2004

Does an Intervention Need to be Personalised to be More Effective in Changing Intentions, Motivations, Attitudes and Fear Arousal Towards Sun Protection?

Kellie Jones
Edith Cowan University

Edith Cowan University

Copyright Warning

Does an Intervention Need to be Personalised to be More Effective in Changing Intentions, Motivations, Attitudes and Fear Arousal Towards Sun Protection?

Kellie Jones

A Report Submitted in Partial Fulfilment of the Requirements for the Award of Bachelor of Arts in Psychology (Honours), Faculty of Community Studies, Education and Social Sciences, Edith Cowan University.

October 2004

I declare that this written assignment is my own work and does not include:

(i) material from published sources used without proper acknowledgement; or
(ii) material copied from the work of other students.

Signature: 

USE OF THESIS

The Use of Thesis statement is not included in this version of the thesis.

Declaration

I certify that this literature review and research project does not incorporate, without acknowledgement, any material previously submitted for a degree or diploma in any institution of higher education and that, to the best of my knowledge and belief, it does not contain any material previously published or written by another person except where due reference is made in the text.

Signature: [redacted]

Date: 20/1/05

Acknowledgements

I would like to acknowledge the guidance given to me by my supervisor, Dr Paul Chang, and thank him for his continued support and enthusiasm throughout the year. In addition, I would like to thank my family and friends for their greatly appreciated practical and emotional support during my study.

Table of Contents

Running head: PERSONALISED INTERVENTION

Does an Intervention Need to be Personalised to be More Effective in Changing Intentions, Motivations, Attitudes and Fear Arousal Towards Sun Protection?

Kellie Jones

Does an Intervention Need to be Personalised to be More Effective in Changing Intentions, Motivations, Attitudes and Fear Arousal Towards Sun Protection?

Previous health campaigns promoting sun-safe practices have not been as successful as would have been hoped in reducing the incidences of skin cancer in Australia. In the past, health-based and education-based messages have been used in these interventions to try to reduce the rate of intentional sun exposure. The present literature review concludes that health-based and education-based campaigns have been successful in increasing knowledge regarding the negative consequences of excessive sun exposure, however, what all these campaigns fail to take into consideration is the primary reason behind intentional tanning, which is the fact that people tan because they think it makes them look more attractive and healthy. Recently, interventions using appearance-based messages that counter this view have been examined. Results from an appearance-based approach focusing on attractiveness of tans have been more successful, although are still limited regarding their effect on intentions, motivations, attitudes and fear arousal towards sun protection. The most recent direction research has taken is to show participants what the sun has actually done to their appearance through the use of ultraviolet photographs. The few studies undertaken using this strategy have shown promising results by allowing participants to see the damage, not normally visible to the naked eye, that the sun has already caused. The present literature review concludes that personalising an intervention through the use of ultraviolet photographs in addition to an appearance-based message may be more effective in changing intentions, motivations, attitudes and fear arousal towards sun protection than an appearance-based message that was not personalised.

Author: Kellie Jones
Supervisor: Dr Paul Chang
Submitted: October 2004

Introduction

In a country like Australia, it is vital that people pay attention to the negative effects of excessive sun exposure. The present literature review provides evidence for the effectiveness of a strategy that personalises the health promotion message that people should not intentionally tan. First, background information and statistics regarding skin cancer in Australia and the effect skin cancer has on one's health are outlined. Then, a review of previous health campaigns targeting excessive sun exposure is undertaken. Following this, an explanation is given to describe the factors that influence tanning behaviours, the most influential factor being to increase one's personal appearance (e.g., Hillhouse & Turrisi, 2002). For the vast majority, people tan because they think it makes them look healthier and more attractive (Jones & Leary, 1984; Keesling & Friedman, 1997). The review will develop the rationale that interventions where people actually see their sun-damaged appearance will be more effective in convincing them to take up sun protection. In conclusion, it is argued that the most effective studies have focused on the core reason for tanning, which is to enhance personal appearance, and that a personalised strategy may be the most successful way to change intentions, motivation, attitudes and fear arousal towards sun protection, thereby reducing skin cancer incidences.

Sun Exposure and Skin Cancer

Despite widespread health promotion campaigns in Australia promoting sun-safe behaviours, the incidence of skin cancer continues to increase by about 5% each year (NHMRC, 1996). About 5.6 million Australians still get sunburnt every summer, despite the fact that virtually all Australians know the risks of developing skin cancer (Anti-Cancer Council of Victoria, 1999). It is common knowledge that excessive exposure to the sun's ultraviolet (UV) rays can cause skin cancer. Moreover, artificial tanning using sunbeds, which is becoming more and more popular, may also cause skin cancer

(Caltabiano & Sarafino, 2002). Evidence from previous studies show that exposure to UV radiation from sunbeds is a significant factor in the development of melanoma, which is the most dangerous of all skin cancers (Freak, 2004). Melanoma is the most common cancer to occur in men and women aged 15 to 44 years. In fact, Australians are eight times more likely to develop common skin cancer than any other form of cancer and Australia has the highest incidence of skin cancer in the world (Caltabiano & Sarafino, 2002). In 1997, for example, 8,366 new skin cancer cases were diagnosed in Australia and 910 people died of melanoma (Anti-Cancer Council of Victoria, 1999). These statistics do not reflect the fact that, although skin cancer is the most common form of cancer, it is also the most preventable (Lamanna, 2004).

