Lane, Johnson, Rollnick, Edwards, & Lyons, 2003; Miller & Rollnick, 2002; Onofrio, Pantaloni, Degutis, Fiellin, & O'Connor, 2005; Rollnick, Butler, & Stott, 1997; Rollnick, Mason, & Butler, 1999; Stott, Rees, Rollnick, Pill, & Hackett, 1996).

Although motivational enhancement techniques have not been investigated for use in UV protection counseling, the prior successful application of these techniques by medical providers in outpatient settings for a variety of health promotion topics supports the use of these techniques for this purpose. In addition, an examination of the basic

concepts of motivational enhancement further supports the application of these techniques to UV protection counseling.

Motivational enhancement concepts

Within motivational enhancement techniques, the concept of motivation is equated to an individual's degree of readiness to implement health behavior change, as described in DiClemente and Prochaska's (1998) Transtheoretical Model of Change. Within this model, motivation is viewed as a fluid state wherein individuals progress through five stages of change: precontemplation, contemplation, preparation, action and maintenance. However, motivational enhancement techniques typically do not focus on strict stage definitions, nor do they adopt the intricate stage-specific interventions that are often described within the Transtheoretical Model of Change (Rollnick et al., 1999). Rather, motivational enhancement adopts the general principle that a practitioner's approach needs to be congruent with the readiness to change of the individual because all individuals will not benefit from the same type of help (Britt et al., 2004; Dunn, 2003; Dunn & Rollnick, 2003; Emmons & Rollnick, 2001; Scales & Miller, 2003; Sindelar, Abrantes, Hart, Lewander, & Spirito, 2004). For instance, if someone has not seriously considered change, talking about taking action will be counterproductive. Thus, as will be explained, the motivational enhancement intervention in this study will not provide advice or education to patients until it has been determined what the patient knows and/or would like to know.

Like Motivational Interviewing, brief motivational enhancement techniques facilitate patient-centered, directive discussions wherein practitioners provide clear structure and encourage patients to play an active role in the consultation (Britt et al., 2004; Dunn, 2003; Miller & Rollnick, 2002; Rollnick et al., 1999). The patient-centered aspect of this method of interaction is based on Stewart et al.'s (1995) patient-centered approach to consultations. Within this framework, a practitioner's assessments should actively seek to enter the patient's world and explore his/her ideas about a given topic and what he/she expects from the provider. These principles support a highly individualized approach to health behavior change counseling which is particularly well suited to UV protection counseling, wherein the commonly reported barriers to the use of UV protection measures have been reported to be highly variable (Boggild & From, 2003; Stanton et al., 2005).

The directive nature of motivational enhancement is derived from the use of concepts, techniques, and strategies drawn from Miller and Rollnick's (2002) Motivational Interviewing. Two of the key concepts drawn from this approach are resistance and change talk. Resistance is a term that is traditionally used by clinicians to describe patients who do not want to change or do what is "best" for him or herself. Evidence of this phenomenon in dermatology settings is apparent in the patient education descriptions provided by Nash (2004), as well as in Polster et al.'s (1998) finding that the second most commonly reported barrier to the provision of routine skin cancer preventative services by dermatologists is lack of interest on the part of patients. Health

care providers generally view resistance as an attribute of the patient; however, Motivational Interviewing posits that resistance is an interpersonal problem that is influenced by the way practitioners speak to patients. Thus, resistance can be minimized through the use of a non-confrontational, patient-centered approach to health behavior change discussions (Britt et al., 2004; Dunn & Rollnick, 2003; Duran, 2003; Emmons & Rollnick, 2001; Miller & Rollnick, 2002; Rollnick et al., 1999; Scales & Miller, 2003).

The term change talk refers to an individual's own stated reasons for and advantages of change. Change talk is an important concept in motivational enhancement interactions because the more a person hears him or herself arguing for change, the more likely it is that change will occur (Miller & Rollnick, 2002; Rollnick et al., 1999; Scales & Miller, 2003). Examples of change talk content include disadvantages of the status quo, advantages of change, optimism for change, and intention to change. Because change talk is the conceptual opposite of resistance, it is proposed that discussions that are reflective and supportive will not only reduce resistance, but also increase change talk (Britt et al., 2004; Scales & Miller, 2003). Furthermore, the directive nature of motivational enhancement encourages practitioners to intentionally use responses intended to diminish resistance and reinforce change talk. For instance, the interventionist in this study may choose to encourage change talk by asking the patient about what he/she does and does not like about sun exposure and/or tanning bed use.

Although motivational enhancement techniques are derived from Motivational Interviewing, it is important to point out that this approach to behavior change

consultations is not equivalent to brief Motivational Interviewing. Motivational Interviewing is intended for use in psychotherapy by trained therapists who have hours to spend with their patients. Within a series of therapy sessions, therapists who practice Motivational Interviewing strategically utilize specific psychotherapeutic methods to diminish resistance, resolve ambivalence about change, develop discrepancy between current and desired behaviors, and trigger behavior change. The purpose of these sessions is typically systematic change wherein the client decides that a major shift in identity, behavior patterns, or both is needed (Miller & Rollnick, 2002; Resnicow, Baskin, Rahotep, Periasamy, & Rollnick, 2004; Rollnick et al., 1999). In contrast, motivational enhancement techniques are typically utilized by practitioners who have less formal counseling training and have less time to spend discussing behavior change with clients. Because of these constraints, motivational enhancement techniques do not contain all of the components essential to conducting psychotherapy. However, the use of motivational enhancement techniques is a skillful clinical method which utilizes strategies that are intended to maintain the spirit of Motivational Interviewing (Moyers, 2004; Resnicow et al., 2004; Rollnick et al., 1999).

The spirit of Motivational Interviewing (Table 2) embodies the essence of how practitioners can reduce resistance and encourage change talk within a patient-centered approach and is thus considered to be a critical component of motivational enhancement interactions (Britt et al., 2004; Duran, 2003; Emmons & Rollnick, 2001; Rollnick et al., 1999; Scales & Miller, 2003; Sindelar et al., 2004). To further facilitate health behavior

change, there are several general techniques (Table 3) that the practitioner should utilize throughout motivational enhancement consultations (Dunn & Rollnick, 2003; Duran, 2003; Field, Hungerford, & Dunn, 2005; Lane et al., 2005; Scales & Miller, 2003; Sindelar et al., 2004; Tevyaw & Monti, 2004).

The spirit and techniques of motivational enhancement contradict several assumptions that are prevalent in the medical community, including: now is the time to consider change, a tough approach is best, patients must follow the advice of the expert, and providers know best what motivates individuals to change (Britt et al., 2004; Rollnick et al., 1999). In contrast to these beliefs, health behavior change discussions based on motivational enhancement aim to be collaborative negotiations between provider and patient that more closely resemble dancing than wrestling (Dunn & Rollnick, 2003; Miller & Rollnick, 2002; Rollnick et al., 1999; Scales & Miller, 2003).

Motivational enhancement intervention

Consistent with the spirit of motivational enhancement techniques, the intervention in the present study will begin by gaining the client's permission to address the topic of skin cancer prevention (Dunn & Rollnick, 2003; Duran, 2003; Emmons & Rollnick, 2001; Rollnick et al., 1999). Because bringing up behavior change is a sensitive matter, not just a professional duty, the interventionist should proceed delicately through this process. Furthermore, the interventionist must be honest about his/her own reasons for bringing up the health behavior change topic. For instance, the interventionist may express that he/she is worried that the participant may be at risk because of a specific

behavior. The interventionist should also leave the question of change open and invite the participant to express his/her own views on the subject.

In addition to the general spirit and techniques of motivational enhancement consultations, interventionists traditionally provide structure via the use of more specific strategies. For the intervention in this research study, the primary motivational enhancement strategy that will be utilized is exchanging information. It is important to keep in mind, however, that motivational enhancement strategies are not discrete, inflexible methods; nor are they intended to be applied *to* or *on* participants. Rather, motivational enhancement strategies can and should be adapted to fit individual situations (Britt et al., 2004; Emmons & Rollnick, 2001; Rollnick et al., 1999). Additionally, the spirit of motivational enhancement is more important than the specific steps of a particular strategy (Emmons & Rollnick, 2001; Rollnick et al., 1999).

Within motivational enhancement techniques, the goal of information exchange is not to have one-sided, expert-driven attempts to get information *from* the participant and then give information *to* the participant. Rather, the flow of information focuses as much on maintaining rapport as exchanging facts (Rollnick et al., 1999). The specific steps of information exchange that will be utilized in this intervention are referred to as the elicit-provide-elicited strategy (Dunn, 2003; Dunn & Rollnick, 2003; Field et al., 2005; Miller & Rollnick, 2002; Rollnick et al., 1999; Scales & Miller, 2003). In the initial elicit phase of the consultation, the interventionist encourages the participant to describe his/her behavior, ask questions, and explain what he/she knows or wants to know. During this

exchange it is desirable for the participant to do most of the talking while the interventionist adopts a curious and eliciting tone. Furthermore, in this phase the interventionist is careful to avoid rapid fire questions that turn control of the discussion over to the interventionist.

In the provide phase, the interventionist is active in conveying clear, non-judgmental information. This is accomplished by using language and pacing that matches the participant's understanding. The interventionist also begins with more general education and then provides more detailed information as directed by the participant. Finally, in the second elicit phase, the participant is given an opportunity to absorb and reflect upon the information provided. This is a crucial step because the participant is encouraged to form his or her own genuine reaction to the information provided. As the participant integrates and makes sense of the information provided, the interventionist follows the reaction of the participant for as long as possible. The interventionist can summarize the participant's reaction, including the emotional content, but it should not be confronted or contested even if it is contradictory to the ideas that have been provided. This portion of the consultation may lead to requests for additional information.

The health behavior change consultation is concluded based on verbal and nonverbal cues from the participant. If the participant expresses a desire to implement change, specifics can be discussed as guided by the participant. If not, the interventionist can simply summarize the discussion and remind the participant that the decision to change lies with him/her. Additionally, it is important to remember that because

motivation is not considered to be an all or none phenomenon, the consultation has not failed if the participant does not decide to immediately implement change. Rather, within this intervention, simply helping someone to think a little more deeply about protecting their skin from UV radiation is considered to be a useful outcome (Britt et al., 2004; Dunn, 2003; Dunn & Rollnick, 2003; Duran, 2003; Tevyaw & Monti, 2004).

Motivational enhancement research considerations

Study design. In examining the present body of motivational enhancement literature, several researchers have provided recommendations for the content and characteristics of future motivational enhancement research. For instance, Dunn et al. (2001) calls for more studies of very brief interventions that utilize motivational enhancement principles and incorporate only a few motivational enhancement techniques. In addition to filling a gap in the literature, such studies would be better able to rule out alternative explanations because of the simplicity of their intervention. Furthermore, it is recommended that in initial studies researchers should include qualitative data and evaluate both the efficacy and feasibility of their intervention (Rollnick et al., 1999).

Several researchers have also called for an increased focus on internal validity within motivational enhancement research. Specifically, it has been recommended that researchers should clearly specify the intervention provided; utilize a control group; assess interventionist competence and treatment fidelity; and provide adequate interventionist training, practice and ongoing supervision (Burke et al., 2003; Burke et

al., 2004; Miller & Rollnick, 2002; Rollnick et al., 1999). Research studies that incorporate these rigorous recommendations will help to strengthen the present body of literature on motivational enhancement techniques.

Intervention length, delivery and timing. When developing a motivational enhancement intervention for use by health care providers in a clinic setting, a key consideration is the length of the intervention. The need for effective brief interventions is clearly illustrated in the research conducted by Polster et al. (1998) who found that the most common barrier to the provision of routine skin cancer preventative services by dermatologists is lack of time. Furthermore, when Hajek et al. (2001) asked for feedback from the midwives who administered the motivational enhancement intervention in their study, they found that their 10-15 minute intervention was too lengthy to be practical. Fortunately, several studies have supported the efficacy of motivational enhancement interventions that are 10 minutes or less (Berg-Smith et al., 1999; Butler et al., 1999; Curry et al., 2003; Dunn et al., 2001; Ockene et al., 1999; Reiff-Hekking et al., 2005). In addition, the efficacy of single encounter motivational enhancement interventions has also been supported in a recent review (Rubak et al., 2005).

Another consideration when researching the delivery of a motivational enhancement intervention in a clinic setting is the use of an interventionist who typically provides medical care in the selected clinic. Utilizing such an interventionist in the present study would be advantageous because he/she would already be knowledgeable not only about skin cancer and UV protection, but also about the usual flow of patients

through the clinic. However, in order to minimize the potential bias of established rapport that may exist between returning patients and their provider, it would be important to exclude patients who had previously received medical care from the interventionist. Furthermore, having a different provider deliver the intervention and the patient's medical care would not only minimize the potential for inadvertent, differential treatment; but would also increase both the fidelity and internal validity of the research by allowing the research portion of the visit to be distinct from the patient's medical care.

When determining the timing of a motivational enhancement intervention, it is important to consider the implications for both the validity and feasibility of the study. Regarding feasibility, patients in medical clinics often spend a moderate amount of time waiting in the exam room for their health care provider to become available. Utilizing this waiting time to provide the intervention would not only increase the likelihood that patients will choose to participate in the study, but would also cause minimal disruption to the usual flow of patients through the clinic. By minimizing disruption, such a design decision would also increase the internal validity of the study because staff members would be more likely to "buy into" the procedures and, thus, implement them correctly and consistently. A second internal validity consideration is the tendency of patients in clinic settings to think of additional questions about their diagnosis or treatment after the provider has left the room. Because of this tendency, having participants receive the intervention prior to the examination and treatment portion of their visit increases the

likelihood that the discussion will be focused on the desired topic, as opposed to spending time answering questions about the participant's presenting complaint.

Interventionist training. Presently, there is not a consensus in the literature regarding the amount of training necessary for providers to become proficient in the strategies and spirit of motivational enhancement techniques (Burke et al., 2003; Burke et al., 2004; Dunn et al., 2001; Johnston et al., 2002; Miller & Rollnick, 2002; Rollnick et al., 1999). Dunn et al. (2001) reviewed 29 studies of brief interventions adapted from Motivational Interviewing and found that only ten studies reported the number of training hours provided. Within these studies training lasted from 2-31 hours, with an average of 15 hours. Regarding the use of motivational enhancement techniques in interventions that are 10 minutes or less, reported training ranges from 2 to 18 hours (Berg-Smith et al., 1999; Butler et al., 1999; Curry et al., 2003; Ockene et al., 1999; Onofrio et al., 2005).

Additionally, few studies have investigated the effectiveness of training health care providers in the use of motivational enhancement techniques. One recent review concluded that some basic motivational enhancement skills, such as open-ended questioning and basic reflective listening, can be acquired within hours or days of training (Resnicow et al., 2004). Another study found that after just two-hours of training in a brief motivational enhancement intervention, 91% of the participating physicians and mid-level providers were able to demonstrate proficiency in administering the intervention (Onofrio et al., 2005). Lane et al. (2003) found that after 2-3 hours of training, five out of six nurses in their study demonstrated improvement in their use of

motivational enhancement techniques. Similarly, Smith et al. (2003) found that with two 90-minute workshops and monthly supervision, the two nurses in their study were able to conduct a brief alcohol intervention competently and with confidence.

In studies where the content of training was explained in some detail, it is apparent that the common training elements include didactic instruction, demonstrations, and role-playing exercises (Berg-Smith et al., 1999; Colby et al., 2005; Hajek et al., 2001; Johnston et al., 2002; Longabaugh et al., 2001; Miller & Mount, 2001; Ockene et al., 1999; Onofrio et al., 2005; Rollnick et al., 1997; Spirito et al., 2004). Another training component that is commonly utilized to further develop and refine motivational enhancement skills is periodic supervision (Berg-Smith et al., 1999; Colby et al., 2005; Curry et al., 2003; Johnston et al., 2002; Smith et al., 2003; Spirito et al., 2004; Tappin et al., 2005; Tevyaw & Monti, 2004). The use of supervision is consistent with two prior studies which found that 15-18 hours of training was essential for establishing a foundation in motivational enhancement techniques, but not sufficient for interventionists to adequately absorb and integrate key skills and strategies. For this reason, these researchers recommend that additional feedback and consultation should be provided to help enhance the efficacy of motivational enhancement training (Berg-Smith et al., 1999; Miller & Mount, 2001).

Intervention fidelity. One of the common critiques of previous research involving motivational enhancement techniques is the lack of integrity checks to ascertain the fidelity of the intervention (Burke et al., 2003; Burke et al., 2004; Miller & Rollnick,

2002). In studies that have incorporated integrity checks into their research design, several methods have been utilized. One method is developing an extensive intervention manual in order to help ensure standardization of the intervention (Resnicow et al., 2004). Within the present study, standardization was promoted by having one interventionist administer the intervention to all of the participants. Furthermore, the decision was made ahead of time to utilize the elicit-provide-elicited technique as the primary strategy in each of the health behavior change discussions. A general outline for the consultations was written prior to the recruitment of subjects; however, because of the client-centered nature of motivational enhancement, the present intervention was not scripted. This decision allowed the interventionist to mold the consultation to the participant's individual situation.

Another common method for assessing treatment fidelity is to have the participant and interventionist complete evaluation forms after the intervention has been delivered (Colby et al., 2005; Longabaugh et al., 2001; Spirito et al., 2004; Tevyaw & Monti, 2004). However, because the focus of this research study is to evaluate the feasibility of a brief approach to utilizing motivational enhancement techniques in a primary care setting, this method of ascertaining fidelity was considered to be too lengthy to be practical. Finally, several studies have utilized coding of recorded interviews or role-play sessions to evaluate the adherence of the interventionist to the study protocol and/or the spirit of Motivational Interviewing (Johnston et al., 2002; Ni Mhurchu, Margetts, & Speller, 1998; Onofrio et al., 2005; Smith et al., 2003; Tappin et al., 2005; Tevyaw & Monti, 2004).

This final method of ascertaining treatment fidelity has the advantage of being both cost effective and consistent with the theoretical underpinnings of the present study.

In reviewing the literature, it was determined that the most appropriate instrument for coding brief motivational enhancement interventions is the Behavior Change Counseling Index (BECCI) (Lane et al., 2005; Lane et al., 2003). The BECCI is a global rating measure that assesses practitioner competence in behavior change counseling, which is one the brief adaptations of Motivational Interviewing used to inform the development of the present intervention (Dunn & Rollnick, 2003). The BECCI is made up of eleven items which assess essential provider behaviors such as using empathetic listening, conveying respect for patient choice, and acknowledging challenges to behavior change.

Measuring outcomes. In research studies that test the effectiveness of interventions such as motivational enhancement, it is critical to select an appropriate outcome measure. One such measure is the stages of change. The purpose of stages of change measures is to classify respondents into one of the five stages of change described in DiClemente and Prochaska's (1998) Transtheoretical Model of Change: precontemplation, contemplation, preparation, action and maintenance. Individuals in the precontemplation stage do not intend to change their behavior in the near future because they are either unaware of their need to change or have not seriously considered changing. In the contemplation stage, individuals are aware of a problem and are seriously considering change, but have not yet committed to action. Individuals who

intend to fully implement change are in the preparation stage and those who have actually modified their behavior are in the action stage. In the final stage, maintenance, individuals work to prevent relapse and consolidate the gains they have achieved.

Over the last twenty years, countless research studies have supported the use of the stages of change to describe, predict, and explain changes in a broad range of conditions such as smoking cessation, drug addiction, weight control, mammography screening and condom use (Miller & Rollnick, 2002; Prochaska & Norcross, 2002; Prochaska & Norcross, 2003; Prochaska et al., 1994). These research studies have supported not only the hypothesis that individuals in different stages of change have different needs, but also the use of various staging algorithms to categorize research participants into one of the five stages of change.