The degree of damage caused by excessive sun exposure is dependent on the amount of sun exposure, frequency of burns, skin type, hair and eye colour, geographical location and time of year (Lamanna, 2004). Although there are some positive aspects of sun exposure, such as its role in the production of vitamin D, the negative consequences far outweigh the benefits (Sinni-MiKeehen, 1995). When a person does not protect themselves against the sun's UV rays, the skin darkens as a defence mechanism against UV ray damage. This causes the skin to age prematurely and increases one's risk of developing skin cancer. Sunburn can occur after only 15 minutes exposure to the sun's UV radiation. UV rays cannot be seen or felt and are not related to temperature as UV levels can still be extreme on cool or cloudy days. When UV light hits the skin, the epidermis releases chemicals that cause blood vessels to swell and leak fluids, causing inflammation, pain and can cause a reddened appearance. Damaged skin cells peel off to get rid of damaged skin cells (Anti-Cancer Council, Victoria, 1999).

Exposure to UV radiation is clearly harmful because it has the potential to cause skin cancer. In order to educate all Australians regarding the effects of sun exposure,

previous health promotion campaigns have focussed on delivering either health-based messages or education-based messages. These messages describe the risks of overexposure to the sun and how behavioural changes (such as wearing a hat and staying out of the sun in the middle of the day) can help minimise UV radiation exposure. As mentioned earlier, despite the widespread campaigns that educate about the health risks of skin cancer, the popularity of tanning increases in an unabated fashion. Generally, it is argued that education is the best tool to prevent problems related to UV exposure (Sinni-MiKeehen, 1995). This may be because one's knowledge and attitudes play a part in early detection of skin cancer (Freak, 2004).

Ineffectiveness of Previous Health-based and Education-based Campaigns

Various studies have shown that education-based programs are not good at changing actual behaviour, even though they may increase knowledge about the potential risks of skin cancer. Clearly, increased knowledge does not necessarily translate into actual behaviour change (Lamanna, 2004). The ineffectiveness of presenting educational material regarding skin cancer prevention has been the topic of much research. For example, in one study concerning attitudes towards skin cancer and health, it was found that an education-based campaign increased participants' knowledge of the risks of skin cancer, however, their attitudes towards sunbathing and tanning were not significantly affected (Kristjansson, Helgason, Mansson-Brahme, Widlund-Ivarson, & Ullen, 2003). The researchers concluded that education-based interventions increased knowledge only and that a more extensive intervention would be required to change behaviours and attitudes. Kristjansson et al. did find a change in the participants' motivation regarding avoiding the midday sun. This change in motivation was measured using the transtheoretical model, a model that describes the different stages of contemplating behavioural changes. If a participant was already contemplating changing her or his

behaviour regarding tanning, the results of the intervention may be more significant compared to a participant who had not contemplated changing her or his behaviour regarding tanning. Taking into consideration the transtheoretical model allowed the researchers to find out the stage participants were at when contemplating behaviour change during baseline, which enabled them to measure the effect of the intervention itself.

One of the most popular sun protection interventions, the 'Slip Slop Slap' campaign, was launched in 1980 in Australia (NHMRC, 1996). The Slip Slop Slap campaign was an educational health campaign that promoted sun-safe behaviours. It was a successful campaign in regards to increasing the public's knowledge about sun-safe behaviours and created more negative attitudes towards tanning but it was less successful in actually changing behaviour. Therefore, even one of the most popular campaigns, although increasing knowledge, failed to change behaviour significantly. This limited success did lead to the implementation of further campaigns but statistics show that skin cancer rates have still continued to rise each year (Williams, 2002). Therefore, the campaigns undertaken in Australia were unable to effectively alter sun protection behaviours.

The evidence reviewed above suggests that the primary way in which the sun protection message is conveyed is through education-based campaigns. What these campaigns lack, however, is that they simply talk about skin cancer, and do not personalise the message and make it relevant to the individual. Therefore, alternative ways to promote sun-safe behaviours need to be examined. One such alternative would be to test the effect of a personalised intervention. The rationale behind such an idea is drawn from evidence that focusing on one's personal appearance is the primary motivator for continued exposure to the sun (Hillhouse & Turrisi, 2002; Jones & Leary, 1994; Keesling & Friedman, 1997).

Focussing on one's personal appearance rather than aiming to increase knowledge about sun and skin cancer may be more effective in changing behaviour. Due to the limited success of health-based and education-based interventions, a personalised alternative may be more effective at communicating one's susceptibility to the negative effects of sun-exposure behaviour, and thereby motivating change in behaviour. In the sections that follow, the support for a personalised intervention focussing on personal appearance is reviewed.