In addition to this firm research base, the stages of change has several other advantages as an outcome measure. First, the results of previous research on UV protection have suggested that assessment of motivational stages may be more sensitive to change than measures of behavior (Pagoto, McChargue, & Fuqua, 2003). Second, a recent review of research involving motivational enhancement interventions found that the effects of counseling were apparent not only with direct objective measures, but also with less expensive, indirect measures such as questionnaires (Rubak et al., 2005). Third, it has been found that self-report measures of UV exposure are significantly related to observed UV protection behaviors and sunscreen swabbing (Oh et al., 2004; O'Riordan, Lunde, Steffen, & Maddock, 2006). Finally, the stages of change is consistent with the

theoretical underpinnings of motivational enhancement in which the focus is on the decisional process and not just whether a decision to change is made (Britt et al., 2004; Dunn, 2003; Dunn & Rollnick, 2003; Duran, 2003; Miller & Rollnick, 2002; Tevyaw & Monti, 2004).

Follow-up length. Finally, in order to adequately test the effectiveness of a motivational enhancement intervention, it is critical to have an appropriate follow-up length. Prior research on motivational enhancement interventions in medical settings can guide this process. Several such studies have found significant treatment effects after a six month follow-up period (Bernstein et al., 2005; Butler et al., 1999; Colby et al., 2005; Fleming et al., 2002; Johnston et al., 2002; Ockene et al., 1999). Follow-up assessments should not be administered more proximally to the intervention because a recent review found that a follow-up period shorter than three months increased the risk of motivational enhancement counseling failure (Rubak et al., 2005).

Chapter 3: Design and Methods

Sample

In this randomized controlled clinical trial, 18-30 year old participants were recruited from a suburban dermatology clinic in northern Utah. Potential participants were excluded if they presented seeking treatment for sunburn, were unable to read and understand English, or had previously received medical treatment from the interventionist. Because this is a feasibility study, a target sample size was not calculated a priori.

Procedures

As illustrated in Figure 1, potential participants were given an information sheet about this study (see Appendix A) when they checked-in for their scheduled appointment. Patients who consented to participate were randomized using a random numbers table and blinded to their group assignment. The individuals in the control group were given a brochure from the American Academy of Dermatology on protecting their skin from UV rays (see Appendix B). In addition to receiving the same brochure, participants in the intervention group participated in a brief (5-8 minute) motivational enhancement session as described in the theoretical framework section. Examples of phrases that may have been used during this session are shown in Figure 2.

Initial data collection was done during the months of September, October and November 2006. The follow-up questionnaire was initially mailed or emailed (based on participant preference) in the months of March, April and May 2007. As illustrated in Figures 3 & 4, participants were given reminder emails and/or phone calls each week. The phone scripts and letters used in this process are included in Appendixes C and D.

Interventionist Training

In preparation for this study, the interventionist attended a 14-hour workshop on Motivational Interviewing which included didactic instruction, demonstrations, and role-playing exercises. In addition, she had periodic consultations with a health care practitioner from the Motivational Interviewing Network of Trainers (MINT) and

completed readings from books and articles on Motivational Interviewing and motivational enhancement techniques.

Fidelity

A practice motivational enhancement session was recorded prior to the recruitment of subjects and coded using the BECCI (Lane et al., 2005; Lane et al., 2003). As described in the theoretical framework section, the BECCI is made up of 11 items which are globally rated on a 5-point Likert scale and then combined into a total practitioner score. Possible scores range from 0 to 4, with higher scores indicating behaviors more consistent with the principles of behavior change counseling. In addition to demonstrating favorable properties in terms of content and construct validity, this instrument has demonstrated good internal consistency ($\alpha = 0.71$) and levels of inter-rater reliability between two raters ($r = 0.73$ to 0.98) (Lane et al., 2005; Lane et al., 2003). The interventionist for the present study received a total practitioner score of 3, thus indicating that her behaviors are consistent with behavior change counseling a good deal of the time (Lane, 2002).

Measures

Because the current body of literature contains a paucity of interventional research on skin cancer prevention counseling, it was necessary to utilize an investigator developed questionnaire in the present study. An extensive review of the literature informed the selection and composition of items, with the intention of including items that were both appropriate for the focus of the current study, as well as acceptable in

regard to reliability and validity. Furthermore, during the development of this questionnaire, the potential items were reviewed by experts in dermatology, skin cancer prevention research, and statistics. The results of this review process supported the content validity of the items.

In addition, within the present sample, the baseline scale scores for the three dependent variables were all significantly correlated with each other ($p \leq .001$), in the expected direction. That is to say, individuals who reported that they were in a more ready stage of change for using UV protection behaviors also reported more positive UV protection attitudes and less difficulty using UV protection behaviors. This finding supports the construct validity of these three measures. Finally, the questionnaire was evaluated for readability and comprehension by a sample of young adults prior to data collection. The initial and follow-up questionnaires can be found in Appendixes E and F. Table 4 illustrates the distribution and interpretation of the items.

Stages of change. The primary outcome in this study is the stages of change for UV protection. Within this 5-item measure, participants were asked to choose the statement that best applies to their use of five different UV protection practices (see Table 1). For the purpose of this research study, the original items had to be modified slightly because they were developed for use in Sweden and, consequently, focused on UV protection behaviors that are not totally consistent with current UV protection recommendations in the United States. Specifically, the following changes were made: changed “sunbathing” to “tanning”, changed “11am and 3pm” to “10am and 4pm”,

changed “clothes” to “clothes, hats and sunglasses” , and changed “sunscreens” to “broad-spectrum sunscreen with a Sun Protection Factor (SPF) of 15 or higher”.

Although it is acknowledged that these alterations may have affected the psychometric properties of this measure, these changes were felt to be necessary because a more appropriate stages of change measure was not identified.

Because of the seasonal nature of sun exposure, the items in this measure do not include time frames. Rather, the response choices for these items are: (a) “I have never thought of using this method” (Precontemplation), (b) “I’m thinking about using this method” (Contemplation), (c) “I intend to start using this method” (Preparation), (d) “I have started to use this method” (Action), and (e) “I have been using this method for a long time” (Maintenance). These response choices are unaltered from previous research and, as indicated, each response corresponds to one of the five stages of change.

In prior research on skin cancer prevention, the original items have been demonstrated to be sensitive to expected differences between subgroups (Branstrom, Kristjansson, Ullen, & Brandberg, 2002; Kristjansson, Helgason, Mansson-Brahme, Widlund-Ivarson, & Ullen, 2003; Kristjansson et al., 2001). Furthermore, the stability of the original five items has been moderately supported by two separate test-retest reliability results: kappa coefficients 0.47 to 0.62 (Branstrom et al., 2002) and values close to $r = 0.70$ (Kristjansson et al., 2003). Branstrom et al. (2002) also found that the absolute agreement between the test and retest scores among these five items varied between 0.58 and 0.74. In the present study, the internal consistency of the modified

items was supported by a Chronbach's alpha value of 0.71, though the scale score test-retest reliability value for participants in the control group ($r = 0.41$) was relatively poor.

Attitudes. A second outcome measure assesses participants' attitudes about protecting their skin from the sun and tanning beds by using four separate items. The first item asks respondents if they think that the advantages of being tan outweigh the disadvantages, while the second item asks how much respondents like being tan. Each question has five Likert-scale responses. In prior research, questions similar to these first two items were found to be moderately reliable in test-retest analysis (kappa coefficients 0.50 and 0.56) (Branstrom et al., 2002). The last two questions are adapted from research by Kristjansson et al. (2001). These questions ask respondents to rate on a five-point Likert scale how healthy or harmful they think exposure to the sun/ tanning beds is, with higher scores indicating more favorable UV protection attitudes. The Chronbach's alpha value obtained for the present study was 0.69 and the scale score test-retest reliability coefficient was strong for participants in the control group ($r = 0.75$).

Self-efficacy. The third and final quantitative outcome measure in this study assesses UV protection self-efficacy. Respondents were asked to choose the statement that best describes how difficult or easy it is for them to use each method of protecting their skin from the sun and tanning beds. The same five methods of UV protection were assessed in these items as in the stages of change items. Respondents could choose one of five Likert-scale responses ranging from "very easy" to "very difficult", with higher scores indicating more difficulty using UV protection methods. In previous research a

similar measure of self-efficacy was able to distinguish between those who used UV protection behaviors and those who did not (de Vries et al., 2005). In the present sample, these four items had an acceptable Chronbach's alpha value of 0.68 and scale score test-retest reliability coefficient of 0.60 for participants in the control group.

Demographic and clinical variables. Demographic variables included age, gender, level of education and marital status. Clinical variables included the primary reason for the participant's dermatology appointment as well as how long, on average, participants are outdoors during daylight hours on a typical work day and non-work day. The date of data collection was also recorded for both the initial and follow-up questionnaires. Two additional clinical variables were contact with skin cancer and skin type.

Contact with skin cancer. The questions and scoring used to assess this variable are based on previous work by Weinstock, Rossi, Redding, Maddock and Cottrill (2000) as well as Jackson, Wilkinson, Hood and Pill (2000). On the questionnaire, three questions were used to assess if participants have ever had skin cancer, if they have a family member who has had skin cancer, and/or if they know anyone who has had skin cancer. The responses to these three questions were then used to create a variable with 4 categories: 0- no experience, 1- acquaintance with someone, 2- family history and 3- personal history. If respondents answered affirmatively to more than one of the questions, the highest response was coded.

Skin type. Skin type was assessed via a single item which asks participants how their skin responds to their first exposure to summer sun, without sunscreen, for 1 hour at midday. The four response categories correspond to the skin type categories described by Fitzpatrick (1988): (a) “always burn, never tan” (Type I); (b) “usually burn, can tan if I work at it” (Type II); (c) “sometimes burn, can tan” (Type III); and (d) “rarely or never burn, tan easily” (Types IV, V, VI).

Qualitative items. Included in the follow-up questionnaire were two qualitative questions. The first asked respondents to describe what, if anything, was helpful about the information they received about protecting their skin from the sun and from tanning beds. The second question asked participants to list any suggestions they may have to improve the delivery of information about protecting their skin from the sun and from tanning beds.

Human subjects protection

Although names, phone numbers, mailing addresses and, in some cases, email addresses had to be collected to be used for follow-up contact, only identification numbers were used on the questionnaires. The contact information forms that connected identification numbers with personal contact information (see Appendix G) were kept in a locked box separate from the questionnaires and were destroyed after the follow-up data was collected. Only the identification numbers were used to analyze the data. Participants were reassured that the quality of care they received at their appointment would not be dependent on their participation in this research study. To thank participants

for their participation in the study, they were given two movie passes after their follow-up questionnaire had been received. Prior to the recruitment of subjects, appropriate institutional review board approval was obtained.

Chapter 4: Results

Sample

Of the 109 dermatology patients who were initially assessed to be eligible to participate based on age and appointment status, 82 (75%) consented to participate in this research study (See Figure 5). Only one individual was excluded because of a language barrier and no individuals needed to be excluded because they were seeking treatment for sunburn. Although independent samples t-test results revealed that the average age of the individuals who declined participation did not differ significantly from that of the study sample ($p = 0.97$), Chi-square revealed that there were significantly more males who declined to participate in this study ($p = 0.048$).

As shown in Table 5, the majority of the sample reported that they were single (63%) and had either one or more college degrees (44%) or had some college education (49%). Five participants had a personal history of skin cancer and the remainder of the sample was fairly evenly distributed between the other three categories of contact with skin cancer. Among the participants, skin type III was the most prevalent (42%), although each of the other skin type categories included approximately one fifth of the sample. The average amount of time participants reported spending outdoors during daylight hours was 1.6 hours on a work day and 2.8 hours on a non-work day. Finally, the most

commonly reported reasons for participants' appointments were either moles/spots to be checked (33%) or acne/rosacea (38%).

Of the 82 original participants, 76 (93%) responded to the follow-up questionnaire. One-way ANOVAs were employed to determine if there were significant group differences, between those who completed the follow-up questionnaire and those who were lost to follow-up. Despite the difference in sample sizes ($n = 76$ completed versus $n = 6$ lost to follow-up), there were no violations of homogeneity of variance. Results of the ANOVAs indicated that there were no significant differences between the two groups based on age, time outdoors on work and non-work days, and baseline scale scores for the three dependent variables. Although the group of six non-completers is too small to run valid statistical comparisons for the categorical variables, it is reassuring to note that these individuals reported a variety of demographic and clinical variables with no one category clearly more represented.

Aim 1 - To describe the UV protection behaviors and beliefs of young adult patients in a dermatology clinic.

To address Aim 1, descriptive statistics were used to profile each of the three dependent variables. The results of these analyses are shown in Table 6. Participants' reported readiness to use specific UV protection measures is further illustrated in Figure 6. As can be seen, participants reported an overall mean stages of change scale score of 3.12 ($SD = 1.05$), which corresponds to the preparation stage. Individuals were in a more ready stage of change for avoiding tanning beds (mean = 3.80, $SD = 1.52$) and wearing

sunscreen (mean = 3.62, SD = 1.42). Participants were least ready to avoid outdoor activities between 10am and 4pm (mean = 2.12, SD = 1.57).

The mean scale score for the attitude items was 3.57 (SD = 0.68), thus indicating positive attitudes toward UV protection. When examining individual items, it is apparent that although, on average, participants reported that they somewhat liked being tan (mean = 2.04, SD = 0.92), they also reported that there are a few more disadvantages to being tan (mean = 4.05, SD = 1.13). Furthermore, participants also reported that they think exposure to the sun (mean = 3.70, SD = 0.99) and tanning beds (mean = 4.51, SD = 0.69) is rather harmful.

Regarding self-efficacy, the participants in this sample reported that overall it was neither easy nor difficult to protect their skin from UV rays (mean = 2.59, SD = 0.76). Participants reported the most difficulty with avoiding activities between 10am and 4pm (mean = 3.83, SD = 1.12) and the greatest self-efficacy for avoiding tanning beds (mean = 1.44, SD = 0.88).

Aim 2 - To examine whether or not the UV protection behaviors and beliefs of young adult dermatology patients are associated with age, gender, level of education, marital status, contact with skin cancer, time outdoors, skin type, the reason for their visit, and the date of data collection.

In order to examine whether or not UV protection behaviors and beliefs were associated with any of the demographic or clinical variables, Pearson correlations were run for each of the demographic and clinical variables as well as for the baseline scale

scores for each of the dependent variables. As can be seen in Table 7, the dependent variable scale scores were not significantly associated with marital status, contact with skin cancer, time spent outdoors on work days, date of data collection, or the reason for participants' appointments. Regarding gender, there was a trend toward significance for the correlation involving UV protection attitudes ($r = 0.21$, $p = 0.058$), with females reporting more favorable UV protection attitudes than male participants.

From Table 7 it is also apparent that there was a significant correlation between baseline attitude scale scores and time spent outdoors on non-work days ($r = -0.36$, $p = 0.001$). Specifically, individuals who spent less daylight time outdoors on non-work days reported more favorable UV protection attitudes. Similarly, there was a trend toward significance for the correlation between baseline stages of change scale scores and time spent outdoors on non-work days ($r = -0.21$, $p = 0.055$). The direction of this correlation indicates that individuals who spent less daylight time outdoors on non-work days reported more readiness to use UV protection measures.

In addition, respondents with more sun sensitive skin types reported more favorable UV protection behaviors and beliefs for all three outcomes, as manifested by significantly higher baseline stages of change scale scores ($r = -0.31$, $p = 0.004$), higher attitude scale scores ($r = -0.36$, $p = 0.001$), and lower self-efficacy scale scores ($r = 0.23$, $p = 0.040$). Regarding age, there was a significant positive correlation between baseline stages of change scale scores and age ($r = 0.28$, $p = 0.011$), indicating that older respondents reported higher stages of change scores, as well as a significant negative

correlation between baseline self-efficacy scale scores and age ($r = -0.23, p = 0.038$), indicating that older respondents reported less difficulty using UV protection measures.

Finally, education was significantly correlated with baseline self-efficacy scores ($r = -0.30, p = 0.007$). The negative direction of this correlation indicates that participants with more education reported that they had less difficulty using UV protection methods. In addition, there was a trend toward significance for the correlations involving education and the scale scores for both the stages of change ($r = 0.21, p = 0.053$) and attitudes ($r = 0.21, p = 0.058$). These results support that participants with more education reported both higher stages of change scale scores as well as higher attitude scale scores.

Aim 3 - To test the efficacy of a motivational enhancement approach to UV protection counseling for young adult dermatology patients, as manifested by favorable changes in UV protection stages of change, UV protection self-efficacy, and UV protection attitudes.

In order to test the efficacy of the study intervention, it was necessary to compare the control and intervention groups for favorable changes in stages of change, self-efficacy, and attitudes. The first step in this process was to run independent samples t-tests and Chi-square analyses to determine if these groups differed significantly on any of the demographic and clinical variables or baseline scores on the dependent variables. As shown in Table 8, the only significant difference found was that there were more married individuals in the control group ($p = 0.042$). Because of this difference between the treatment groups, it was necessary to utilize analysis of covariance (ANCOVA), controlling for marital status.

Before proceeding with ANCOVA, the data set was evaluated to determine if either of the two main, underlying assumptions of ANCOVA, normality and homogeneity of variance, were violated. The normality of the data was supported by evaluations of skewness (range = -0.81 to 0.38) and kurtosis (range = -1.12 to 1.02). These tests were run on the baseline scale scores of participants who completed both questionnaires as well as on the follow-up scale scores of the control and intervention groups separately. Finally, Levene's test of equality was run for all three dependent variables scale scores. The results of these tests were not significant ($p < 0.05$), thus supporting the assumption of homogeneity of variance within this data set.

To determine if significant differences in improvement exist between the control and intervention groups, two sets of ANCOVAs were run for each of the three dependent variables (see Table 9). In the first set of ANCOVAs, the dependent variable scale change scores were used as the dependent variable and the only covariate was marital status. The results of these analyses were not significant for stages of change scale change scores ($F_{(1,75)} = 0.052$, $p = 0.82$), attitude scale change scores ($F_{(1,75)} = 2.02$, $p = 0.16$), or self-efficacy scale change scores ($F_{(1,75)} = 0.42$, $p = 0.52$). A second set of ANCOVAs were run with the follow-up dependent variable scale scores as the dependent variable and both marital status and baseline dependent variable scale scores as covariates. The results of these analyses were not significant for stages of change scale scores ($F_{(1,75)} = 0.59$, $p = 0.45$), attitude scale scores ($F_{(1,75)} = 1.57$, $p = 0.21$), or self-efficacy scale scores ($F_{(1,75)} = 0.85$, $p = 0.36$).

After the ANCOVA analyses were run, it was decided to run additional exploratory analyses in order to further evaluate what, if any, change was reported by participants in this sample. Tables 10 and 11 display the means, standard deviations, and change scores for the three dependent variables at baseline and follow-up. In addition, the UV protection stages of change distribution for the 76 participants who completed the follow-up questionnaire is illustrated in Figure 7. In order to determine if there were significant changes in any of the individual items or scale scores from baseline to follow-up, paired samples t-tests were run separately for the control and intervention groups for each of the three sets of dependent variables.

Adjusting for the familywise error rate reduces the probability of making false discoveries (type 1 errors) when performing multiple tests in which the dependent variables are conceptually very similar. The level of significance used for the three scale scores was maintained at 0.05 because these variables are conceptually distinct. However, the individual items within each scale are by design very similar and, therefore, a revised level of significance was utilized for these three sets of individual items ($\alpha = 0.05 / \text{number of items} = 0.01$). The significance values obtained for the paired samples t-tests are listed in Tables 10 and 11.