Personal Appearance

What education-based campaigns lack is that they do not consider the motivations behind why people tan in the first place. In order to design an effective intervention, the motivations that influence tanning behaviours need be considered. There are several factors that influence one's behaviour and these factors need to be considered within a system (Caltabiano & Sarafino, 2002). For example, there are individual factors including personality, interpersonal factors including family and friends and factors in the community, such as schools, doctors, churches and local communities. These factors all play a part in influencing one's intentions, beliefs, motivations and behaviour. Therefore, espousing *knowledge alone* regarding the effects of sun exposure may be of limited value.

The literature suggests there are many factors why people intentionally tan, including risk taking, relaxation, knowledge of others with skin cancer, peer pressure and self-image (Keesling & Friedman, 1987). Many people, especially adolescents, hold strong positive attitudes towards sunbathing (Jackson & Aiken, 2000). A tan is said to increase one's attractiveness and healthy appearance (Leary & Jones, 1993). These social and cultural norms are a powerful influence on one's behaviour (Moghaddam, 1998). With regards to adolescent behaviour, several factors help to set the norm for tanning behaviour. These include whether or not friends use sunscreens, whether or not one's friends

sunbathe, and the level of tanning that one's friends achieve (Jackson & Aiken, 2000). Regarding adults, high-status or famous people are influential role models that exert a powerful influence on image norms (Moghaddam, 1998). For example, many adults aspire to look like their favourite movie star, which often involves having a tanned complexion. Hence, the factors that contribute to setting the social norms with respect to tanning must be considered in any intervention designed to target intentional sun exposure behaviour.

What has been highlighted time and again in the literature as the most influential factor for tanning behaviours is personal appearance. Studies have shown that people, especially younger adults, believe that having a tan makes you look more physically attractive (e.g., Hillhouse & Turrisi, 2002; Jones & Leary, 1994; Keesling & Friedman, 1997; McClendon, Prentice-Dunn, Blake & McMath, 2002; Mahler, Kulik, Gibbons, Gerrard & Harrell, 2003; Miller, Ashton, McHoskey & Gimbel, 1990; NHMRC, 1996). This belief has a long history. Tanning was one of the popular beauty fads that has evolved into a concept of beauty. A tan was considered attractive because it showed that one had been on an exotic holiday which reflected one's status. Moreover, health practitioners promoted tanning as a way of producing vitamin D but failed to state that minimal exposure to the sun was sufficient (Williams, 2002). Finally, the modelling world emphasised the importance of a tan as part of any beauty routine (Salpietro & Del Campo, 1995).

The pervasiveness of the tanning message is demonstrated by information in the popular press. For example, in an issue of Sun and Skin News published by the Skin Cancer Foundation in America, it was found that over 80% of people aged 25 years and younger believed they looked better with a tan. It was suggested, therefore, that the best way to convince people about the dangers of sun exposure would be to focus on what UV radiation does to one's appearance (Gorgos, 2002).

Contrary to the belief that tanning is attractive, however, tanning actually causes premature ageing of the skin and other negative consequences to one's appearance (Anti-Cancer Council, Victoria, 1999). The most frequent part of the body to get sunburnt is the face and this is the leading cause of premature ageing. Exposure to UV rays causes cells to die off more rapidly, which causes the skin to age faster. The visible signs of aging caused by UV exposure have been known to emerge in people as early as 15 years of age. In Australia, people are prone to sun damage and premature ageing, due to the extreme levels of UV radiation exposure throughout the year, and not just the summer months (Anti-Cancer Council, Victoria, 1999).

The importance of a tan for improved personal appearance has also been highlighted in the research literature. In one study, conducted by Jones and Leary (1994), the effectiveness of health-based versus appearance-based messages on university students' intentions to protect themselves against excessive sun-exposure was explored. The participants were randomly allocated to one of three groups. The first group was given an essay to read describing health risks of excessive exposure to the sun. The second group was given an essay to read that described the deleterious effects of tanning on physical appearance. The third group was a control group given an essay to read that described the process of getting a tan. The most effective intervention was group two that combined the message that tanning, rather than enhancing one's physical appearance, actually deleteriously effected one's looks as a result of premature aging. In addition, Jones and Leary found that for participants who were concerned about their appearance, then the effects were even more significant in group two. The results showed that appearance-based messages were more effective in changing intentions to protect against sun-exposure, compared to health-based messages or a control group.

Recent studies have confirmed that combining both a health-based plus an appearance-based message has been more effective than a health-based message alone. Jones (2002) and Caccetta (2002) found that combining health- and appearance-based knowledge was more effective in changing intentions to change, fear levels and knowledge, however, it was not more effective in changing attitude or motivation towards change. Kubiak (2003) also found the same effects as Jones and Caccetta. In addition, Kubiak found an increase in motivation to adopt safe sun practices when participants were shown appearance plus health information compared to a group of participants who were only shown health-based information, and compared to a control group who viewed general information about healthy living. Moreover, Kubiak found the appearance plus health group was also more effective in changing attitudes towards sun-exposure compared to the control group, but was no different to the health only group.