As shown in Table 10, the participants in the control group did not demonstrate any statistically significant improvement on any of the dependent variable scale scores or individual item scores. Table 11 illustrates that within the intervention group participants reported statistically significant improvement in their opinions about the harmfulness of

tanning beds ($p = 0.005$). When interpreting these results, however, it should be considered that the change from baseline to follow-up (0.25) was smaller than the standard deviations obtained for the baseline ($SD = 0.61$) and follow-up ($SD = 0.46$) values as well as for the change score ($SD = 0.50$). Furthermore, it is also important to point out that most of the baseline items, follow-up items, and change scores also had relatively high standard deviations, many of which were greater than 1.0, thereby reducing power to detect group differences.

Qualitative responses

Of the 76 participants who completed the follow-up questionnaire, 66 (87%) provided responses to one or both of the qualitative questions. The responses to the question regarding what, if anything, was helpful about the information participants received about protecting their skin from the sun and from tanning beds were generally positive. Several participants from both the control and intervention groups indicated that the information provided was a review for them. The majority, however, reported specific information they learned. These responses are listed in the first section of Table 12. No distinct differences were apparent between the reported information gained in the control versus the intervention group.

When asked for suggestions about improving the delivery of information about protecting their skin from the sun and from tanning beds, participants provided a spectrum of responses. In fact, nearly all of the individuals who suggested specific topics to be added to discussions about skin cancer prevention focused on different areas (see

the second section of Table 12). In addition to the suggestions about what to include in skin cancer prevention discussions, there were numerous suggestions about other methods of providing UV protection information (see the third section of Table 12). One participant specifically recommended that information should be presented in a location where a lot of people will be exposed because he felt that if he had not received the information at his visit, he would not have been exposed to the information from another source.

There were a few negative responses to the qualitative questions. One of the negative responses was from an individual in the control group who “can’t remember the information.” Another individual in the control group felt the brochure was boring and needed updated colors and pictures. The other two negative responses were from individuals in the intervention group who stated that they did not read the brochure. Conversely, one participant in the control group reported that she “liked having a brochure to keep and refer to later”. There were no negative responses regarding the motivational enhancement portion of the intervention.

Fortunately, these two qualitative questions elicited several more positive responses. For instance, one individual in the control group “Thought it was wonderful”. In the intervention group, one person reported that “It was very helpful” and another stated that “The delivery of information was very effective”. In addition, some participants in the control group expressed a change in their opinions of sun exposure, as manifested by their statements: “I think more about protecting my skin when I am in the

sun for a prolonged amount of time” and “I will definitely be much more careful about protecting my skin”. Regarding changes in behavior, one individual in the control group stated that “The pamphlet and pictures scared me into buying sunglasses and hats”. In the intervention group two participants reported changes in their behavior: “I bought face lotion with sunscreen in it...” and “I use sunscreen all the time now”.

Finally, two of the responses were particularly interesting because of their consistency with the theoretical framework of motivational enhancement. One participant in the intervention group stated that “I knew most of it, but felt encouraged to do it more”. Additionally, an individual in the control group explained that “...the second someone says ‘you shouldn’t spend time in the sun’, I want to give up on the idea completely because I am not going to give up playing outside.” Instead this respondent advocates “Providing many options and an agreeing statement that, ‘yes we all love to spend time outside and this is good for us, but let’s just be safe about it...”

Chapter 5: Discussion

Aim 1 - To describe the UV protection behaviors and beliefs of young adult patients in a dermatology clinic.

The participants in this sample expressed positive attitudes toward UV protection, as manifested by the prevalent opinion that exposure to the sun and tanning beds is rather harmful. Furthermore, participants reported that although they somewhat liked being tan, they also felt that there are a few more disadvantages to being tan. These positive attitudes indicate adequate knowledge about the risks associated with UV exposure.

However, despite this knowledge, the average participant only reported that they “intended to start” using the five UV protection methods listed in Table 1. This apparent disparity between UV protection attitudes and behaviors is consistent with previous research in which increased awareness of the risks of UV exposure was not associated with behavior change (AAD, 2003a; Boggild & From, 2003; Guile & Nicholson, 2004; Helfand & Krages, 2003; Jungers et al., 2003; Knight et al., 2002; Kristjansson et al., 2003b; Murphy, 2002; Stanton et al., 2005).

An examination of the stages of change results for each of the specific UV protection behaviors reveals that although the average scale scores corresponded to the preparation stage of change, there was significant variation in the stages of change results for the individual behaviors. Specifically, the young adults in this sample were in a more ready stage of change for avoiding tanning beds and wearing sunscreen. Participants were least ready to avoid outdoor activities between 10am and 4pm. These differences were also apparent in the self-efficacy data wherein participants reported the most difficulty with avoiding activities between 10am and 4pm and the greatest self-efficacy with avoiding tanning beds.

There are several possible explanations for the expressed differences among this sample regarding the avoidance of tanning beds and outdoor activities between 10am and 4pm. One aspect to consider is the increased accessibility of outdoor activities when compared to tanning beds. Because of this factor, going to the tanning beds is an intentional method of UV exposure, where as going outdoors between 10am and 4pm is

something that would likely happen routinely to most people unless they were making a conscious effort to avoid this period of intense UV exposure. It should also be considered that that daytime outdoor activities are often associated with socialization or physical exercise benefits where as tanning salon attendance is generally a solitary activity. Perhaps because of these benefits, or because of the accessibility of natural sunlight, individuals may conclude that avoiding outdoor activities between 10am and 4pm is either not worth the sacrifice and/or unrealistic. Alternatively, it is possible that many of the individuals in this sample were simply unaware of the benefits of avoiding outdoor activities between 10am and 4pm.

The research of Stanton, Moffatt, and Clavarino (2005) provides additional insight into the apparent incongruence between UV protection behaviors and beliefs. These researchers discovered that although only 10% of the participants in their study met the health guidelines for UV protection, 38% reported that they thought they used enough sun protection to meet the health professional guidelines. In the present study, participants were only asked to indicate their readiness to use the five UV protection measures advocated by health agencies. Participants were not asked if they felt their level of UV protection was adequate. Based on the positive attitudes of this sample towards UV protection, it is possible that respondents felt that the UV protection behaviors they were using were sufficient to prevent skin cancer. It is also unclear if the participants in this sample were simply unaware of UV protection health guidelines or if they had

ignored health guidelines and decided how much UV protection was enough for them on the basis of what they considered appropriate for their circumstances.

Aim 2 - To examine whether or not the UV protection behaviors and beliefs of young adult dermatology patients are associated with age, gender, level of education, marital status, contact with skin cancer, time outdoors, skin type, the reason for their visit, and the date of data collection.

In the prior UV protection literature, the variable most consistently related to UV protection behaviors is having a sun sensitive skin type (Branstrom et al., 2004; Cottrell et al., 2005; de Vries et al., 2005; Demko et al., 2003; Kristjansson et al., 2001; Mahler et al., 2003; Weinstock et al., 2002; Weinstock et al., 2000). This relationship was upheld in the present study, as manifested by the fact that participants in this sample with more sun sensitive skin types were in a more ready stage of change to use UV protection behaviors, had more positive UV protection attitudes, and expressed less difficulty using UV protection behaviors. This difference may have been motivated by a desire to prevent painful sunburns or it could have been based on an awareness of skin cancer risk. Additional research is needed to determine the reason for this consistently observed difference in both behaviors and beliefs.

Regarding sun exposure, the finding that time outdoors on work days was not associated with any of the dependent variables supports the conclusion that occupational sun exposure was not a significant factor when examining UV protection behaviors and beliefs within this sample. Interestingly, the sun exposure that participants likely have

more control over, time spent outdoors on non-work days, was strongly associated with UV protection attitudes and weakly associated with UV protection stages of change. Specifically, individuals who spent less daylight time outdoors on non-work days reported having more favorable UV protection attitudes and being in a more ready stage of change to use UV protection measures. It cannot be determined from this study, however, whether this correlation exists because individuals who do not enjoy being outdoors or who do not have time to be outdoors tend to have more positive UV protection behaviors and beliefs, or if individuals who are committed to UV protection choose to spend less time outdoors. Additional research focusing on the reason for this association could be very helpful in informing the development of future skin cancer prevention interventions.

Although no prior research studies were identified that specifically examined the relationship between age and UV protection behaviors or beliefs in a sample of young adults, UV protection studies with larger age group samples have found that the use of UV protection behaviors increases with age (Branstrom et al., 2004; Saraiya et al., 2002; Weinstock et al., 2002). Consistent with these findings, the older respondents in this sample of 18 to 30 year-olds reported both more readiness to use UV protection behaviors and more ease in using UV protection measures. One possible explanation for this finding is increased maturity. However, it is interesting to note that UV protection behaviors and beliefs did not differ significantly between single and married participants. Another potential explanation for the increased self-efficacy and readiness to use UV

protection behaviors among older participants is education. This hypothesis is supported by the finding that in this sample, participants with more education reported less difficulty using UV protection behaviors. Furthermore, there was a statistical trend for participants with more education to report more readiness to use UV protection behaviors as well as more favorable UV protection attitudes.

The relationship between UV protection and having a personal history of skin cancer or a personal knowledge of someone with skin cancer is much less clear. For the sample in this study, the variable contact with skin cancer was not related to UV protection stages of change, attitudes or self-efficacy. This is particularly surprising because several participants in this sample suggested that it would be helpful in future UV protection education efforts to have people who have had skin cancer share their stories. In the previous research on this topic, the findings have also been contradictory. Even though only five participants in this sample reported a personal history of cancer, the results of this study are consistent with previous research in which having a personal history of skin cancer had no effect on the desire for a suntan or the use of UV protection measures (Jackson et al., 2000; Weinstock et al., 2000). However, having a family history of skin cancer or a personal knowledge of someone with skin cancer has been previously associated with both higher (Weinstock et al., 2002; Weinstock et al., 2000) and lower rates of using UV protection behaviors (Jackson et al., 2000; Knight et al., 2002; Manne et al., 2004).

Finally, it is interesting to note that although males and females did not report significantly different stages of change or self-efficacy data, there was a trend for female participants to report more favorable UV protection attitudes. This finding adds to the currently complicated body of literature on gender and UV protection wherein females are more likely than males to sunbathe and use tanning beds (Branstrom et al., 2004; Demko et al., 2003; Knight et al., 2002; Kristjansson et al., 2003a; Lazovich & Forster, 2005), but are also more likely to use UV protection behaviors (Branstrom et al., 2004; Cottrell et al., 2005; de Vries et al., 2005; Weinstock et al., 2002; Weinstock et al., 2000).

Aim 3 - To test the efficacy of a motivational enhancement approach to UV protection counseling for young adult dermatology patients, as manifested by favorable changes in UV protection stages of change, UV protection self-efficacy, and UV protection attitudes.

When interpreting the follow-up data, it is encouraging to find that there was significant improvement in participants' opinions about the harmfulness of tanning beds from baseline to follow-up within the intervention group. However, the large standard deviations for the baseline scores, follow-up scores, and change scores are concerning. This high level of variability within the present data set makes it difficult to confidently conclude that improvement actually took place. Based on this lack of definitive changes from baseline to follow-up, it is not surprising that a comparison of the control and intervention groups did not detect statistically significant differences in improvement for any of the dependent variables.

Regarding clinical significance, the prior literature on UV protection stages of change has proposed that a movement of one stage of change is considered significant (Branstrom et al., 2002; Kristjansson et al., 2003; Kristjansson et al., 2001). Within this study sample, no stages of change items had a change score this high. For UV protection attitudes and self-efficacy, no standard of clinical significance has yet been established. Since the range of responses for these three outcomes is 1-5, it could be argued that even an increase of 0.5 is clinically significant. In examining the data, none of the change scores for the attitude or self-efficacy items met this hypothesized standard for clinical significance. Furthermore, the one statistically significant change from baseline to follow-up (perceived harmfulness of tanning beds) was only 0.25 and, therefore, may not be clinically significant.

Additionally, it must be remembered that within motivational enhancement interventions, motivation is not considered to be an all or none phenomenon. Rather, simply helping someone to think a little more deeply about change is considered to be a useful outcome (Britt et al., 2004; Dunn, 2003; Dunn & Rollnick, 2003; Duran, 2003; Tevyaw & Monti, 2004). (Rollnick et al., 1999). Thus, despite the lack of significant improvement in the quantitative outcome measures used in this study, it is encouraging that the qualitative responses clearly demonstrated that several of the participants began thinking more about UV protection. A few participants even reported favorable changes in their UV protection behaviors as a result of reading the brochure and, a little more commonly, from participating in the motivational enhancement intervention.

Finally, when interpreting the data obtained in this study it is important to consider that the willingness of participants to take steps toward changing their UV protection behaviors may have been affected by the specific challenges associated with UV protection and/or the interpersonal factors inherent to motivational enhancement techniques. It is also important to consider the potential impact that the timing of data collection, the delivery of the intervention and control, the characteristics of the sample, and the chosen outcome measures may have had on the data that was collected.

Challenges specific to UV protection. Although no research was identified that compared the efficacy of interventions for UV protection to interventions for other health behaviors, it can be argued that there are challenges specific to UV protection which make this health behavior particularly difficult to influence. One such challenge is the fact that skin cancer can take years, even decades, to appear. This lack of immediate consequences can make it particularly difficult for individuals to change their UV exposure behaviors. Furthermore, the most immediate indicator of UV exposure, tan skin, is often considered to be desirable. This social acceptance, and even promotion, of a tan appearance not only undermines behavior change interventions, but also places UV protection decades behind health behaviors such as smoking cessation and seatbelt use, as these health behaviors are now generally encouraged by societal influences.

In addition to social pressures to have tan skin, there is also a pervasive attitude in the U.S. regarding the healthiness of being in the sun. While being outdoors can have many benefits, such as recreation and exercise, outdoor activities are generally promoted

without any mention of the importance of using UV protection behaviors while engaging in such activities. In addition to the physical fitness benefits of outdoor activities, solar UV exposure has been associated with various positive psychological benefits. For instance, being outdoors for one individual may signify freedom from daily stress, while another individual may associate UV exposure with warmth and happiness when compared to the dreariness of rain or snow. Several research studies have even supported the hypothesis that tanning can become an addictive behavior (Kaur et al., 2006; Poorsattar & Hornung, 2007; Warthan, Uchida, & Wagner, 2005; Zeller, Lazovich, Forster, & Widome, 2006). These psychological factors may help explain not only why having a knowledge of UV exposure risks does not translate into behavior change (AAD, 2003a; Boggild & From, 2003; Guile & Nicholson, 2004; Helfand & Krages, 2003; Jungers et al., 2003; Knight et al., 2002; Kristjansson et al., 2003b; Murphy, 2002; Stanton et al., 2005), but also why this health behavior may be particularly difficult to influence.

Another challenge to promoting UV protection is the fact that there are currently five main recommendations in the United States to achieve this goal (see Table 1). The use of sunscreen has historically been the most frequently used method of UV protection, despite the fact that sunscreen does not block all UV radiation and should not be used exclusively (AAD, 2003a; AAD, 2003b; AAD, 2004). When made aware of all five methods of UV protection, it is unlikely that the majority individuals will embrace all of these methods. Many may feel that some of these recommendations are unrealistic and/or

too difficult to implement. This challenge is a difficult one for skin cancer prevention researchers. On one hand, researchers are more likely to achieve significant changes from their intervention if they focus on just tanning bed avoidance or sunscreen use. However, because of the inadequacy of using just one or two UV protection recommendations, it may not be ethical to proceed with such a narrow focus. Conversely, it can be argued that helping individuals utilize more UV protection, even if it is not totally sufficient, is still a desirable outcome.

Another challenge inherent in promoting UV protection behaviors is the availability of UV rays. Other than tanning beds, exposure to UV radiation is generally readily available and, in many instances, unavoidable. Since it is unrealistic to assume that individuals stay indoors during daylight hours every day of the week, it is safe to assume that if no action is taken, some amount of unprotected UV exposure will occur. One component of UV protection is planning ahead to avoid unnecessary UV exposure. However, unlike substance abuse or smoking cessation, UV protection requires an individual to focus not just on refraining from harmful activities, but also on taking proactive steps to make worthwhile outdoor activities safe for the skin.

In summary, UV protection poses a unique collection of challenges for skin cancer prevention researchers. Though these challenges make the development of provider delivered health behavior change interventions difficult, continued effort to promote change should still be made. Based on the results of this single study, it would be premature to abandon the investigation of motivational enhancement techniques.

Continued research on the utilization of these techniques for skin cancer prevention is warranted based not only on the complex interplay of personal and societal factors associated with this health behavior, but also on the wide variety of health behaviors that have obtained favorable results from other motivational enhancement interventions (Britt et al., 2004; Burke et al., 2003; Burke, Dunn, Atkins, & Phelps, 2004; Butler et al., 1999; Colby et al., 2005; Cowley et al., 2002; Curry et al., 2003; Johnston et al., 2002; Ockene et al., 1999; Reiff-Hekking et al., 2005; Rubak et al., 2005; Scales & Miller, 2003). This being said, it should also be considered that because of the many challenges associated with UV protection, this set of behaviors may also require the use of large scale, community based interventions in order to favorably influence cultural norms as well as individual behaviors.

Interpersonal factors. One of the key components of motivational enhancement interventions is the focus on establishing and maintaining rapport throughout the consultation. As may be expected from this focus, the use of motivational enhancement techniques has been found to enhance provider-patient relationships, as well as reengage resistant clients and increase treatment adherence over time (Berg-Smith et al., 1999; Colby et al., 2005; Miller & Rollnick, 2002; Rollnick et al., 1997; Rollnick et al., 1999). For the topic of skin cancer prevention, these findings suggest that although this study did not reveal statistically or clinically significant improvement within the 6 month follow-up period, there may be an increased possibility for change in the future because rapport was maintained. More specifically, participants who develop rapport with their provider will

likely be more open to engaging in UV protection discussions in the future. This potential for future change sharply contrasts the previous finding that traditional, paternalistic provider advice has been associated with increases in patient resistance, attrition, and the frequency of problem behaviors (Butler et al., 1999; Miller & Rollnick, 2002; Rollnick et al., 1999). In the future, researchers may want to consider increasing the frequency of motivational enhancement discussions in order to evaluate the potential of patient-provider rapport to facilitate change in UV protection behaviors over multiple office visits.

The emotional burden of providing traditional skin cancer prevention advice to patients in a dermatology setting is well illustrated in the research of Nash (2004) and Polster et al. (1998). The findings of these researchers clearly demonstrate the frustration that many health care providers feel when trying to convince apparently uninterested patients to protect their skin from UV radiation. Similarly, a physician in the study by Rollnick et al., (1997) reported that traditional advice giving is “like banging you head against a brick wall”. These frustrations are likely linked to reduced job satisfaction and increased provider burnout, in addition to negatively impacting the frequency and quality of skin cancer prevention counseling that is initiated by these providers. In contrast to traditional paternalistic advice giving, motivational enhancement techniques are intended to more closely resemble dancing than wrestling (Dunn & Rollnick, 2003; Miller & Rollnick, 2002; Rollnick et al., 1999; Scales & Miller, 2003). Thus, it is likely that using motivational enhancement techniques favorably influences factors such as clinician job

satisfaction and burnout rates, though no empirical studies were identified that specifically assessed these potential emotional benefits for providers. In the future, motivational enhancement research should investigate the potential relationship between these psychological benefits for health care providers and the use of motivational enhancement techniques.

In the current body of literature, several motivational enhancement studies have reported that providers were satisfied with using motivational enhancement techniques (Britt et al., 2004; Butler et al., 1999; Colby et al., 2005; Curry et al., 2003; Lane et al., 2003). Furthermore, Berg-Smith et al., (1999) specifically reported that only 7% of the health care providers in their study felt that the use of motivational enhancement techniques was not satisfying or only slightly satisfying. Additionally, one of the physicians in the study by Rollnick et al., (1997) reported that when compared to traditional advice giving, the use of motivational enhancement techniques was “more rewarding because you feel you are doing things”. This physician also admitted that experiencing satisfaction with motivational enhancement techniques increases the likelihood of initiating lifestyle change discussions in the future. Similar enthusiasm for the use of motivational enhancement techniques was shown by the nurses in the study by Byrne, Watson, Butler and Accoroni, (2006). After learning about motivational enhancement techniques, these nurses independently organized supplemental training sessions and videotaped their own consultations in order to better evaluate their use of motivational enhancement techniques. This evidence of positive provider benefits is

likely associated with an increase in providers' willingness to engage in health behavior change discussions and, therefore, further supports the assumption that the use of motivational techniques for skin cancer prevention counseling increases the possibility of change in the future.

Timing of data collection. Although the number of sunny days in the fall (16-18) and spring (20-21) is comparable (National Weather Service, n.d.; Western Regional Climate Center, n.d.), the possibility that the season in which the data was collected lead to an underestimation of the impact of the intervention should be considered. This influence may have resulted from participants having a different mind set about UV protection during these two times of year. In the fall, the young adults in this sample may have felt more prone to protect themselves from the sun because they were tired of the heat and long sunny days that are typically present in the summer. In contrast, during the spring participants may have been excited to be out in the warm sunny weather because the snow was melting and winter was ending.

Based on these potential perceptions, having the same UV protection behaviors and beliefs in the spring and fall may be an indication of positive benefits from the brochure and/or brief motivational enhancement intervention. In order to further minimize the potential impact of time of year in future studies, it may be beneficial to assess UV protection behaviors and beliefs at multiple follow-up points. In addition, future researchers should also consider increasing the total follow-up length to one year

so that the baseline and final follow-up data will be collected during the same month of the year.

Increasing the length of time between the initial and final data collection may also be beneficial from a theoretical standpoint. Prior studies of motivational enhancement techniques have found that conducting follow-up assessments too soon after the intervention leads to a lack of detectable differences (Rubak et al., 2005). For several health behaviors, a follow-up period of six months has been adequate to detect changes in the desired behavior (Bernstein et al., 2005; Butler et al., 1999; Colby et al., 2005; Fleming et al., 2002; Johnston et al., 2002; Ockene et al., 1999). However, because of the challenges specific to UV protection, as well as the seasonal nature of UV exposure, it may take more time to detect differences in individuals' readiness to take steps toward changing these particular behaviors.

Intervention delivery. Because this sample only demonstrated questionable improvement on one of the outcome items, it is necessary to question what, if anything, about the intervention was inadequate or inappropriate for this sample, setting or topic. Such an assessment is difficult because prior research on brief motivational enhancement interventions has thus far been unsuccessful in determining how these techniques work and for whom they work best (Britt et al., 2004; Burke et al., 2004; Dunn et al., 2001). Furthermore, there is currently insufficient evidence to suggest which level of intervention is appropriate for different clinical situations, and which components are most essential to include (Resnicow et al., 2004).

This being said, one of the key factors to consider is the skill level of the interventionist. Based on the BECCI coding of the practice motivational enhancement session, the interventionist in this study demonstrated adequate motivational enhancement skills, though there was room for improvement. In prior research on motivational enhancement interventions, favorable treatment effects have been obtained for other health behavior change topics by health care providers who received training of equal or shorter duration than the training provided to the interventionist in this study (Berg-Smith et al., 1999; Butler et al., 1999; Curry et al., 2003; Dunn et al., 2001; Ockene et al., 1999; Reiff-Hekking et al., 2005). However, because of the challenges specific to UV protection, it may be necessary in the future to utilize interventionists with a higher level of expertise in order to facilitate changes in UV protection behaviors.

Regarding the content of the intervention, having the interventionist provide the brochure to all participants, regardless their desire for the information, was not consistent with a motivational enhancement approach to health behavior change counseling. This choice was made to increase the internal validity of the study by exposing the control and intervention groups to similar circumstances. However, this step may have partially undermined the patient-centered aspect of the motivational enhancement intervention. It should also be considered that because of the challenges specific to UV protection, this health behavior may require an intervention that is more consistent with traditional Motivational Interviewing. That is to say, in addition to utilizing a highly skilled interventionist, it may be necessary for future interventions to include more components

of traditional Motivational Interviewing, such as assessing importance and confidence. Future researchers should also consider lengthening the duration and/or frequency of the intervention.

An additional factor to consider is whether the motivational enhancement intervention was consistently provided to all participants in the treatment group. Though the interventionist reports that this was the case, it would be beneficial in future research to use an instrument such as the BECCI to code several of the actual interventions that are provided so that a more objective assessment of consistency can be made. Finally, it is questionable whether the ineffectiveness of this study's intervention was due, in part, to the interventionist's counseling style. Because an answer to this question has not yet been established in the literature (Miller & Rollnick, 2002), it is advisable to include more than one interventionist in future research studies to help clarify this issue.

Control delivery. In previous research, traditional physician advice has been found to undermine behavior change not only by increasing patient resistance and attrition, but also by leading to increased frequency of the problem behavior (Miller & Rollnick, 2002). Similarly, one respondent in this study reported that "...the second someone says 'you shouldn't spend time in the sun', I want to give up on the idea completely..." The association of these negative outcomes with the use of traditional provider advice may indicate that the lack of declining UV protection behaviors and beliefs in the control group is actually a positive finding.

Possible explanations for positive benefits within the control group include the Hawthorne effect, the initial questionnaire and/or brochure functioning as an intervention, the interventionist utilizing a patient-centered approach when providing the brochure, and having the presentation of the brochure appear more impactful because the research portion of the visit was distinct from the patient's medical care. Although providing a brochure to the control group may have introduced confounding factors, this decision was considered to be more ethical than having a control group with no form of UV protection education. This being said, the two treatment groups were exposed to similar conditions and, thus, the non-treatment group helps to control for these potentially confounding factors.

Sample characteristics. In previous research, young adults have been consistently identified as being less likely to change their UV protection behaviors, with some researchers finding that the use of UV protection behaviors within this age group has been declining despite recent education efforts (AAD, 2003a; AAD, 2004; Branstrom et al., 2004; Weinstock et al., 2000). Based on these findings, a stabilization of UV protection behaviors and beliefs among the young adults in this sample may reflect positive benefits from participating in this study. In future research, it may be prudent to replicate this study in a sample of adults over age 30. Such a study may provide a better assessment of the effectiveness of a brief motivational enhancement intervention. The motivational enhancement intervention could then be refined in an older population before evaluating its efficacy in a young adult population.

Regarding sample size, it is debatable whether a larger sample size would be beneficial in evaluating the efficacy of a brief motivational enhancement intervention for skin cancer prevention counseling among young adult dermatology patients. Because there was only one, relatively small, statistically significant change from baseline to follow-up within this sample, it could be argued that increasing the sample size would not change this lack of detectable differences. However, it can also be argued that a larger sample size would have less variability and, therefore, assessments of change from baseline to follow-up could be made more clearly and confidently.

Previous motivational enhancement research on the influence of participant readiness to change may also aid in the interpretation of this study's findings. The research on this topic thus far has produced mixed results, with the majority of studies supporting that individuals who are least ready to change are more likely to benefit from motivational enhancement interventions (Dunn et al., 2001; Miller & Rollnick, 2002). Within this study's sample the average participant was in the preparation stage, reported positive UV protection attitudes, and felt that it was neither easy nor difficult to use UV protection measures. When examining specific UV protection measures, average baseline scores for items such as avoiding tanning beds and using sunscreen were already quite high and did not leave much room for improvement. In the future, it would be interesting to replicate this study in a sample composed only of individuals in the precontemplation or contemplation stages who had less desirable UV protection beliefs. Based on previous

research, it is likely that such a sample would demonstrate more improvement after receiving a brief motivational enhancement intervention.

Outcome measures. Unfortunately, the paucity of prior interventional research on UV protection has resulted on a lack of standardized measures of UV protection behaviors and beliefs. Although attempts were made to adapt measures used in previous research to the purposes of the present study, these alterations may have negatively affected the psychometric properties of these measures. Within this sample, the content and construct validity of all three quantitative outcome measures was supported, although the reliability of some of these measures was questionable.

More specifically, the Chronbach's alpha values obtained for this sample supported the internal consistency of all three dependent variables, but the test-retest reliability results were more variable. The most concerning reliability finding is the fact that the main outcome measure, the stages of change, had a poor test-retest reliability coefficient in the present sample. This is of particular concern because prior research on the unmodified items obtained much higher test-retest reliability coefficients. In contrast, the four items assessing UV protection attitudes in this study had a much higher test-retest reliability coefficient when compared to the moderate test-retest coefficient obtained for two similar items in previous research. Finally, the self-efficacy test-retest reliability coefficient obtained in this study was acceptable, though not particularly strong. No previous research has conducted a reliability analysis on similar self-efficacy items.

Because of the variation in test-retest reliability estimates obtained for these outcome measures, it would be desirable in future studies to have stronger measures, particularly for the stages of change, in order to more accurately assess for changes among the treatment groups. Before further skin cancer prevention research is conducted in the U.S., it is recommended that additional efforts be made to develop appropriate, standardized measures of UV protection behaviors and beliefs that demonstrate strong validity and reliability estimates based on multiple assessments in the population of interest. In addition, efforts should be made to establish standards of clinical significance for these measures.

Another important characteristic to consider is the match between the intervention and the chosen outcomes measures. Within this study, both the stages of change and self-efficacy items addressed five different methods of UV protection. However, the motivational enhancement interventions in this study were guided by the participant and, thus, each of these five methods of UV protection may or may not have been discussed. Utilizing an intervention that focused simply on one of the five UV protection methods in conjunction with an outcome measure that addressed only one method of UV protection may have increased the likelihood of detecting favorable improvement in the intervention group. In addition, it should also be pointed out that the elicit-provide-elicited strategy is not specifically designed to enhance self-efficacy. Therefore, it is possible that the use of a motivational enhancement strategy that focused more clearly on supporting self-efficacy would have resulted in more favorable outcomes for this variable.

Finally, because motivational enhancement techniques focus on helping individuals to think more deeply about change, it may be helpful in future research to record each of the motivational enhancement sessions and then compare the prevalence of change talk among participants in the control and intervention groups. An examination of this information, in addition to traditional outcome measures, may add more insight into the efficacy of a motivational enhancement approach to skin cancer prevention. Additionally, it may also be helpful to ask participants how satisfied they were with the counseling they received, if they felt that the intervention influenced their UV protection behaviors and beliefs, and/or if they would be open to discussing UV protection with their provider in the future.

Feasibility

The feasibility of both utilizing and researching a motivational enhancement approach to skin cancer prevention was clearly supported in this study. The interventionist and dermatologist involved were both able to maintain their patient loads throughout the three month recruitment and treatment process. This was done without any loss in productivity and without any consistent or significant delay in the delivery of timely patient care. Furthermore, the clinic support staff were willing to pass out the information sheets and explain the research study as needed. When asked about the inconvenience of the study, these individuals agreed that it was relatively easy to do because the study fit well with the usual flow of patients through the clinic. Finally, the

high participation and follow-up rates support that young adult dermatology patients are open to participating in such a study.

Support for health care provider counseling

Despite the lack of significant treatment effects in the present sample, several aspects of this research study support the continued investigation and use of universal health care provider counseling for skin cancer prevention. One such factor is the high participation rate. This aspect of the study suggests that young adult dermatology patients want to learn more about skin cancer prevention from their health care provider. Another consideration is the fact that in response to the qualitative questions, several participants suggested that (a) information on skin cancer prevention should be discussed more during doctor's visits and (b) such information should be available in general practice, dermatology, and pediatric offices. One participant even specifically expressed that he felt if he had not received information about skin cancer prevention at his visit, he would not have been exposed to the information from another source.

Finally, the fact that none of the dependent variables were associated with the reason for participants' appointments illustrates that it may not be possible to determine who is in need of UV protection counseling based on the reason they present to a dermatology clinic. Often skin cancer prevention discussions are initiated by dermatology providers only with patients who are presenting to have moles or spots checked for skin cancer. However, the findings of this study support the philosophy that UV protection

behaviors and beliefs cannot be easily predicted and, thus, it is important to provide skin cancer prevention counseling to all patients.

Support for motivational enhancement techniques

The findings of this study also provide support for additional research involving the use of a motivational enhancement approach to skin cancer prevention counseling. When examining the qualitative data it is particularly encouraging to note that there were no negative responses about the motivational enhancement portion of the intervention. In addition, slightly more participants in the intervention group reported changes in their UV protection behaviors when compared to the qualitative responses of the control group.

It is also noteworthy that in addition to providing positive feedback about the information they received, most participants described learning something different, including individuals in the control group who received the same brochure. Furthermore, participants recommended a wide variety of skin cancer prevention content to be included in future interventions. This diversity of opinions regarding what information is important within skin cancer prevention counseling further supports the use of motivational enhancement principles because they allow for a highly individualized approach to health behavior change counseling.

Additional support was provided by one participant in the control group who explained that "...the second someone says 'you shouldn't spend time in the sun', I want to give up on the idea completely because I am not going to give up playing outside."

Instead this respondent advocates “Providing many options and an agreeing statement that, ‘yes we all love to spend time outside and this is good for us, but let’s just be safe about it...” This response clearly illustrates the importance of utilizing a patient-centered approach when providing skin cancer prevention counseling, as opposed to the more paternalistic provider advice and that is typically given.

Finally, because the brief motivational enhancement intervention used in this study did not disrupt the productivity of the health care providers involved, it proved to be a very cost effective health behavior change intervention. Together these findings provide support for the continued investigation of motivational enhancement techniques in the area of skin cancer prevention counseling in order to obtain the clinical efficacy demonstrated by these techniques in brief interventions for other health behavior change topics (Berg-Smith et al., 1999; Butler et al., 1999; Curry et al., 2003; Dunn et al., 2001; Ockene et al., 1999; Reiff-Hekking et al., 2005).

Limitations

One potential concern in the design of the present study is the use of a self-report questionnaire instead of objective measures of UV exposure. Objective measures, such as skin colorimeter measurement, have the advantage of not being affected by recall bias or social desirability, though they are not as consistent with the treatment goal of favorably influencing participants’ thoughts about behaviors change. Social desirability is a limitation that should also be considered when interpreting the responses to the two qualitative questions.

As has already been addressed, the data that was collected may have been affected by the following factors: the timing of data collection, the delivery of the intervention and control, the sample characteristics, and the outcome measures. The high level of variability in this sample also makes it difficult to make confident conclusions about what, if any, significant improvement took place. Finally, the use of only one interventionist does not simulate real-world events as closely as would a research design with multiple practitioners. This is particularly true in the present study wherein the interventionist was also one of the researchers.

Strengths

The most significant strength of the present research study is likely the focus on increasing internal validity. This was accomplished by addressing many of the weaknesses identified in previous research on motivational enhancement interventions, including the need to utilize a control group, provide adequate interventionist training, ascertain treatment fidelity, clearly specify the intervention, and implement an intervention that focuses only on motivational enhancement techniques (Burke et al., 2003; Burke et al., 2004; Dunn et al., 2001; Miller & Rollnick, 2002; Rollnick et al., 1999). Furthermore, because this was a randomized controlled trial, cause and effect conclusions could be made. This rigorous design provides a strong framework that can be adapted for future studies of brief motivational enhancement interventions in clinical settings.

Although the size of the present sample is relatively small, the high initial participation rate and follow-up response rate both strengthen the external validity of the findings. External validity is further strengthened by the fact that this study was conducted during regularly scheduled appointments in an office setting without extensive exclusionary criteria. Based on these study characteristics, the findings of this study can be generalized to patient populations with similar demographic and clinical variables.

Suggestions for future research

In combining the findings of this study with the findings of previous UV protection studies, it is apparent that additional research is needed to investigate why favorable UV protection behaviors and beliefs are reported by individuals who are older, more educated, have more sun sensitive skin types, and spend less time outdoors on non-work days. In addition, more research is needed to further clarify the relationship between UV protection and the variables of contact with skin cancer and gender. Regarding the general use of motivational enhancement techniques, additional research is also needed to examine the potential relationship between the use of these techniques and provider benefits such as increased job satisfaction and lower burnout rates.

Based on both the positive feasibility findings of this study, as well as the support demonstrated for the use of health care provider counseling and motivational enhancement techniques for skin cancer prevention counseling, it is recommended that future studies continue to test the efficacy of similar interventions. Future research efforts should maintain a focus on increasing internal validity by taking steps such as utilizing a

control group, providing adequate interventionist training, ascertaining treatment fidelity, clearly specifying the intervention, and implementing an intervention that focuses only on motivational enhancement techniques. It is also recommended that an instrument such as the BECCI be used to code several of the actual interventions that are provided to participants in order to better assess treatment fidelity and consistency. The recording of motivational enhancement sessions in future skin cancer prevention research would also enable researchers to compare the prevalence of change talk among participants in the control and intervention groups. Fortunately, the present study provides a robust framework that can be replicated in future studies with the addition of specific changes to better test the efficacy of a brief motivational enhancement approach to skin cancer prevention.

The most important change that needs to be made in future skin cancer prevention research efforts is to develop and utilize standardized measures of UV protection behaviors and beliefs that demonstrate strong validity and reliability estimates. The development of such measures should focus on using content that is consistent with current U.S. UV protection guidelines as well as performing multiple assessments of reliability and validity in the population of interest. It is also recommended that in future studies researchers more closely match the content of the motivational enhancement intervention to the chosen outcome measures. Furthermore, future researchers may want to consider asking participants (a) if they feel that their level of UV protection is adequate to prevent skin cancer, (b) if they are aware of the five UV protection behaviors

recommended in current U.S. health guidelines, (c) how satisfied they were with the counseling they received, (d) if they felt that the intervention influenced their UV protection behaviors and beliefs, and/or (e) if they would be open to discussing UV protection with their provider in the future. Finally, researchers can consider including objective measures of UV exposure such as skin colorimeter measurement.

In future research it may also be prudent to recruit a sample of adults over age 30 as this may provide a better assessment of the effectiveness of a brief motivational enhancement intervention for skin cancer prevention. Researchers may also consider recruiting more participants who are in the precontemplation and contemplation stages of change. In order to increase the dose of the intervention, future researchers may want to lengthen the motivational enhancement session or increase the frequency to more than one session. Alternatively, future researchers may alter the content of the intervention by including different motivational enhancement strategies. Larger scale studies should also be undertaken in which multiple interventionists administer the intervention to a larger sample. It may also be prudent to utilize interventionists who are more proficient in the use of motivational enhancement techniques and/or Motivational Interviewing. Finally, it may be beneficial to assess UV protection behaviors and beliefs at multiple follow-up points in addition to increasing the total follow-up length to one year so that the baseline and final follow-up data will be collected during the same month of the year.

Conclusion

In summary, the young adult dermatology patients in this sample expressed positive attitudes toward UV protection. Although these attitudes indicate adequate knowledge about the risks of UV exposure, the average participant only reported that they were in the preparation stage for using UV protection behaviors. Participants also reported that it was neither easy nor difficult to use UV protection measures. The data collected supports that individuals who are older, more educated, have more sun sensitive skin types, and spend less time outdoors on non-work days have more responsible UV protection behaviors and beliefs.

Regarding the efficacy of the intervention, there were no detectable differences in improvement between the control and intervention groups for any of the quantitative outcome measures. Furthermore, although there was a statistically significant increase in one of the UV protection attitude items from baseline to follow-up, this change was relatively small and likely not clinically significant. In contrast, examination of the qualitative responses revealed that none of the participants provided any negative feedback about the motivational enhancement portion of the intervention. Additionally, several participants reported favorable changes in their UV protection behaviors as a result of reading the brochure and, a little more commonly, from participating in the motivational enhancement intervention.