Not only has it been found that a tan is important for improved personal appearance, but this belief has been found to outweigh the risks of developing skin cancer. These findings have been interpreted according to the health belief model, which posits the likelihood someone will take preventative action depends on the threat of the health problem and the pros and cons of taking action (Caltabiano & Sarafino, 2002). For example, attitudes, knowledge, perceptions, beliefs and behaviours among American college students regarding sunbathing and skin cancer using surveys were examined by Lamanna (2004). The instruments she used measured tanning behaviours and attitudes towards general cancer and cancer prevention. These instruments were based on the health belief model that describes perceived susceptibility, seriousness, benefits and barriers as a rationale for behaviour. Significant gender differences regarding degree of value placed on suntanned skin were found, which the health belief model was unable to explain. However, it was also found that participants believed the benefits of tanning outweighed

the risks of developing skin cancer. Female participants displayed greater knowledge towards sunbathing risks and skin cancer but they also placed a greater value on the appearance of tanned skin. Personal attractiveness was more important than skin cancer. Lamanna concluded that it would be beneficial for interventions to concentrate on the immediate negative effects of tanning on personal appearance. She suggested that the use of UV photographs to depict prematurely aged skin would be beneficial.

The studies reviewed above highlight the need to consider people's reasons for tanning, the primary reason being the enhancement of personal appearance. This means that personal appearance should be a factor when designing interventions to promote sun protection. Recently, the direction that many studies have taken is to include personalised images that show sun damage not normally visible to the naked eye. Additionally, personalisation of the intervention has also been found to raise interest amongst participants thereby directing attention to the intervention (Mahler et al., 2003; Rossi, Blais & Weinstock, 1994). This has been achieved through the use of UV photographs and the use of these photos will be reviewed in the following section.

UV Photographs

UV photographs have been used in previous clinical trials to show the negative effects sun exposure has on the skin (Fulton, 1997). UV photos show underlying skin damage caused by UV exposure that cannot be seen by the naked eye, such as epidermal pigmentation, which includes brown spots and a freckled appearance. Ultraviolet radiation (UVR) includes both UV-A and UV-B rays and can cause acute sunburn, photocarcinogenesis, immunologic suppression and photoaging of the skin (Kaminester, 1996). Photoaging refers to the changes in the skin that are caused by chronic exposure to UVR. Photoaging includes formation of brown spots on the skin, fine and deep wrinkling, blackheads, whiteheads, prominent blood vessels, yellow colouring of the skin, loss of

elasticity of the skin, parched appearance, dryness and itchiness, basal cell carcinomas, squamous cell carcinoms and malignant melanomas and damage can occur from as little as 10 minutes exposure to UVR (Kaminester, 1996). The UV photograph, therefore, provides a personalised view of underlying skin damage, which may be used to augment the health-based message.

Personalised Interventions

The personalisation of an appearance-based message was tested in a study conducted by Rossi et al. (1994). It was found that personalisation of the appearance-based message resulted in a high degree of interest and that people were eager to participate. The aim of the intervention was to promote individual precautionary behaviours regarding skin cancer prevention. Two of the seven interventions used a personalised appearance-based message the first of which used a sun scanner, which highlighted the negative cosmetic effects of chronic sun exposure on the face. The second personalised intervention consisted of taking UV and polarised light instant photographs of participants' faces to show the effects of sun exposure to the face not visible to the naked eye. The most interesting thing to note from Rossi et al.'s study was that the highest participation rate came from the photography intervention. The researchers recorded a high degree of interest among potential participants for this personalised intervention and found the participants were more likely to absorb the information if they were interested in the content. In addition, the participants were shown the immediate consequences of their behaviour. Unlike other interventions that do not show the immediate negative consequences of sun exposure, this strategy was able to reach the participants instantaneously. Having a UV photograph taken was also a highly personal reminder that they could take home with them and show family and friends, which could create discussion regarding sun protective behaviours (Rossi et al., 1994).

The finding that personalisation of an appearance-based message resulted in increased interest by participants was supported in another study that examined the effects of using an appearance-based intervention only, which described photoaging information, versus using the appearance-based intervention plus UV photographs. Both intentions and protective behaviours regarding sun protection were significantly increased in the group shown appearance-based information plus UV photographs. It was found that the UV photographs made the appearance-based message more salient and resulted in a substantially lowered rate of reported sunbathing. Additionally, at follow-up, those participants reported greater protective behaviours regarding incidental sun exposure (Mahler et al., 2003).

In summary, results from previous research suggest that the personalised interventions using appearance-based messages have been found to increase participants' knowledge and behaviour. Other studies reviewed support this finding, but in addition have found significant increases in motivation in addition to knowledge and behaviour (Pagoto, McChargue, & Faqua, 2003). The use of UV photographs resulted in immediate as opposed to delayed consequences and targeted the most fundamental reason for intentional sun exposure, which was to increase personal appearance. The researchers also found that measuring motivation pre- and post-intervention was helpful in discovering the process of change regarding behaviour compared to the direct measures of behaviour. These findings were important because the results showed a positive significant change in motivation and behaviour.

The rationale for both undertaking personalised strategies focussing on appearance, as well as looking at both motivation and behaviour is explored below. Four main models can be used to explain the effectiveness of the photoaging stimuli. These models are

immediate versus delayed consequences, threat appeals, the health belief model and the transtheoretical model and are briefly reviewed in the sections below.

Immediate versus Delayed Consequences

When consequences of behaviour are immediate, there is a greater likelihood of behaviour change than when consequences are delayed (Tarpy & Sawabin, 1974). In other words, if one believes they are more vulnerable and can see the damage immediately, then they are more likely to change their behaviour. It stands to reason that delaying the consequences of a particular behaviour reduces its impact. The use of UV photographs addresses this issue because the photographs immediately show any damage caused through sun exposure, thereby increasing one's perception of their vulnerability towards sun damage. If we can emphasise the negative consequences of exposure on appearance then this approach may be more effective (Mahler et al., 2003).

The use of immediate versus delayed consequences concerning the issue of personal appearance as a strong motivator for tanning behaviours has been explored in several studies. For example, Jackson and Aiken (2000) defined risk as the distal threat (at some time in the future) of skin cancer and the more proximal threat (immediate threat) of photoaging. In Jackson and Aiken's intervention, the authors addressed issues concerning immediate versus delayed consequences. It was stated that the risk of skin cancer seemed remote to people, therefore they hypothesised that an intervention would need to show immediate consequences in order to be more effective. This intervention drew its rationale from the health belief model, which posits the likelihood someone will take preventive action depends on the threat of the health problem and the advantages and disadvantages of taking some preventative action (Caltabiano & Sarafino, 2002).

In Jackson and Aiken's (2000) study, it was found perceived susceptibility to skin cancer and photoaging were a powerful predictor of intention to both sun protect and

sunbathe. They also found that beliefs about photoaging showed a relationship to intention and behaviour. Taking these findings into consideration regarding young adults, it would be beneficial to target this proximal risk of premature aging. This proximal risk not only highlights immediate consequences, it undermines the rationale for sunbathing in the first place, which is to make one more attractive. In other words, proximal interventions stress the fact that sunbathing ages the skin which makes it more unattractive. Therefore, in order to design an effective strategy it would be advantageous to show the immediate consequences of current behaviour which may encourage immediate behaviour change. The positive effect an immediate versus delayed consequence can have on an intervention can be further enhanced through the use of threat appeals.

Threat Appeals

The use of threat appeals has a long history in health promotion. Threat appeals may also help explain why a personalised intervention using appearance-based messages would be effective. The emotional components of threat appeals stress the harmful consequences that will occur if a recommendation is not followed. This is done by inducing fear. Inducing fear about the negative consequences of one's actions (or lack of actions) is said to motivate one to comply with the advocated recommended behaviours to avoid the negative consequences (Devos-Comby & Salovey, 2002). This strategy can lead to two different responses. If the threat appeal also contained an effective method of how to avoid the negative outcome, through self-efficacy, people would be motivated to comply with the threat appeal. However, if the threat appeal did not contain any strategies to avoid the negative consequences, people may rationalise their current behaviour so that the threat became irrelevant.

The protection motivation theory also helps explain, in a cognitive way, why threat appeals may be effective. There are four components of the protection motivation theory,

including severity of threat, vulnerability to the threat, response efficacy (the negative consequence can be avoided by following the recommendation) and self-efficacy (the belief that one can engage in the preventative behaviour) (Devos-Comby & Salovey, 2002). Therefore, the threat itself is not the core component required in order to achieve change; rather, the appeal must contain several components such as promoting self-efficacy, to optimise the likelihood the advocated behaviour is adopted.

One major pitfall regarding threat appeals is that people tend to minimise the possibility that they will personally experience a negative outcome (Devos-Comby & Salovey, 2002; Petty & Wegner, 1998). This negative aspect of threat appeals helps to justify the rationale to use personalised methods in designing strategies for behaviour change. If a person is confronted with knowledge or evidence of their own vulnerability, this could make it harder to minimise the possibility that they will personally experience a negative outcome. Individuals are generally unrealistically optimistic about their risks for all sorts of potential health problems and are resistant to feelings of personal susceptibility. By taking UV photographs of individuals participating in a health campaign targeting the prevention of sun exposure, those individuals would be unable to minimise the possibility that they may have personally experienced any negative consequences of sun exposure, including skin cancer, because the evidence is presented to them immediately. In turn, this may lead to a change in attitudes and intentions regarding sun exposure and motivate them to change their actual behaviour.