To this author's knowledge, this is the first randomized controlled trial to test the feasibility and efficacy of a motivational enhancement approach to skin cancer

prevention. The feasibility of utilizing and researching this approach to skin cancer prevention was clearly supported. In addition, the results provide support for the continued investigation of both health care provider counseling and motivational enhancement techniques for increasing UV protection behaviors and beliefs.

The rigorous design of this study not only facilitates confident interpretation and generalization of the data, but also provides a strong framework that can be replicated in future studies. The most significant change that needs to be made in future studies is to develop and utilize standardized measures of UV protection behaviors and beliefs that demonstrate strong validity and reliability.

As more is learned about utilizing motivational enhancement techniques for skin cancer prevention, these research findings can further contribute to the current knowledge base of ways in which health care providers can better help their patients to avoid harmful behaviors, as well as inform the development of future practice guidelines. The significance of continued research on this topic is potentially far reaching, as motivational enhancement techniques can be utilized by a spectrum of providers including, but not limited to: registered nurses, advanced practice nurses, physician assistants, and physicians.

Table 1. UV protection measures

-
- Avoid tanning beds
 - Avoid outdoor activities between 10 a.m. and 4 p.m.
 - Seek shade whenever possible
 - Wear a broad-spectrum sunscreen with a Sun Protection Factor (SPF) of 15 or higher
 - Wear sun protective clothing and accessories, such as wide-brimmed hats and sunglasses
-

Table 2. The spirit of Motivational Interviewing

Value Base	<ul style="list-style-type: none">- Respect for the autonomy of patients and their choices is paramount- Patient should decide what behavior, if any, to focus on
Skills	<ul style="list-style-type: none">- A confrontational interviewing style is not productive- Information exchange is a critical skill- Readiness to change should be continually monitored
Practitioner Role	<ul style="list-style-type: none">- Provides structure, direction and support- Provides information wanted by the patient- Elicits and respects the patient's views and aspirations- Negotiates change sensitively
Patient Role	<ul style="list-style-type: none">- Is an active decision maker

Table 3. Techniques for the practitioner

- Simple, open questions
 - Active/ reflective listening
 - Clarifying and summarizing
 - Convey encouraging verbal and nonverbal prompts
 - Curiosity to understand the patient's perspective
 - Belief that the answers lie mostly with the patient
 - An awareness of what he or she is doing, why it is being done, and how the patient is reacting
-

Table 4. Questionnaire items

	Initial Questionnaire: #of items	Follow-up Questionnaire: #of items
Quantitative Dependent Variables		
<i>Stages of Change</i>	5	5
Range 1-5; Scale score = mean of all items		
Higher score = more readiness to use UV protection methods		
Higher change score = more ready to use UV protection methods at follow-up		
<i>Attitudes</i>	4	4
Range 1-5; Scale score = mean of all items		
Higher score = more favorable UV protection attitudes		
Higher change score = more favorable UV protection attitudes at follow-up		
<i>Self-efficacy</i>	5	5
Range 1-5; Scale score = mean of all items		
Higher score = more difficulty using UV protection methods		
Higher change score = more difficulty using UV protection methods at follow-up		
Qualitative Dependent Variables		
<i>Helpfulness of the intervention</i>	-	1
<i>Suggestions for future interventions</i>	-	1
Demographic and Clinical Variables		
<i>Contact with skin cancer</i>	3	-
<i>Skin type</i>	1	-
<i>Time outdoors</i>	2	2
<i>Age</i>	1	-
<i>Gender</i>	1	-
<i>Level of education</i>	1	-
<i>Marital status</i>	1	-
<i>Reason for appointment</i>	1	-
<i>Date of data collection</i>	1	1
Item totals:	26	19

Table 5. Demographics for the total sample (n = 82)^a

	n (%)		n (%)
Age		Skin type ^b	
18-19	16 (20%)	Type I	17 (21%)
20-21	14 (17%)	Type II	16 (20%)
22-23	13 (16%)	Type III	34 (42%)
24-25	14 (17%)	Type IV-VI	15 (18%)
26-27	13 (16%)		
28-30	12 (15%)	Workday time outdoors	
		Less than 1 hour	32 (40%)
Gender		1 - 1.9 hours	22 (27%)
Male	28 (34%)	2 - 2.9 hours	14 (17%)
Female	54 (66%)	3 - 3.9 hours	5 (6%)
		4 - 4.9 hours	5 (6%)
Education		5 hours or more	3 (4%)
Less than high school	2 (2%)	Non-workday time outdoors	
High school graduate	4 (5%)	Less than 1 hour	7 (9%)
Some college	40 (49%)	1-1.9 hours	17 (21%)
College degree	30 (37%)	2 - 2.9 hours	20 (24%)
Some graduate school	5 (6%)	3 - 3.9 hours	12 (15%)
Graduate degree	1 (1%)	4 - 4.9 hours	14 (17%)
		5 hours or more	11 (13%)
Marital status		Appointment reason	
Single	52 (63%)	Warts	7 (9%)
Married	30 (37%)	Acne or Rosacea	31 (38%)
Contact with skin cancer		Rash or Itching	11 (13%)
No experience	21 (26%)	Moles / spots	27 (33%)
Acquaintance	29 (35%)	Other	6 (7%)
Family history	27 (33%)		
Personal history	5 (6%)		

^aPercentages may not add up to 100% due to rounding.

^bType I = always burn, never tan; Type II = usually burn, can tan if I work at it; Type III = sometimes burn, can tan; Type IV-VI = rarely or never burn, tan easily

Table 6. Baseline UV protection behaviors and beliefs (n = 82) ^a

	mean (SD)
Stages of Change	
No tanning beds	3.80 (1.52)
Avoid 10am-4pm	2.12 (1.57)
Seek shade	3.01 (1.63)
Wear sunscreen	3.62 (1.42)
Protective clothing	3.02 (1.57)
<i>Scale score</i>	<i>3.12 (1.05)</i>
Attitudes	
Advantages/disadvantages	4.05 (1.13)
Like being tan	2.04 (0.92)
Sun healthy	3.70 (0.99)
Tanning bed healthy	4.51 (0.69)
<i>Scale score</i>	<i>3.57 (0.68)</i>
Self-efficacy	
No tanning beds	1.44 (0.88)
Avoid 10am-4pm	3.83 (1.12)
Seek shade	2.79 (1.16)
Wear sunscreen	2.32 (1.28)
Protective clothing	2.59 (1.23)
<i>Scale score</i>	<i>2.59 (0.76)</i>

^aScore interpretation:

Stages of Change: Higher score = more readiness to use UV protection methods

Attitudes: Higher score = more favorable UV protection attitudes

Self-efficacy: Lower score = more self-efficacy for using UV protection methods

Table 7. Relationships between demographic/clinical variables and dependent variables (n = 82)

	Stages of change	Attitudes	Self-efficacy
Pearson Correlations			
Contact with skin cancer	r = 0.10 p = 0.36	r = 0.082 p = 0.46	r = -0.005 p = 0.96
Skin type	r = -0.31 p = 0.004**	r = -0.36 p = 0.001**	r = 0.23 p = 0.040*
Time outdoors, work day	r = -0.058 p = 0.61	r = -0.050 p = 0.66	r = 0.046 p = 0.68
Time outdoors, non-work day	r = -0.21 p = 0.055	r = -0.36 p = 0.001**	r = 0.008 p = 0.94
Age	r = 0.28 p = 0.011*	r = 0.14 p = 0.20	r = -0.23 p = 0.038*
Gender	r = 0.10 p = 0.37	r = 0.21 p = 0.058	r = -0.014 p = 0.90
Education	r = 0.21 p = 0.053	r = 0.21 p = 0.058	r = -0.30 p = 0.007**
Marital status	r = 0.17 p = 0.13	r = 0.095 p = 0.40	r = -0.12 p = 0.29
Appointment reason	r = 0.11 p = 0.34	r = 0.015 p = 0.89	r = -0.13 p = 0.26
Date of data collection	r = -0.010 p = 0.93	r = -0.036 p = 0.75	r = 0.087 p = 0.44

* p < .05

** p < .01

Table 8. Demographics for the control and intervention group (n = 76)

	<u>Control</u>		<u>Intervention</u>		
	M	(SD)	M	(SD)	
<u>Chi-square analyses</u>					
Contact with skin cancer	—	—	—	—	$\chi^2_{(3)} = 3.17$ p = 0.21
Gender	—	—	—	—	$\chi^2_{(3)} = 0.14$ p = 0.71
Marital status	—	—	—	—	$\chi^2_{(3)} = 4.12$ p = 0.042*
Appointment reason	—	—	—	—	$\chi^2_{(3)} = 0.36$ p = 0.95
<u>Independent sample t-tests</u>					
Date of data collection (baseline)	—	—	—	—	$t_{(74)} = -1.21$ p = 0.23
Date of data collection (follow-up)	—	—	—	—	$t_{(74)} = -1.29$ p = 0.20
Time outdoors, work day (baseline)	1.63	(1.35)	1.45	(1.79)	$t_{(73)} = 0.48$ p = 0.63
Time outdoors, non-work day (baseline)	2.69	(1.86)	2.99	(1.74)	$t_{(73)} = -0.71$ p = 0.48
Time outdoors, work days (follow-up)	1.52	(1.31)	1.54	(1.34)	$t_{(72)} = -0.05$ p = 0.96
Time outdoors, non-work days (follow-up)	2.77	(1.76)	2.64	(1.65)	$t_{(73)} = 0.32$ p = 0.75
Age	23.58	(3.53)	23.14	(3.68)	$t_{(74)} = 0.53$ p = 0.60
Skin type	2.45	(1.04)	2.64	(1.05)	$t_{(74)} = -0.79$ p = 0.43
Education	3.48	(0.82)	3.47	(0.88)	$t_{(74)} = 0.01$ p = 0.99
Stages of change baseline scale score	3.24	(1.11)	3.02	(1.02)	$t_{(74)} = -0.31$ p = 0.76
Attitudes baseline scale score	3.66	(0.66)	3.51	(0.74)	$t_{(74)} = 0.89$ p = 0.38
Self-efficacy baseline scale score	2.54	(0.74)	2.59	(0.76)	$t_{(74)} = 0.91$ p = 0.37

* p < .05

Table 9. Differences in improvement between the control and intervention group (n = 76)

	<u>Control</u>		<u>Intervention</u>		F-statistic	p-value
	M	(SD)	M	(SD)		
<u>ANCOVA using Scale Change Scores as the dependent variable^a</u>						
Stages of change	0.22	(1.10)	0.19	(0.87)	0.052	0.82
Attitudes	0.063	(0.44)	0.17	(0.54)	2.02	0.16
Self-efficacy	-0.13	(0.61)	0.044	(0.77)	0.42	0.52
<u>ANCOVA using Follow-up Scale Scores as the dependent variable^b</u>						
Stages of change	3.46	(0.87)	3.21	(0.95)	0.59	0.45
Attitudes	3.72	(0.53)	3.68	(0.59)	1.57	0.21
Self-efficacy	2.41	(0.61)	2.63	(0.77)	0.85	0.36

^aCovariate = marital status

^bCovariates = baseline scale scores and marital status

Table 10. Comparison of baseline and follow-up scores for the control group (n = 40)^{a, b}

	<u>Baseline</u>		<u>Follow-up</u>		t-statistic, p-value	<u>Change score</u>	
	M	(SD)	M	(SD)		M	(SD)
Stages of Change							
No tanning beds	3.83	(1.63)	3.43	(1.65)	1.15, 0.26	-0.40	(2.20)
Avoid 10am-4pm	2.35	(1.70)	2.55	(1.60)	-0.62, 0.54	0.20	(2.04)
Seek shade	3.33	(1.47)	3.78	(1.42)	-1.85, 0.071	0.45	(1.54)
Wear sunscreen	3.65	(1.42)	4.00	(1.20)	-1.93, 0.060	0.35	(1.14)
Protective clothing	3.05	(1.58)	3.55	(1.32)	-2.04, 0.048	0.50	(1.55)
<i>Scale score</i>	<i>3.24</i>	<i>(1.11)</i>	<i>3.46</i>	<i>(0.87)</i>	<i>-1.27, 0.21</i>	<i>0.22</i>	<i>(1.10)</i>
Attitudes							
Advantages/ disadvantages	4.18	(1.04)	4.15	(0.92)	0.18, 0.86	-0.025	(0.89)
Like being tan	2.17	(0.93)	2.15	(0.83)	0.26, 0.80	-0.025	(0.62)
Sun healthy	3.75	(0.98)	3.88	(0.94)	-0.78, 0.44	0.13	(1.02)
Tanning bed healthy	4.52	(0.78)	4.70	(0.52)	-2.01, 0.051	0.18	(0.55)
<i>Scale score</i>	<i>3.66</i>	<i>(0.66)</i>	<i>3.72</i>	<i>(0.53)</i>	<i>-0.90, 0.38</i>	<i>0.063</i>	<i>(0.44)</i>
Self-efficacy							
No tanning beds	1.45	(0.85)	1.15	(0.58)	2.40, 0.021	-0.30	(0.79)
Avoid 10am-4pm	3.77	(0.95)	3.50	(1.28)	1.60, 0.12	-0.28	(1.09)
Seek shade	2.63	(1.08)	2.58	(1.26)	0.21, 0.84	-0.050	(1.54)
Wear sunscreen	2.17	(1.22)	2.25	(1.30)	-0.33, 0.74	0.075	(1.42)
Protective clothing	2.65	(1.39)	2.58	(1.32)	0.32, 0.75	-0.075	(1.47)
<i>Scale score</i>	<i>2.54</i>	<i>(0.74)</i>	<i>2.41</i>	<i>(0.61)</i>	<i>1.29, 0.21</i>	<i>-0.13</i>	<i>(0.61)</i>

*Significant at $p < .05$

** Significant at $p < .01$

^aAn alpha value of 0.05 was used for the scale scores and an alpha value of 0.01 was used for the individual items because it was necessary to control for familywise error.

^bScore interpretation:

Stages of Change: Higher score = more readiness to use UV protection methods

Higher change score = favorable change from baseline to follow-up

Attitudes: Higher score = more favorable UV protection attitudes

Higher change score = favorable change from baseline to follow-up

Self-efficacy: Lower score = more self-efficacy for using UV protection methods

Lower change score = favorable change from baseline to follow-up

Table 11. Comparison of baseline and follow-up scores for the intervention group (n = 36) ^{a, b}

	Baseline		Follow-up		t-statistic, p-value	Change score	
	M	(SD)	M	(SD)		M	(SD)
Stages of Change							
No tanning beds	4.00	(1.33)	3.31	(1.75)	2.10, 0.043	-0.69	(1.98)
Avoid 10am-4pm	1.92	(1.40)	2.33	(1.60)	-1.50, 0.14	0.42	(1.66)
Seek shade	2.67	(1.76)	3.19	(1.53)	-2.22, 0.033	0.53	(1.42)
Wear sunscreen	3.50	(1.46)	3.78	(1.31)	-1.50, 0.14	0.28	(1.11)
Protective clothing	3.00	(1.55)	3.42	(1.48)	-1.38, 0.18	0.42	(1.81)
<i>Scale score</i>	<i>3.02</i>	<i>(1.02)</i>	<i>3.21</i>	<i>(0.95)</i>	<i>-1.30, 0.20</i>	<i>0.19</i>	<i>(0.87)</i>
Attitudes							
Advantages/ disadvantages	4.00	(1.24)	4.13	(0.95)	-0.79, 0.44	0.13	(0.95)
Like being tan	1.94	(0.96)	2.00	(1.01)	-0.39, 0.70	0.056	(0.86)
Sun healthy	3.64	(1.02)	3.88	(0.94)	-1.29, 0.21	0.24	(1.10)
Tanning bed healthy	4.47	(0.61)	4.72	(0.46)	-3.00, 0.005**	0.25	(0.50)
<i>Scale score</i>	<i>3.51</i>	<i>(0.74)</i>	<i>3.68</i>	<i>(0.59)</i>	<i>-1.86, 0.072</i>	<i>0.17</i>	<i>(0.54)</i>
Self-efficacy							
No tanning beds	1.31	(0.75)	1.53	(1.06)	-1.75, 0.088	0.22	(0.76)
Avoid 10am-4pm	3.78	(1.27)	3.86	(1.13)	-0.48, 0.64	0.083	(1.05)
Seek shade	3.00	(1.20)	2.89	(1.14)	0.44, 0.66	-0.11	(1.51)
Wear sunscreen	2.44	(1.34)	2.44	(1.36)	0.00, 1.00	0.00	(1.04)
Protective clothing	2.42	(1.13)	2.44	(1.25)	-0.11, 0.91	0.028	(1.52)
<i>Scale score</i>	<i>2.59</i>	<i>(0.76)</i>	<i>2.63</i>	<i>(0.77)</i>	<i>-0.35, 0.73</i>	<i>0.044</i>	<i>(0.77)</i>

* p < .05

** p < .01

^aAn alpha value of 0.05 was used for the scale scores and an alpha value of 0.01 was used for the individual items because it was necessary to control for familywise error.

^bScore interpretation:

Stages of Change: Higher score = more readiness to use UV protection methods

Higher change score = favorable change from baseline to follow-up

Attitudes: Higher score = more favorable UV protection attitudes

Higher change score = favorable change from baseline to follow-up

Self-efficacy: Lower score = more self-efficacy for using UV protection methods

Lower change score = favorable change from baseline to follow-up

Table 12. Qualitative results

 Helpful intervention content

- New ways to protect my skin*
- How harmful tanning beds are*
- A tan represents sun damage*
- The sun is harmful for the eyes also*
- Damage besides skin cancer that can happen from the sun*
- Base tanning is not healthy
- How skin cancer forms
- Apply sunscreen 30 minutes before going out
- Some lotions and make-ups have sunscreen in them
- Only 10 minutes of sun is needed for daily vitamin D intake
- The difference between sunscreen SPFs

 Suggested content for future interventions

- How skin cancer can spread to other organs
- How harmful even infrequent exposure can be
- How much sun exposure is good for a person
- How different skin tones are affected by sun exposure
- What types of types of clothes to use
- The effects of UV exposure later in life*
- How harmful tanning beds are *
- Using spray tans and tanning lotion
- How sensitive one's skin is personally

 Suggested methods of UV protection education

- Television commercials*
- Magazine articles and advertisements*
- Pictures that show the results of sun exposure*
- Warning signs in tanning salons*
- Having people who have had skin cancer share their stories*
- Advertisements on the internet
- Receiving information via mail or email
- Teaching information in high school health classes
- Refrigerator magnets explaining the signs of cancer in moles
- More discussions at doctor's visits*
- Having information in general practice, dermatology and pediatric offices*
- Reduce the cost of sunscreen

 *Response provided by more than one participant.