Health Belief Model

Both threat appeals and immediate versus delayed consequences are helpful in providing a rationale for the development of an intervention programme promoting sun-safe behaviour. However, what they fail to take into consideration is how people perceive their own susceptibility, as well as the seriousness of their actions and the benefits and

barriers of behaving in a certain manner. Therefore a review of the literature in relation to the health belief model is presented, which takes into account these factors. In this model people make two assessments before deciding to take preventative action. The first assessment is to decide how threatening the health problem is. This involves how the individual perceives the seriousness of the threat and one's own susceptibility. The second assessment is the weighing up of the pros and cons of undertaking the behaviour. That is, a person makes an assessment of the benefits of undertaking the new behaviour or maintaining the current behaviour, and the costs, such as how much money is involved or how significantly does one's lifestyle have to change (Caltabiano & Sarafino, 2002). The health belief model provides the rationale for focusing on the core reason for tanning, which is to enhance one's personal appearance. By showing that one's appearance is actually being damaged by sun exposure, rather than being improved, this would help increase the perceived threat. In this way, personalising the message by taking UV photographs increases one's perceived susceptibility. According to Caltabiano and Sarafino, older adults perceive themselves as more vulnerable than younger adults regarding illnesses. Therefore, in order to reach younger adults, a personalised message may be more effective in changing their behaviour because they can see the immediate effect that their behaviour is having on their personal appearance. The costs of tanning would be seen as proximal rather than distal and this may motivate immediate behaviour change. Additionally, the use of UV photographs would challenge people's rationale for tanning because people would see that what they are actually doing is damaging their skin and appearance.

Transtheoretical Model

The health belief model is therefore useful to help understand people's perceptions towards their behaviour but what it does not take into account is the readiness with which

people are prepared to change their behaviour. The transtheoretical model helps put into perspective the stages at which people are prepared to change a particular behaviour. It may be that some people have never considered changing a particular behaviour, whereas other people have been contemplating for some time whether to change a particular behaviour. If a person is currently well, they may not believe that they need to change any of their behaviours. However, if a person is unwell then they may feel motivated to change certain behaviours. Therefore, it is important to know whether someone is motivated to change a particular behaviour when exposing a person to an intervention so that the motivation level can be taken into account when calculating the effect of the intervention on the targeted behaviour change.

There are five stages of change in the transtheoretical model (Ryder, 1999). The first is precontemplation, where an individual has no intention to change her or his behaviour. The second stage, contemplation, is when an individual is ambivalent about her or his behaviour. At the third stage, preparation, an individual has decided to change her or his behaviour and has made plans regarding how to do so. At the action stage, the fourth stage, the individual is actively changing her or his behaviour. Most interventions designed to change behaviour are focused on actively changing behaviour, regardless of whether the individual concerned is at the action stage or not. The final stage, the maintenance stage, is when an individual has either changed her or his behaviour for six months or the effort put into changing the behaviour has reduced. Depending on the stage at which an individual is, intervention processes would work differently. To date, previous research on sun protection involving the use of personalised UV photoaging photographs has failed to take into account whether or not people are prepared to change their behaviour.

The transtheoretical model is relevant regarding sun protection behaviour because any intervention outcome recorded would be mediated by the participants' stage of change.

The effectiveness of an intervention would depend in part on what stage of change the intervention is geared towards. Therefore, recording participants' motivation to change their behaviour at pre-test allows the researcher to take this into account when analysing the results from the intervention. Additionally, by using UV photographs, participants may realise that although they perceive themselves as more attractive with a tan, their skin has actually been damaged. It may cause people to become more motivated to change their tanning behaviours. As mentioned earlier, to date, the stage at which a person is at with regards to their preparedness to change has yet to be explained fully in research using personalised images to convince people to protect themselves from the sun.

Conclusion

After reviewing the literature concerning the effectiveness of personalised interventions in changing intentions, motivations, attitudes and fear arousal concerning sun protection, it is concluded that personalised interventions should indeed be considered. The interventions that focussed on health-based and education-based strategies have resulted in limited success. People's knowledge increased but very little, if any, behaviour change was found (Lamanna, 2004). This evidence was supported by the statistics showing a continued increase in the incidences of skin cancer (NHMRC, 1996). In other words, there has been no follow up with regards to reporting any actual behaviour change. It was found that these previous strategies had failed to consider the most important influential factor concerning people and intentional sun exposure, being to enhance personal appearance.

The studies that explored strategies using appearance-based messages have shown increased effectiveness in changing intentions, motivations, attitudes and fear arousal, although, again, actual behaviour change was limited (Hillhouse & Turrisi, 2002). Those interventions exploring the use of personalised strategies have resulted in the most successful changes regarding intentions, motivations and behaviour change (Mahler et al.,

2003). Specifically, the direction that many studies have now taken in exploring the use of UV photographs to personalise the intervention have encouraging results. Not only was this method found to challenge a person's core reason for intentional sun exposure, tanning, but in addition, this strategy also had the effect of being able to deliver the immediate consequences of this particular behaviour by showing the true consequences of their tanning behaviour. This personalised strategy was found to hold the interest of the participants and the message was more likely to be absorbed.

In order to bring together these findings, an understanding of four theoretical models, being immediate versus delayed consequences, threat appeals, the health belief model and the transtheoretical model, all help support the rationale that interventions concerning sun protection should focus on a personalised strategy, specifically, through the use of UV photographs.