Figure 1. Patient flow diagram

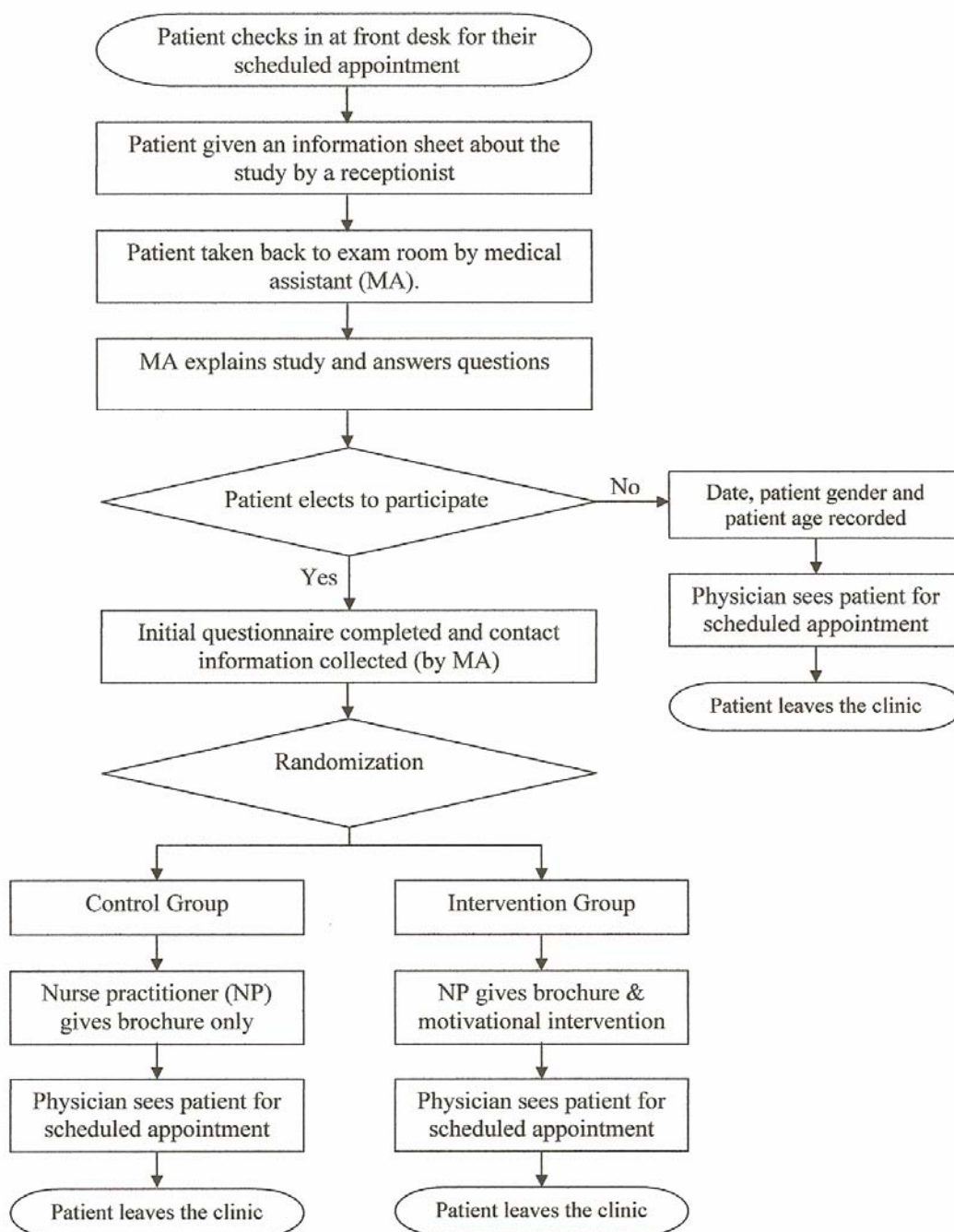


Figure 2. Motivational enhancement intervention

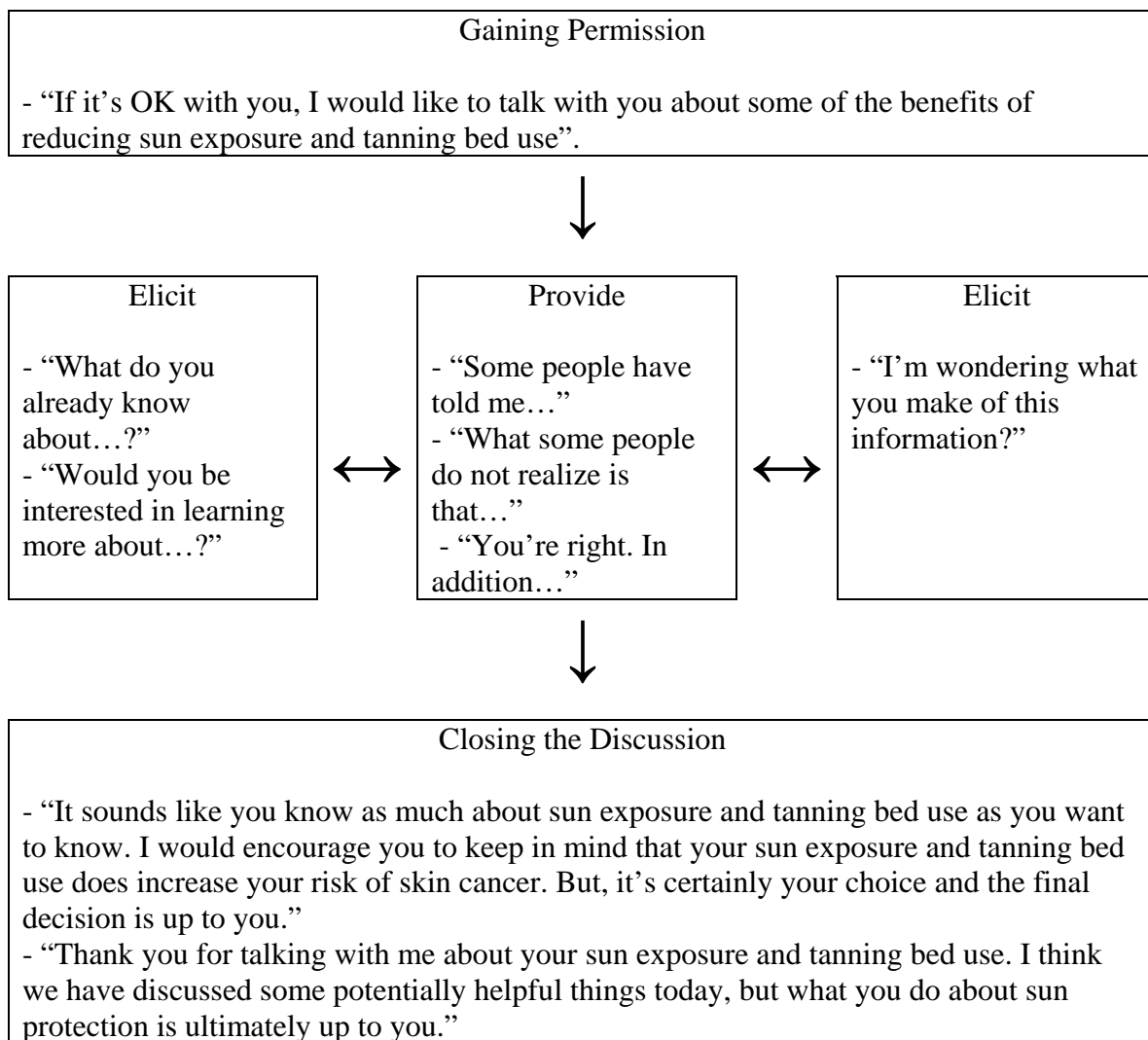


Figure 3. Participant follow-up diagram: Email group

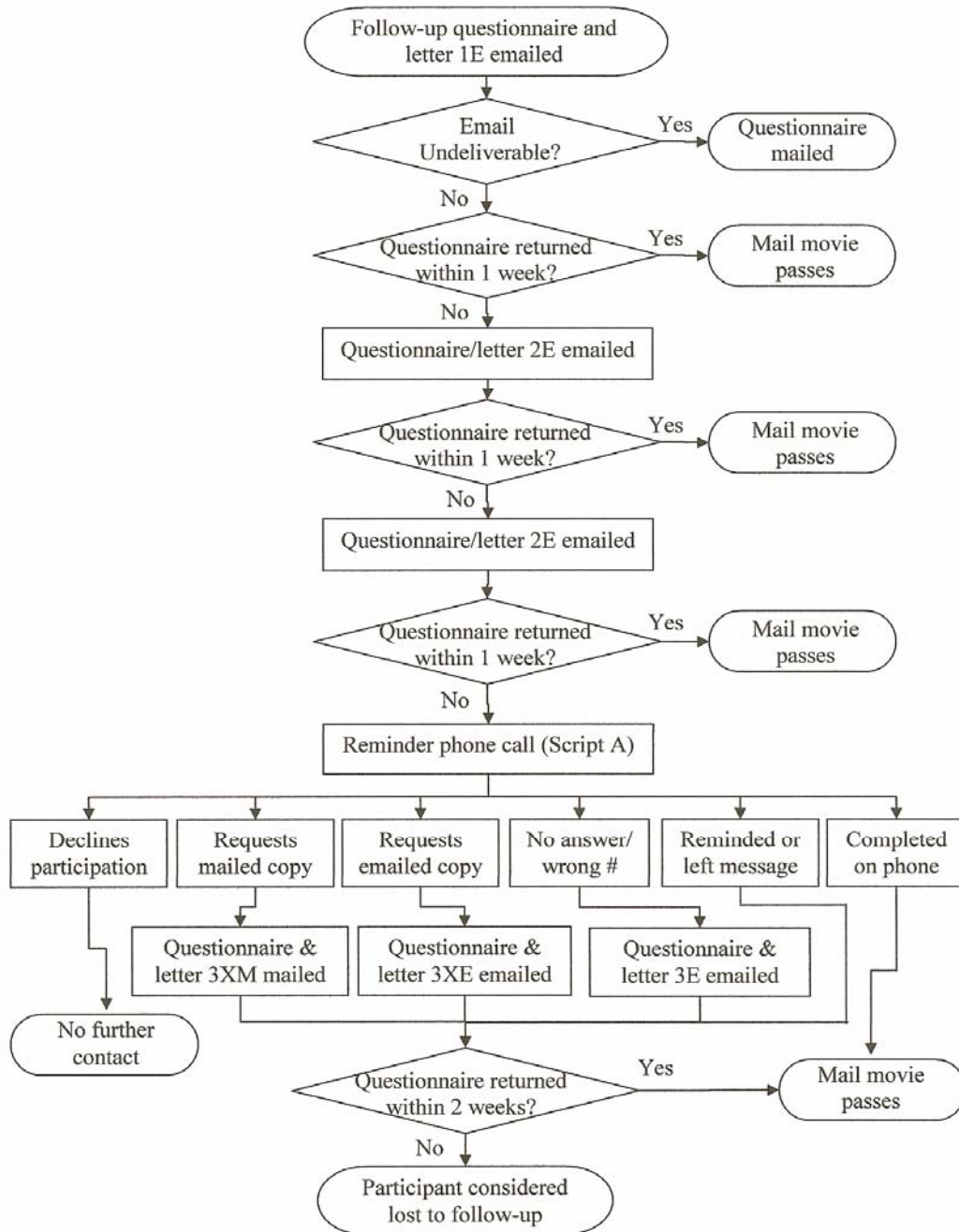
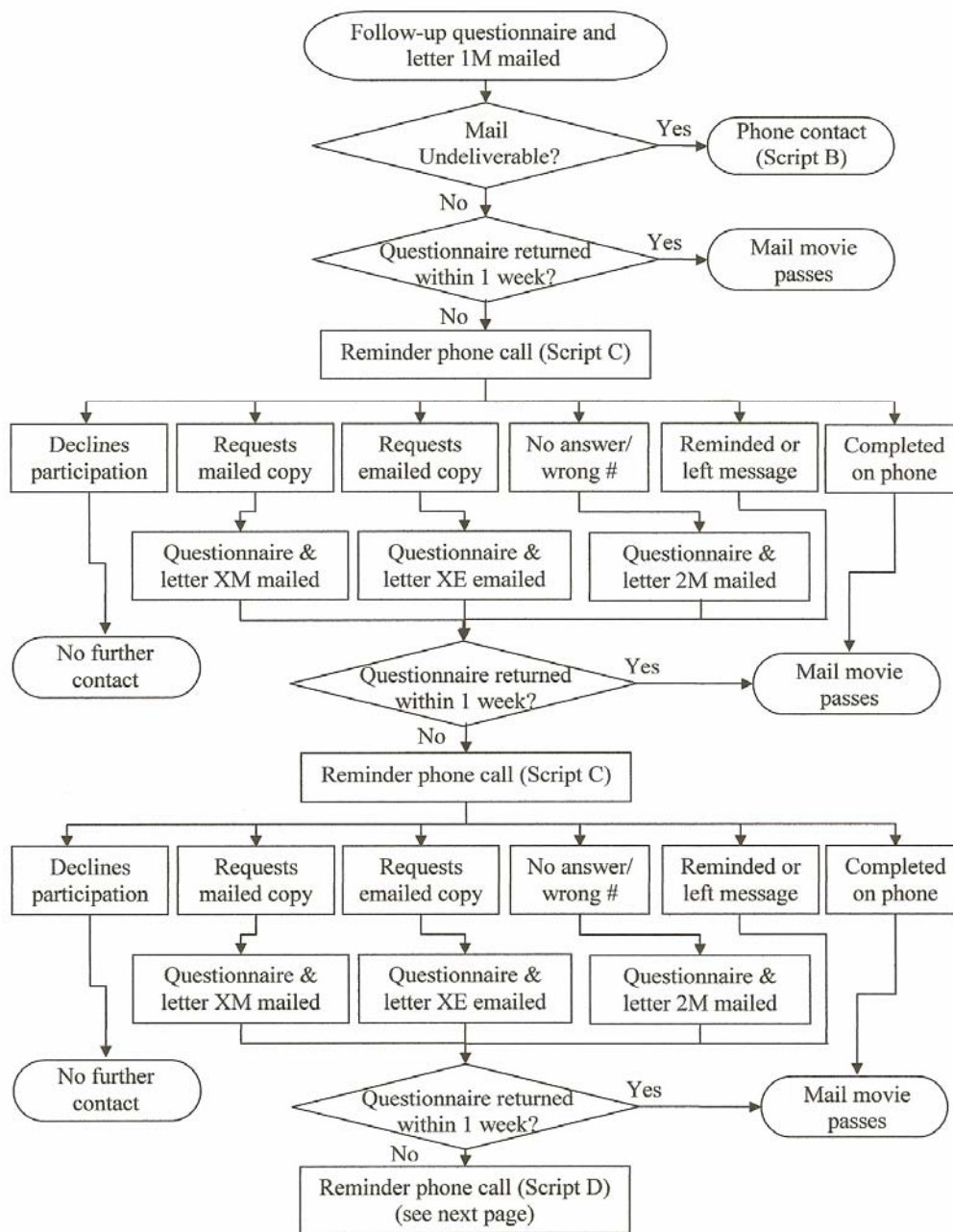


Figure 4. Participant follow-up diagram: Mail group



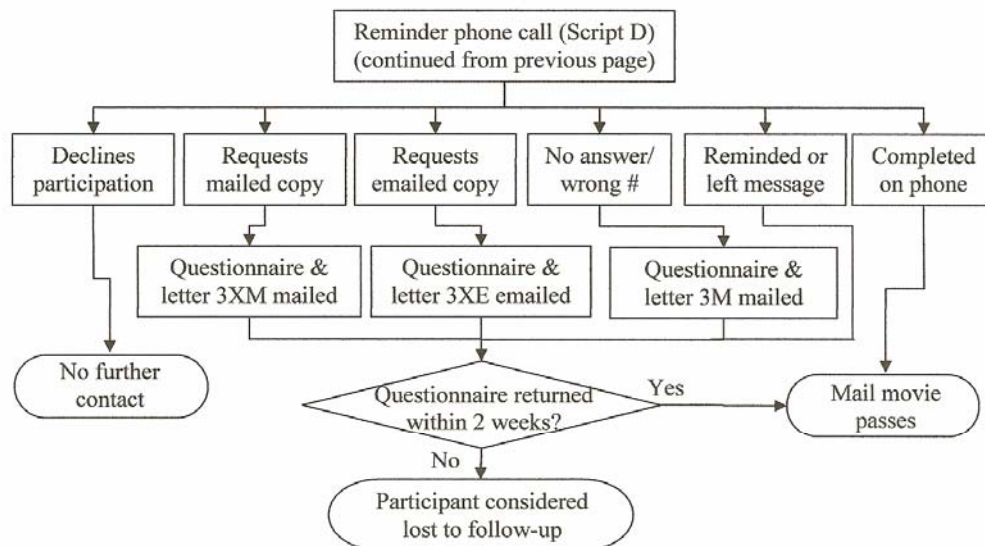


Figure 5. CONSORT diagram

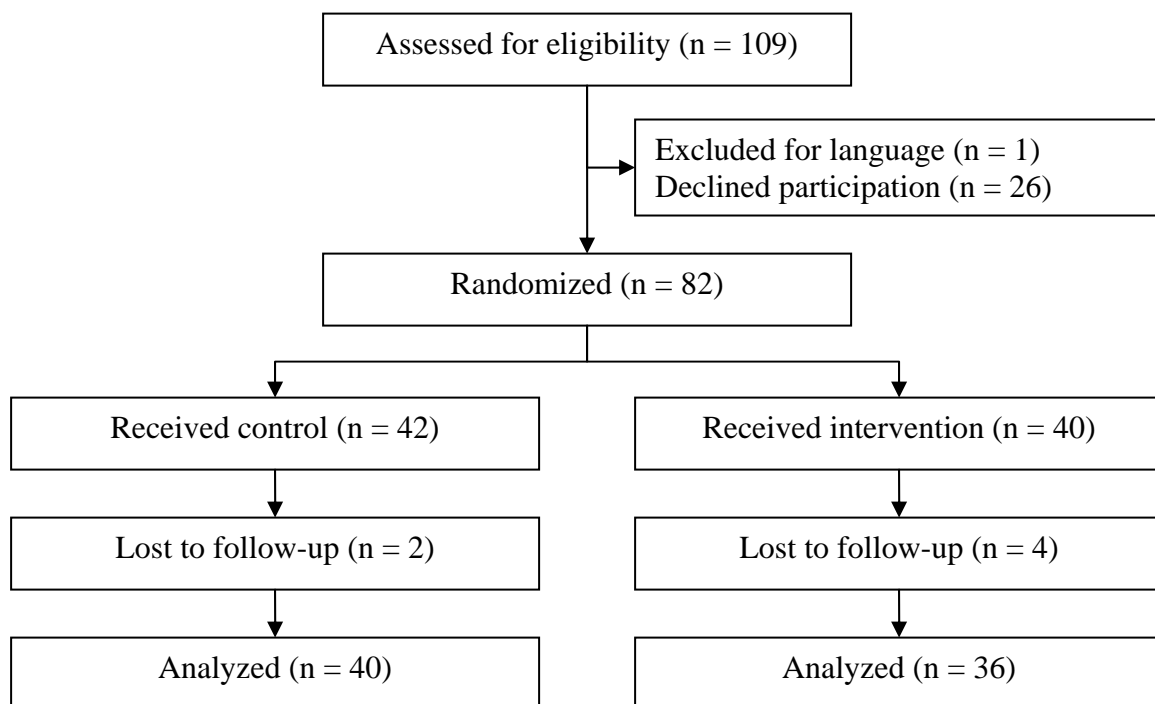


Figure 6. Baseline stages of change distribution

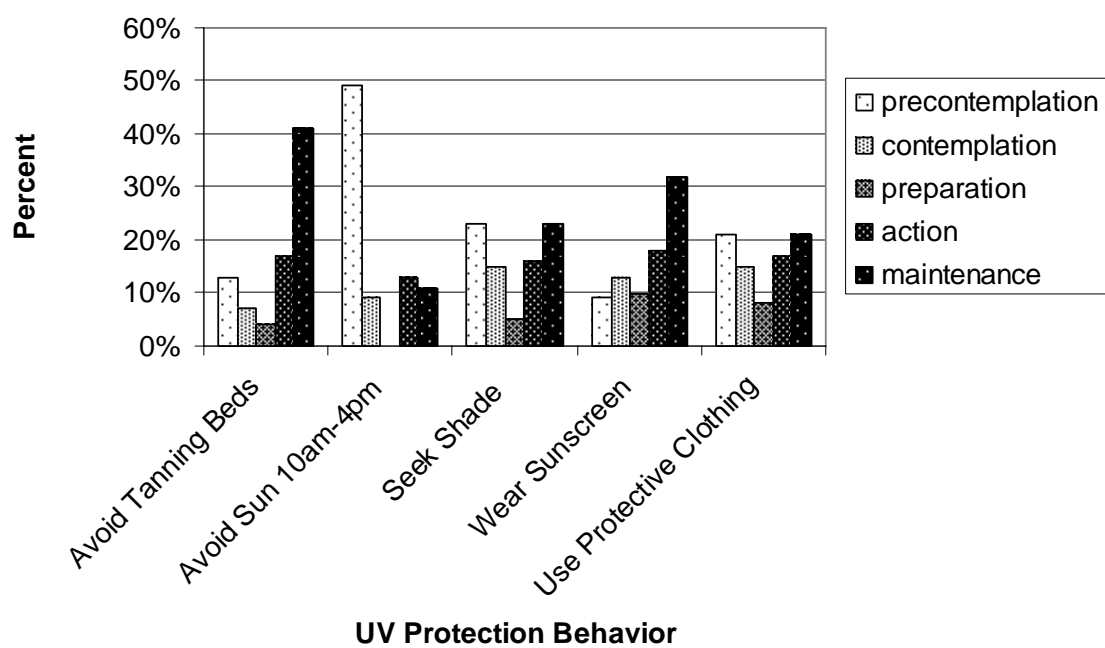
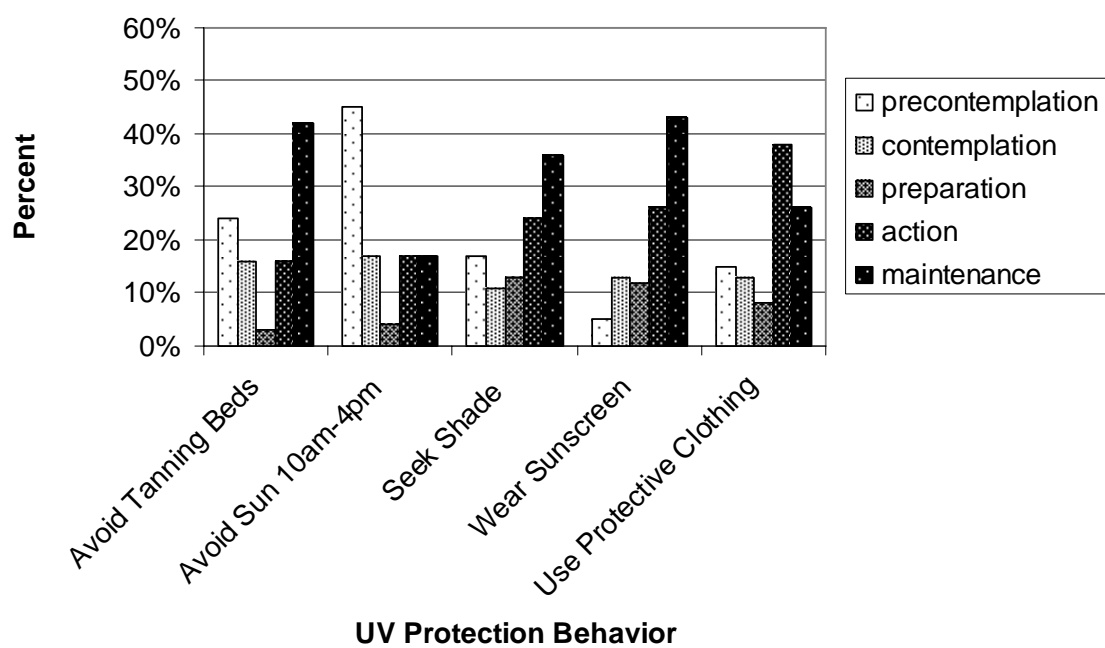


Figure 7. Follow-up stages of change distribution



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Appendix A: Informational flyer

Skin Protection Study

What is the purpose of this study?

This study is being done to learn more about a method of providing dermatology patients with information about methods of improving skin health.

Who can participate in this study?

Individuals who have an appointment with the dermatologist and are at least 18 years old, but not more than 30 years old. Participants can join this study in the months of September, October and November 2006.

What can I expect if I participate?

Individuals who want to be in the study will be given a survey to fill out before their appointment. This will take about three to five minutes. Before you see the dermatologist, you will be educated about your skin and sun exposure. Some subjects will get a brochure and some subjects will get a brief talk. This will take about five to eight minutes. The decision about who will get the brochure and who will get the talk will be random. This means that subjects will have an equal chance of getting either type of education. Six months after the education another survey will be mailed or emailed to you. This will take about three to five minutes to fill out. If you do not return the survey, you will be reminded with an email or a phone call. After your second survey is returned, two movie passes will be mailed to you to thank you for participating.

What are the possible benefits and risks of participating?

You may or may not personally benefit from the information you will get in this study. However, by serving as a participant, you may help us learn how to benefit patients in the future. There should be no risks involved in participation.

Will it cost anything to participate?

It will not cost you anything to participate in this study.

How will my privacy be protected?

Your name and contact information will be recorded so that your follow-up questionnaire and movie passes can be sent to you. This information will be kept in a locked box and only the researchers in this study will be able to access it. This information will not be used on your survey. Instead, we will use only an identification number. After the follow-up surveys are received, the names and contact information for all of the subjects will be destroyed.

What if I choose not to participate?

Participation in this research study is completely voluntary. Your decision of whether or not to participate will not affect your health care in any way. If you do join, and later change your mind, you may quit at any time.

Investigators: Nancy Press, PhD & Christina Linton, PhD
Please call Christina Linton at (801) 374-8999 with any questions or concerns.

Appendix B: UV protection brochure

The Sun and Your Skin

UVA/UVB

effects of the sun

protection

allergic reactions

aging

sunscreen

skin cancer

American Academy of Dermatology

AAD
1938
OF DERMATOLOGY

American Academy of Dermatology

Soaking up the sun's rays used to be considered healthy...before we learned about the dangers of ultraviolet rays.

Sunlight can be used to treat some skin diseases, but we all need to avoid overexposure to the sun. Too much sun can cause sunburn, wrinkles, freckles, skin texture changes, dilated blood vessels, and skin cancers. It may also cause rash problems.

The Sun's Rays
The sun produces both visible and invisible rays. The invisible rays, known as ultraviolet-A (UVA) and ultraviolet-B (UVB), cause most of the problems. Both cause suntan, sunburn, and sun damage. There is no "safe" UV light.

Harmful UV rays are more intense in the summer, at higher altitudes, and closer to the equator. For example, Florida receives 150% more UV than Maine. The sun's harmful effects are also increased by wind and reflections from water, sand, and snow. Even on cloudy days UV radiation reaches the earth and can cause skin damage. Although window glass blocks UVB light, UVA rays are able to penetrate through glass. The UV index is a prediction of ultraviolet intensity in a given location. It can be found in the weather section of most large daily newspapers and some television weather forecasts.

Protection from the Sun
Using sun protection will help prevent skin damage and reduce the risk of cancer. Sun protection should always start with avoiding peak sun hours and dressing sensibly. Most clothing absorbs or reflects UV rays, but white fabric like loose-knit cotton, and wet clothes that cling to your skin, do not offer much protection. The tighter the weave, the more

1

sun protection it will offer. The American Academy of Dermatology recommends that you avoid deliberate sunbathing, wear a wide-brimmed hat, sunglasses, and protective clothing. If you must be in the sun, use a sunscreen with a sun protection factor (SPF) of at least 15, even on cloudy days.

Sunscreens work by absorbing, reflecting, or scattering the sun's rays on the skin. They are available in many forms, including ointments, creams, gels, lotions, sprays, and wax sticks. All are labeled with SPF numbers. The higher the SPF, the greater the protection from sunburn, caused mostly by UVB rays. Some sunscreens, called "broad spectrum," block out both UVA and UVB rays. These do a better job of protecting skin from other effects of the sun. However, sunscreens are not perfect.



Sunscreens protect the skin from burning rays.

Sunscreens should be applied about 20 minutes before going outdoors. Even water-resistant sunscreens should be reapplied about every two hours, after swimming, or after strenuous activities.

Beach umbrellas and other kinds of shade are a good idea, but they do not provide full

protection because UV rays can still bounce off sand, water, and porch decks. Remember, UV rays are invisible.

Effects of the Sun

Sunburn — Your chances of developing a sunburn are greatest between 10 am and 4 pm, when the sun's rays are strongest. It's easier to burn on a hot day, because heat increases the effects of UV rays, but you can get burned on overcast days as well.

Sun protection is also important in the winter. Snow reflects up to 80 percent of the sun's rays, causing sunburn and damage to uncovered skin. Winter sports in the mountains increase the risk of sunburn because there is less atmosphere at high altitudes to block the sun's rays.

If skin is exposed to sunlight too long, redness may develop and increase for up to 24 hours. A severe sunburn causes skin tenderness, pain, swelling, and blistering. Additional symptoms like fever, chills, upset stomach, and confusion indicate a serious sunburn and require immediate medical attention. If you develop a severe sunburn or begin to develop a fever, your dermatologist may suggest medicine to reduce swelling, pain, and prevent infection.

Unfortunately, there is no quick cure for minor sunburn. Cool, wet compresses, baths, and soothing lotions may provide some relief.

Tanning — A tan is often mistaken as a sign of good health. Dermatologists know better. A suntan is actually the result of skin injury. Tanning occurs when UV rays enter the skin and it protects itself by producing more pigment or melanin.

Indoor tanning is just as bad for your skin as

sunlight. Most tanning salons use ultraviolet-A bulbs. Studies have shown that UVA rays go deeper into the skin and contribute to premature wrinkling and skin cancer.

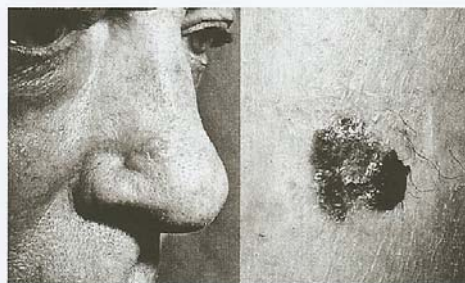
Aging — People who work outdoors or sun bathe without sun protection can develop tough, leathery skin, making them look older than they are. The sun can also cause large freckles called “age spots,” and scaly growths (actinic keratoses), that may develop into skin cancer. These skin changes are caused by years of sun exposure. Protecting children from the sun is especially important, since most of our lifetime exposure occurs before the age of 20.



Wrinkling of the skin from years of sun exposure.

Wrinkles — Wrinkles are directly related to sun exposure. They can be intensified by smoking. Your dermatologist and dermatologic surgeon can treat these with a variety of surgical methods including chemical peels, laser surgery, dermabrasion, and soft tissue fillers.

Skin Cancer — More than 90 percent of all skin cancers occur on sun-exposed skin. The face, neck, ears, forearms, and hands are the most common places it appears.



Basal cell carcinoma Malignant melanoma

The three most common types of skin cancer are basal cell carcinoma, squamous cell carcinoma, and melanoma.

Basal cell carcinoma usually develops on the face, ears, nose, and around the mouth of fair-skinned individuals. It can start as a red patch or shiny bump that is pink, red, or white. It may be crusty or have an open sore that does not heal, or heals only temporarily. This type of cancer can be cured easily if treated early.

Squamous cell carcinoma usually appears as a scaly patch or raised, warty growth. It also has a high cure rate when found and treated early. In rare cases, if not treated, it can be deadly.

Melanoma is the most dangerous form of skin cancer. It usually looks like a dark brown or black mole-like patch with irregular edges. Sometimes it is multicolored with shades of red, blue, or white. This type of skin cancer can occur anywhere on the body and when found early, can be cured. If ignored, it spreads throughout the body and can be fatal.

Allergic Reactions — Some people develop allergic reactions to the sun. These reactions may



Photoallergic dermatitis

show up after only a short time in the sun. Bumps, hives, blisters, or red blotches are the most common symptoms of a sun allergy. Sometimes these reactions are due to cosmetics, perfumes, plants, topical medications, or sun preparations. Certain drugs, including birth control pills, antibiotics, blood pressure, arthritis, and depression medications can cause a skin rash with sun exposure. If this occurs, a dermatologist can help.

Diseases — Some diseases can be made worse by the sun, including cold sores, chickenpox, and a number of less common disorders such as lupus erythematosus. UV rays also can cause cataracts, a gradual clouding of the lens in the eye.

Tips for Sun Protection

1. Use a broad-spectrum sunscreen with a SPF of at least 15 on all exposed skin, including the lips, even on cloudy days.
2. If exposed to water, either through swimming or sweating, a water-resistant sunscreen should be used.
3. Reapply sunscreen frequently.
4. Wear a broad-brimmed hat and sunglasses.

5. Sit in the shade whenever possible.
6. Wear protective, tightly-woven clothing.
7. Plan outdoor activities early or late in the day to avoid peak sunlight hours between 10 am and 4 pm.

Everyone should be able to enjoy sunny days. By using a little common sense, as well as the guidelines developed by the American Academy of Dermatology, you can safely work and play outdoors without worrying too much about skin cancer or wrinkles. But if either should occur, your dermatologist has specific expertise in treatment options.

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Appendix C. Phone scripts for follow-up questionnaire

Script A (Final reminder for email participants)

Live Person: Hello, may I please speak with (participant's name)?

NO SUCH PERSON AT THIS NUMBER: Verify that number was dialed correctly.

HE/SHE MOVED: Do you know the number where I can reach him/her?

HE/SHE IS NOT IN: Do you know when would be a better time to reach him/her?

WHO IS THIS?/WHY ARE YOU CALLING?

My name is _____. I'm calling to remind him/her about a survey he/she volunteered to complete.

YES, THIS IS (PARTICIPANT'S NAME).

My name is _____ and I'm calling to remind you about the skin protection survey you volunteered to complete. You should have received a link to the survey recently in an email.

GOT SURVEY, BUT DID NOT COMPLETE YET: Would you prefer to answer the survey questions over the phone? This should take less than five minutes.

YES: Great. *Ask questions exactly as written on questionnaire. When the questions are complete:* That's it. Thank you. We will be mailing the movie passes, so let me make sure that the mailing address we have for you is correct ... OK, you should be receiving your two movie passes in the mail shortly. Bye.

NO: OK, that's fine. The study is almost over, but if you complete the survey by __ (1 week later) __, we will still be able to send you the two movie passes. We're looking forward to hearing from you. Thank you. Bye.

DID NOT GET/ LOST SURVEY: That's OK. I can either email or mail you another survey or you can answer the survey questions over the phone. This should take less than five minutes.

EMAIL ANOTHER ONE: Let me make sure that the email address we have for you is correct ... OK, you should be receiving that survey shortly. Bye

MAIL ANOTHER ONE: Let me make sure that the mailing address we have for you is correct ... OK, you should be receiving that survey shortly. Bye

OVER THE PHONE: Great. *Ask questions exactly as written on questionnaire. When the questions are complete:* That's it. Thank you. We will be mailing the movie passes, so let me make sure that the mailing address we have for you is correct ... OK, you should be receiving your two movie passes in the mail shortly. Bye.

I ALREADY RETURNED THE SURVEY: Thank you. You should be receiving your movie passes in the mail shortly. Bye.

I DO NOT WANT TO (HAVE TIME TO) PARTICIPATE: Would you prefer to answer the survey questions over the phone? This should take less than five minutes.

YES: Great. *Ask questions exactly as written on questionnaire. When the questions are complete:* That's it. Thank you. We will be mailing the movie passes, so let me make sure that the mailing address we have for you is correct ... OK, you should be receiving your two movie passes in the mail shortly. Bye.

NO: OK. I will record that information and we will not contact you again.

Answering Machine (Leave message after 3 attempts)

Hi, this is a message for <<participant's name>>. My name is _____ and I'm calling to remind you about the skin protection survey you volunteered to complete. You should have received a link to the survey recently by email. The study is almost over, but if you complete the survey by __ (1 week later)__, we will still be able to send you the two movie passes. Your responses are very important to us and we are looking forward to hearing from you. If you did not receive the survey or if you would prefer to complete the survey over the phone, please call 801-812-5509 and let me know when is a generally good time to reach you. Thanks!

No Answer: Make 3 attempts at different times of day.

Script B (Mail Undeliverable)

Live Person: Hello, may I please speak with (participant's name)?

NO SUCH PERSON AT THIS NUMBER: Verify that number was dialed correctly.

HE/SHE MOVED: Do you know the number where I can reach him/her?

HE/SHE IS NOT IN: Do you know when would be a better time to reach him/her?

WHO IS THIS?/WHY ARE YOU CALLING?

My name is _____. I'm calling to remind him/her about a survey he/she volunteered to complete.

YES, THIS IS (PARTICIPANT'S NAME).

My name is _____ and I'm calling to talk to you about the skin protection survey you volunteered to complete. We have had trouble mailing the survey to your address. I can either email or mail you another survey or you can answer the survey questions over the phone. This should take less than five minutes.

EMAIL: OK, what is your email address?... *Repeat back to participant to confirm. ... I will also need an address to mail the two movie passes to... Repeat back to participant to confirm. ... OK, you should be receiving that survey shortly. Bye. (Send with letter XE and start at top of email flowsheet)*

MAIL: OK, what address should I mail the survey to?... *Repeat back to participant to confirm. ... OK, you should be receiving that survey shortly. Bye. (Will send with letter XM and start at top of mail flowsheet)*

OVER THE PHONE: Great. *Ask questions exactly as written on questionnaire. When the questions are complete:* That's it. Thank you. We will be mailing the movie passes, so what address would you like us to use? ... *Repeat back to participant to confirm. ... OK, you should be receiving your two movie passes in the mail shortly. Bye.*

I DO NOT WANT TO (HAVE TIME TO) PARTICIPATE: OK. I will record that information and we will not contact you again.

Answering Machine (Leave message after 3 attempts)

Hi, this is a message for <<participant's name>>. My name is _____ and I'm calling to talk to you about the skin protection survey you volunteered to complete. We have had trouble mailing the survey to your address. Please call 801-812-5509 and let me know where I can email or mail you another survey. If you would prefer to complete the survey over the phone, please call and let me know when is a generally good time to reach you. Thanks!

No Answer: After 3 attempts, participant considered lost to follow-up.

Script C (Reminder for mail participants)

Live Person: Hello, may I please speak with (participant's name)?

NO SUCH PERSON AT THIS NUMBER: Verify that number was dialed correctly.

HE/SHE MOVED: Do you know the number where I can reach him/her?

HE/SHE IS NOT IN: Do you know when would be a better time to reach him/her?

WHO IS THIS?/WHY ARE YOU CALLING?

My name is _____. I'm calling to remind him/her about a survey he/she volunteered to complete.

YES, THIS IS (PARTICIPANT'S NAME).

My name is _____ and I'm calling to remind you about the skin protection survey you volunteered to complete. You should have received the survey recently in the mail.

GOT SURVEY, BUT DID NOT COMPLETE YET: Would you prefer to answer the survey questions over the phone? This should take less than five minutes.

YES: Great. *Ask questions exactly as written on questionnaire. When the questions are complete:* That's it. Thank you. We will be mailing the movie passes, so let me make sure that the mailing address we have for you is correct ... OK, you should be receiving your two movie passes in the mail shortly. Bye.

NO: OK, that's fine. We're looking forward to hearing from you. Thank you. Bye.

DID NOT GET/ LOST SURVEY: That's OK. I can either email or mail you another survey or you can answer the survey questions over the phone. This should take less than five minutes.