References

Caccetta, J. (2002). *The effectiveness of an appearance-based intervention on sun protection.* Unpublished manuscript, Edith Cowan University, Western Australia.

Caltabiano, M. L., & Sarafino, E. P. (2002). *Health psychology: Biopsychosocial interactions. An Australian perspective.* Milton: John Wiley & Sons Australia, Ltd.

Cancer Foundation of Western Australia. (1997).

Devos-Comby, L., and Salovey, P. (2002). Applying persuasion strategies to alter HIV-relevant thoughts and behavior. *Review of General Psychology, 6,* 287-304.

Freak, J. (2004). Promoting knowledge and awareness of skin cancer. *Nursing Standard, 18,* 45-54.

Fulton, J. (1997). Utilizing the ultraviolet (UV Detect) camera to enhance the appearance of photodamage and other skin conditions. *American Society for Dermatologic Surgery Inc,. 23,* 163-169.

Gorgos, D. (2002). Teens are dangerously devoted to tanning. *Dermatology Nursing, 14,* 408.

Hillhouse, J. J., & Turrisi, R. (2002). Examination of the efficacy of an appearance-focused intervention to reduce UV exposure. *Journal of Behavioural Medicine, 25(4),* 395-409.

Jackson, K., and Aiken, L. (2000). A psychosocial model of sun protection and sunbathing in young women: The impact of health beliefs, attitudes, norms and self-efficacy for sun protection. *Health Psychology, 19,* 469-478.

Jones, A. R. (2002). *The effects of photoaging in promoting sun-safe behavioural change.* Unpublished manuscript, Edith Cowan University, Western Australia.

Jones, J. L., & Leary, M. R. (1994). Effects of appearance-based admonitions against sun exposure on tanning intentions in young adults. *Health Psychology, 13,* 86-90.

Kaminester, L. (1996). Current concepts: Photoprotection. *Archives of Family Medicine, 5,* 289-295.

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

Kubiak, J. (2003). *Effects of a combined appearance and health-based intervention on attitudes towards sun exposure.* Unpublished manuscript, Edith Cowan University, Western Australia.

Lamanna, L. (2004). College students' knowledge and attitudes about cancer and perceived risks of developing skin cancer. *Dermatology Nursing, 16,* 161-164, 175-176.

Leary, M. R., & Jones, J. L. (1993). The social psychology of tanning and sunscreen use: Self-presentational motives as a predictor of health risk. *Journal of Applied Social Psychology, 23,* 1390-1406.

McClendon, B. T., Prentice-Dunn, S., Blake, R., & McMath, B. (2002). The role of appearance concern in responses to intervention to reduce skin cancer risk. *Health Education, 102,* 76-83.

Mahler, H. I. M., Kulik, J. A., Gibbons, F. X., Gerrard, M., & Harrell, J. (2003). Effects of appearance-based interventions on sun protection intentions and self-reported behaviours. *Health Psychology, 22,* 199-209.

Miller, A. G., Ashton, W. A., McHoskey, J. W., & Gimbel, J. (1990). What price attractiveness? Stereotype and risk factors in suntanning behaviour. *Journal of Applied Social Psychology, 20,* 1272-1300.

Moghaddam, F. (1998). *Social psychology: Exploring universals across cultures.* New York: W.H. Freeman and Company.

National Health and Medical Research Council (NHMRC). (1996). *Primary prevention of skin cancer in Australia: Report of the sun protection programs working party.* Canberra: Australian Government Publishing Service.

Pagoto, S., McChargue, D., and Faqua, W. (2003). Effects of a multicomponent intervention on motivation and sun protection behaviours among Midwestern beachgoers. *Health Psychology, 22,* 429-433.

Petty, R. E., & Wegener, D. T. (1998). Attitude change: Multiple roles for persuasion variables. In D. T. Gibert & S. T. Fiske (Eds.), *The handbook of social psychology* (Vol. 1, pp. 323-390). Boston: McGraw-Hill.

Rossi, J., Blais, L., and Weinstock, M. (1994). The Rhode Island sun smart project: Skin cancer prevention reaches the beaches. *American Journal of Public Health, 84,* 672-674.

Ryder, D. (1999). Deciding to change: Enhancing client motivation to change behaviour. *Behaviour Change, 16,* 165-174.

Salpietro, B., and Del Campo, D. (1995). Is a tan really beautiful? *Dermatology Nursing, 7,* 355-357.

Sinni-MiKeehen, B. (1995). Health effects and regulation of tanning salons. *Dermatology Nursing, 7,* 307-312.

Tarpy, R. M., & Sawabini, F. L. (1974). Reinforcement delay: A selective review of the last decade. *Psychological Review, 81,* 984-997.

Vail-Smith, K., & Felts, W. M. (1993). Sunbathing: College students' knowledge, attitudes, and perception of risks. *Journal of American College Health, 42,* 21-26.