EMAIL ANOTHER ONE: OK, what is your email address?... *Repeat back to participant to confirm.* ... You should be receiving that survey shortly. Bye

MAIL ANOTHER ONE: Let me make sure that the mailing address we have for you is correct ... OK, you should be receiving that survey shortly. Bye

OVER THE PHONE: Great. *Ask questions exactly as written on questionnaire. When the questions are complete:* That's it. Thank you. We will be mailing the movie passes, so let me make sure that the mailing address we have for you is correct ... OK, you should be receiving your two movie passes in the mail shortly. Bye.

I ALREADY RETURNED THE SURVEY: Thank you. You should be receiving your movie passes in the mail shortly. Bye.

I DO NOT WANT TO (HAVE TIME TO) PARTICIPATE: Would you prefer to answer the survey questions over the phone? This should take less than five minutes.

YES: Great. *Ask questions exactly as written on questionnaire. When the questions are complete:* That's it. Thank you. We will be mailing the movie passes, so let me make sure that the mailing address we have for you is correct ... OK, you should be receiving your two movie passes in the mail shortly. Bye.

NO: OK. I will record that information and we will not contact you again.

Answering Machine (Leave message after 3 attempts)

Hi, this is a message for <<participant's name>>. My name is _____ and I'm calling to remind you about the skin protection survey you volunteered to complete. You should have received the survey recently in the mail. Your responses are very important to us and we are looking forward to hearing from you. If you did not receive the survey or if you would prefer to complete the survey over the phone, please call 801-812-5509 and let me know when is a generally good time to reach you. Thanks!

No Answer: Make 3 attempts at different times of day.

Script D (Final reminder for mail participants)

Live Person: Hello, may I please speak with (participant's name)?

NO SUCH PERSON AT THIS NUMBER: Verify that number was dialed correctly.

HE/SHE MOVED: Do you know the number where I can reach him/her?

HE/SHE IS NOT IN: Do you know when would be a better time to reach him/her?

WHO IS THIS?/WHY ARE YOU CALLING?

My name is _____. I'm calling to remind him/her about a survey he/she volunteered to complete.

YES, THIS IS (PARTICIPANT'S NAME).

My name is _____ and I'm calling to remind you about the skin protection survey you volunteered to complete. You should have received the survey recently in the mail.

GOT SURVEY, BUT DID NOT COMPLETE YET: Would you prefer to answer the survey questions over the phone? This should take less than five minutes.

YES: Great. *Ask questions exactly as written on questionnaire. When the questions are complete:* That's it. Thank you. We will be mailing the movie passes, so let me make sure that the mailing address we have for you is correct ... OK, you should be receiving your two movie passes in the mail shortly. Bye.

NO: OK, that's fine. The study is almost over, but if you complete the survey by __ (1 week later) __, we will still be able to send you the two movie passes. We're looking forward to hearing from you. Thank you. Bye.

DID NOT GET/ LOST SURVEY: That's OK. I can either email or mail you another survey or you can answer the survey questions over the phone. This should take less than five minutes.

EMAIL ANOTHER ONE: OK, what is your email address?... *Repeat back to participant to confirm.* ... You should be receiving that survey shortly.
Bye

MAIL ANOTHER ONE: Let me make sure that the mailing address we have for you is correct ... OK, you should be receiving that survey shortly.
Bye

OVER THE PHONE: Great. *Ask questions exactly as written on questionnaire. When the questions are complete:* That's it. Thank you. We will be mailing the movie passes, so let me make sure that the mailing address we have for you is correct ... OK, you should be receiving your two movie passes in the mail shortly. Bye.

I ALREADY RETURNED THE SURVEY: Thank you. You should be receiving your movie passes in the mail shortly. Bye.

I DO NOT WANT TO (HAVE TIME TO) PARTICIPATE: Would you prefer to answer the survey questions over the phone? This should take less than five minutes.

YES: Great. *Ask questions exactly as written on questionnaire. When the questions are complete:* That's it. Thank you. We will be mailing the movie passes, so let me make sure that the mailing address we have for you is correct ... OK, you should be receiving your two movie passes in the mail shortly. Bye.

NO: OK. I will record that information and we will not contact you again.

Answering Machine (Leave message after 3 attempts)

Hi, this is a message for <<participant's name>>. My name is _____ and I'm calling to remind you about the skin protection survey you volunteered to complete. You should have received the survey recently in the mail. The study is almost over, but if you complete the survey by __ (1 week later) __, we will still be able to send you the two movie passes. Your responses are very important to us and we are looking forward to hearing from you. If you did not receive the survey or if you would prefer to complete the survey over the phone, please call 801-812-5509 and let me know when is a generally good time to reach you. Thanks!

No Answer: Make 3 attempts at different times of day.

Appendix D: Letters to accompany follow-up questionnaire

(Letter 1M - 1st follow-up letter)

{March 1, 2007}

Dear Participant:

As you may recall, in the Fall of last year you enrolled in a skin protection study and agreed to participate in a follow-up questionnaire. It is now time for the second and final questionnaire. You will find the questionnaire enclosed with this letter. Your responses are very important to us and we are looking forward to hearing from you. Please answer all of the questions and return the questionnaire in the stamped envelope provided. When we receive your completed questionnaire, we will mail two movie passes to you. Thank you for your participation!

Sincerely,

Nancy Press, PhD
Christina Linton, PhDc
1055 N 500 W, Suite 111
Provo, UT 84604
(801) 812-5472
skin_study@yahoo.com

(Letter 1E - 1st follow-up email)

{March 1, 2007}

Dear Participant:

As you may recall, in the Fall of last year you enrolled in a skin protection study and agreed to participate in a follow-up questionnaire. It is now time for the second and final questionnaire. You can access the questionnaire by clicking on this link: _____. Your responses are very important to us and we are looking forward to hearing from you. When we receive your completed questionnaire, we will mail two movie passes to you. Thank you for your participation!

Sincerely,

Nancy Press, PhD
Christina Linton, PhDc
1055 N 500 W, Suite 111
Provo, UT 84604
(801) 812-5472
skin_study@yahoo.com

(Letter 2M - Reminder letter)

{March 1, 2007}

Dear Participant:

As you may recall, in the Fall of last year you enrolled in a skin protection study and agreed to participate in a follow-up questionnaire. You should have recently received this follow-up questionnaire in the mail. Our records show that we have not yet received your completed questionnaire. Your responses are very important to us and to the successful completion of this study. We very much look forward to hearing from you.

You will find another copy of the questionnaire enclosed with this letter. Please answer all of the questions and return the questionnaire in the stamped envelope provided. It will only take a few minutes to complete and when we receive your completed questionnaire, we will mail two movie passes to you. If you have already returned the questionnaire, disregard this letter and watch for your movie passes in the mail. Thank you for your participation!

Sincerely,

Nancy Press, PhD
Christina Linton, PhD
1055 N 500 W, Suite 111
Provo, UT 84604
(801) 812-5472
skin_study@yahoo.com

(Letter 2E - Reminder email)

{March 1, 2007}

Dear Participant:

As you may recall, in the Fall of last year you enrolled in a skin protection study and agreed to participate in a follow-up questionnaire. You should have recently received an email inviting you to complete this follow-up questionnaire. Our records show that we have not yet received your completed questionnaire. Your responses are very important to us and to the successful completion of this study. We very much look forward to hearing from you.

You can access the questionnaire by clicking on this link: _____. It will only take a few minutes and when we receive your completed questionnaire, we will mail two movie passes to you. If you have already returned the questionnaire, disregard this email and watch for your movie passes in the mail. Thank you for your participation!

Sincerely,

Nancy Press, PhD
Christina Linton, PhDc
1055 N 500 W, Suite 111
Provo, UT 84604
(801) 812-5472
skin_study@yahoo.com

(Letter 3M - Final letter)

{March 1, 2007}

Dear Participant:

As you may recall, in the Fall of last year you enrolled in a skin protection study and agreed to participate in a follow-up questionnaire. You should have recently received this follow-up questionnaire in the mail. The study is almost over and our records show that we have not yet received your completed questionnaire. Your responses are very important to us and to the successful completion of this study. We very much look forward to hearing from you.

You will find another copy of the questionnaire enclosed with this letter. Please answer all of the questions and return the questionnaire in the stamped envelope provided. It will only take a few minutes to complete and if we receive your questionnaire before _(10 days later than mailing)____, we will mail two movie passes to you. If you have already returned the questionnaire, disregard this letter and watch for your movie passes in the mail. Thank you for your participation!

Sincerely,

Nancy Press, PhD
Christina Linton, PhD
1055 N 500 W, Suite 111
Provo, UT 84604
(801) 812-5472
skin_study@yahoo.com

(Letter 3E - Final email)

{March 1, 2007}

Dear Participant:

As you may recall, in the Fall of last year you enrolled in a skin protection study and agreed to participate in a follow-up questionnaire. You should have recently received an email inviting you to complete this follow-up questionnaire. The study is almost over and our records show that we have not yet received your completed questionnaire. Your responses are very important to us and to the successful completion of this study. We very much look forward to hearing from you.

You can access the questionnaire by clicking on this link: _____. It will only take a few minutes and if we receive your questionnaire before _(1 week later than email)____, we will mail two movie passes to you. If you have already returned the questionnaire, disregard this email and watch for your movie passes in the mail. Thank you for your participation!

Sincerely,

Nancy Press, PhD
Christina Linton, PhDc
1055 N 500 W, Suite 111
Provo, UT 84604
(801) 812-5472
skin_study@yahoo.com

(Letter XM - Mailed survey requested during phone conversation)

{March 1, 2007}

Dear Participant:

We are sending you this letter to follow-up on our recent phone conversation about the follow-up questionnaire you agreed to complete when you enrolled in our skin protection study last Fall. Your responses are very important to us and to the successful completion of this study. We very much look forward to hearing from you.

You will find another copy of the questionnaire enclosed with this letter. Please answer all of the questions and return the questionnaire in the stamped envelope provided. It will only take a few minutes to complete and when we receive your completed questionnaire, we will mail two movie passes to you. Thank you for your participation!

Sincerely,

Nancy Press, PhD
Christina Linton, PhDc
1055 N 500 W, Suite 111
Provo, UT 84604
(801) 812-5472
skin_study@yahoo.com

(Letter XE - Emailed survey requested during phone conversation)

{March 1, 2007}

Dear Participant:

We are sending you this letter to follow-up on our recent phone conversation about the follow-up questionnaire you agreed to complete when you enrolled in our skin protection study last Fall. Your responses are very important to us and to the successful completion of this study. We very much look forward to hearing from you.

You can access the questionnaire by clicking on this link: _____. It will only take a few minutes and when we receive your completed questionnaire, we will mail two movie passes to you. Thank you for your participation!

Sincerely,

Nancy Press, PhD
Christina Linton, PhD
1055 N 500 W, Suite 111
Provo, UT 84604
(801) 812-5472
skin_study@yahoo.com

(Letter 3XM - Mailed survey requested during final phone conversation)

{March 1, 2007}

Dear Participant:

We are sending you this letter to follow-up on our recent phone conversation about the follow-up questionnaire you agreed to complete when you enrolled in our skin protection study last Fall. Your responses are very important to us and to the successful completion of this study. We very much look forward to hearing from you.

You will find another copy of the questionnaire enclosed with this letter. Please answer all of the questions and return the questionnaire in the stamped envelope provided. It will only take a few minutes to complete and if we receive your questionnaire before _(10 days later than mailing)____, we will mail two movie passes to you. Thank you for your participation!

Sincerely,

Nancy Press, PhD
Christina Linton, PhD
1055 N 500 W, Suite 111
Provo, UT 84604
(801) 812-5472
skin_study@yahoo.com

(Letter 3XE - Emailed survey requested during final phone conversation)

{March 1, 2007}

Dear Participant:

We are sending you this letter to follow-up on our recent phone conversation about the follow-up questionnaire you agreed to complete when you enrolled in our skin protection study last Fall. Your responses are very important to us and to the successful completion of this study. We very much look forward to hearing from you.

You can access the questionnaire by clicking on this link: _____. It will only take a few minutes and if we receive your questionnaire before _(1 week later than email)____, we will mail two movie passes to you. Thank you for your participation!

Sincerely,

Nancy Press, PhD
Christina Linton, PhDc
1055 N 500 W, Suite 111
Provo, UT 84604
(801) 812-5472
skin_study@yahoo.com

(Letter MP – Letter to go with movie passes)

Dear Participant:

Thank you very much for your participation in our skin protection study. We are grateful for your willingness to complete both of the questionnaires. Enclosed you will find two movie passes to thank you for your help on this research project.

Sincerely,

Nancy Press, PhD
Christina Linton, PhDc
1055 N 500 W, Suite 111
Provo, UT 84604
(801) 812-5472
skin_study@yahoo.com

Appendix E. Initial questionnaire

ID #: _____

Date: _____

Skin Protection Questionnaire

Choose the statement below that best applies to your use of the following practices.

- a. I have never thought of using this method.
 - b. I'm thinking about using this method.
 - c. I intend to start using this method.
 - d. I have started to use this method.
 - e. I have been using this method for a long time.
1. _____ Avoiding tanning beds
 2. _____ Avoiding outdoor activities between 10 a.m. and 4 p.m.
 3. _____ Seeking shade whenever possible
 4. _____ Wearing a broad-spectrum sunscreen with a Sun Protection Factor (SPF) of 15 or higher
 5. _____ Wearing sun protective clothing and accessories, such as wide-brimmed hats and sunglasses.
6. **Do you think that the advantages of being tan outweigh the disadvantages?**
 - a. There are many more advantages.
 - b. There are a few more advantages.
 - c. Advantages and disadvantages are equal.
 - d. There are a few more disadvantages.
 - e. There are many more disadvantages.
 7. **How much do you like being tan?**
 - a. I like it very much
 - b. I like it somewhat.
 - c. I neither like it nor dislike it
 - d. I dislike it somewhat.
 - e. I dislike it very much.
 8. **How healthy or harmful do you think exposure to the sun is?**
 - a. Very healthy
 - b. Rather healthy
 - c. Neither healthy nor harmful
 - d. Rather harmful
 - e. Very harmful
 9. **How healthy or harmful do you think exposure to a tanning bed is?**
 - a. Very healthy
 - b. Rather healthy
 - c. Neither healthy nor harmful
 - d. Rather harmful
 - e. Very harmful

ID #: _____

Date: _____

Choose the statement below that best describes how easy or difficult it is to do each of the following.

- a. Very easy
 - b. Slightly easy
 - c. Neither easy nor difficult
 - d. Slightly difficult
 - e. Very difficult
10. _____ Avoiding tanning beds
 11. _____ Avoiding outdoor activities between 10 a.m. and 4 p.m.
 12. _____ Seeking shade whenever possible
 13. _____ Wearing a broad-spectrum sunscreen with a Sun Protection Factor (SPF) of 15 or higher
 14. _____ Wearing sun protective clothing and accessories, such as wide-brimmed hats and sunglasses.
15. On a typical *work day*, during daylight hours, approximately how much time, on average, are you outdoors?
- If less than one hour per day, _____ minutes per day
- If one hour or more per day, _____ hours per day
16. On a typical *non-work day*, during daylight hours, approximately how much time, on average, are you outdoors?
- If less than one hour per day, _____ minutes per day
- If one hour or more per day, _____ hours per day
17. Have you ever had a melanoma or any other type of skin cancer?
- a. No
 - b. Yes
18. Has anyone in your immediate family ever had a melanoma or any other type of skin cancer?
- a. No
 - b. Yes
19. Outside of your immediate family, do you know anyone who has ever had a melanoma or any other type of skin cancer?
- a. No
 - b. Yes

ID #: _____

Date: _____

20. Which of the following categories best explains how your skin responds to your first exposure to summer sun, without sunscreen, for 1 hour at midday?

- a. Always burn, never tan
- b. Usually burn, can tan if I work at it
- c. Sometimes burn, can tan
- d. Rarely or never burn, tan easily

21. How old are you? _____

22. What is your gender?

- a. Male
- b. Female

23. What is the highest level of education that you have obtained?

- a. Less than high school
- b. High school graduate
- c. Some college
- d. College or business degree
- e. Some graduate school
- f. Graduate degree

24. What is your current marital status?

- a. Single
- b. Married
- c. Divorced / Separated
- d. Widowed
- e. Other

25. What was the primary reason for your appointment today?

- a. Warts
- b. Acne or Rosacea
- c. Rash or Itching
- d. Nail problem
- e. Hair problem
- f. Moles or spots to be checked
- g. Other _____

Appendix F: Follow-up questionnaire

ID #: _____

Date: _____

Skin Protection Questionnaire

Choose the statement below that best applies to your use of the following practices.

- a. I have never thought of using this method.
- b. I'm thinking about using this method.
- c. I intend to start using this method.
- d. I have started to use this method.
- e. I have been using this method for a long time.

1. _____ Avoiding tanning beds
 2. _____ Avoiding outdoor activities between 10 a.m. and 4 p.m.
 3. _____ Seeking shade whenever possible
 4. _____ Wearing a broad-spectrum sunscreen with a Sun Protection Factor (SPF) of 15 or higher
 5. _____ Wearing sun protective clothing and accessories, such as wide-brimmed hats and sunglasses.
6. **Do you think that the advantages of being tan outweigh the disadvantages?**
 - a. There are many more advantages.
 - b. There are a few more advantages.
 - c. Advantages and disadvantages are equal.
 - d. There are a few more disadvantages.
 - e. There are many more disadvantages.
 7. **How much do you like being tan?**
 - a. I like it very much
 - b. I like it somewhat.
 - c. I neither like it nor dislike it
 - d. I dislike it somewhat.
 - e. I dislike it very much.
 8. **How healthy or harmful do you think exposure to the sun is?**
 - a. Very healthy
 - b. Rather healthy
 - c. Neither healthy nor harmful
 - d. Rather harmful
 - e. Very harmful
 9. **How healthy or harmful do you think exposure to a tanning bed is?**
 - a. Very healthy
 - b. Rather healthy
 - c. Neither healthy nor harmful
 - d. Rather harmful
 - e. Very harmful

ID #: _____

Date: _____

Choose the statement below that best describes how easy or difficult it is to do each of the following.

- a. Very easy
 - b. Slightly easy
 - c. Neither easy nor difficult
 - d. Slightly difficult
 - e. Very difficult
10. _____ Avoiding tanning beds
11. _____ Avoiding outdoor activities between 10 a.m. and 4 p.m.
12. _____ Seeking shade whenever possible
13. _____ Wearing a broad-spectrum sunscreen with a Sun Protection Factor (SPF) of 15 or higher
14. _____ Wearing sun protective clothing and accessories, such as wide-brimmed hats and sunglasses.
15. On a typical *work day*, during daylight hours, approximately how much time, on average, are you outdoors?
- If less than one hour per day, _____ minutes per day
- If one hour or more per day, _____ hours per day
16. On a typical *non-work day*, during daylight hours, approximately how much time, on average, are you outdoors?
- If less than one hour per day, _____ minutes per day
- If one hour or more per day, _____ hours per day
17. What, if anything, was helpful about the information you received about protecting your skin from the sun and from tanning beds?

ID #: _____

Date: _____

18. What suggestions do you have to improve the delivery of information about protecting your skin from the sun and from tanning beds?

Appendix G: Contact information form

ID Number: _____

Contact Information for Follow-up Questionnaire

Thank you so much for agreeing to participate in this study. The information you provided will help us find out how to better help our patients in the future. The follow-up questionnaire, which will be mailed or emailed to you about 6 months from today, is another key part of this project. It would help us greatly if you could provide the email or mailing address where we should send the follow-up questionnaire. The movie passes will need to be mailed, so whether or not you prefer email contact, please also provide your mailing address. If you think that there is a possibility that you will be moving, please also provide a more permanent address. Thank you!

Name: _____

Phone Number: _____

Email (optional): _____

Would you prefer to complete the follow-up questionnaire online? ___Yes ___No

Current mailing address:_____
Street address_____
City State Zip Code**Permanent address:**_____
Street address_____
City State Zip Code