Williams, D. (2002). Rays of Hope. *Time,* 58-67.

Running head: PERSONALISED INTERVENTION

Does an Intervention Need to be Personalised to be More Effective in Changing Intentions, Motivations, Attitudes and Fear Arousal Towards Sun Protection?

Kellie Jones

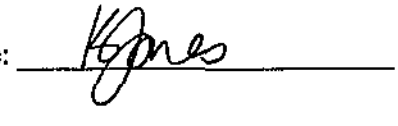
Edith Cowan University

A Report Submitted in Partial Fulfilment of the Requirements for the Award of Bachelor of Arts in Psychology (Honours), Faculty of Community Studies, Education and Social Sciences, Edith Cowan University.

October 2004

I declare that this written assignment is my own work and does not include:

(i) material from published sources used without proper acknowledgement; or
(ii) material copied from the work of other students.

Signature: 

Abstract

Education-based messages promoting sun-safe behaviours have not been as successful as would have been hoped in reducing the incidences of skin cancer in Australia. Recently, interventions using messages that focus on the primary motivator – to enhance personal appearance - have been examined and results have been more successful. The present study examines the effectiveness of personalising an appearance-based message through the use of ultraviolet photographs. This type of message would show that tanning actually *damages* one's appearance. A total of 80 participants were randomly selected and assigned to one of four groups. The Control group saw a general health message, the Education group saw an education-based message regarding sun-safe behaviours, as did the Photoaging group who also saw UV photographs of models, as did the Personalised Photoaging group who also had UV pictures taken of themselves. An important qualitative component to the study was to record comments made by participants regarding their reactions towards the intervention in which they took part. Quantitative results of the study indicated that personalising a sun-safe message is not necessarily more effective in changing intentions, motivations, attitudes and fear arousal towards sun protection than an appearance-based message or education-based message. Qualitatively, however, the Personalised Photoaging group expressed the most interest in the intervention, fear and intentions to change sun-safe behaviours. Therefore, it is concluded further examination is needed regarding personalisation of sun-safe messages.

Submitted: October 2004

Does an Intervention Need to be Personalised to be More Effective in Changing Intentions, Motivations, Attitudes and Fear Arousal Towards Sun Protection?

Despite widespread health promotion campaigns in Australia promoting sun-safe behaviours, the incidence of skin cancer continues to increase by about 5% each year (NHMRC, 1996). About 5.6 million Australians still get sunburnt every summer, despite the fact that virtually all Australians know the risks of developing skin cancer (Anti-Cancer Council of Victoria, 1999). It is common knowledge that excessive exposure to the sun's ultraviolet (UV) rays can cause skin cancer. In fact, Australians are eight times more likely to develop common skin cancer than any other form of cancer and Western Australia has the second highest rate of skin cancer in the world (Caltabiano & Sarafino, 2002; Cancer Foundation of Western Australia, 1997).

In this study, the effectiveness of different health promotion methods that aim to reduce overexposure to the sun is explored. Previous educational campaigns have been found to be less effective than more recent campaigns that focus on the primary motivator that people have for tanning, that is, to enhance one's personal appearance. Instead, more recent studies have used UV photographs of models to enhance the personal appearance message. This study further explores the use of UV photographs as part of a health promotion strategy, by taking UV photographs of participants, which show underlying skin damage due to sun exposure that is invisible to the naked eye. The rationale for this personalised method is set within the context of the health belief model, immediate versus delayed consequences of one's actions and fear arousal.

It has been argued that education is the best tool to prevent problems related to UV exposure (Sinni-MiKeehen, 1995). Various studies, however, have shown that although education-based programs may increase knowledge about the potential risks of skin cancer, they are not good at changing attitudes related to sun exposure, nor are education-

based campaigns effective at changing people's intentions to behave in a sun-safe way (Keesling & Friedman, 1997). Furthermore, increased knowledge does not necessarily translate into actual behaviour change (Lamanna, 2004). For example, one of the most popular campaigns, the 'Slip Slop Slap' campaign, was launched in 1980 in Australia (NHMRC, 1996). The Slip Slop Slap campaign was an educational health campaign that promoted sun-safe behaviours. It was a successful campaign in regards to increasing the public's knowledge about sun-safe behaviours and it created more negative attitudes towards tanning but it was less successful in actually changing behaviour. Even though it was one of the most popular campaigns and increased knowledge about skin cancer, it failed to change behaviour or attitudes towards intentional sun exposure in a significant way.

Education-based campaigns over the years have simply informed the public about the potential risks of the sun or skin cancer. These campaigns, however, have never really focused on people's motivations for tanning. Many people, especially adolescents, hold strong positive attitudes towards sunbathing (Jackson & Aiken, 2000). A tan is said to increase one's attractiveness and healthy appearance (Leary & Jones, 1993). These social norms are a powerful influence on one's behaviour (Moghaddam, 1998). Studies have shown that people, especially younger adults, believe that having a tan makes you look more physically attractive (e.g., Hillhouse & Turrisi, 2002; Jones & Leary, 1994; Keesling & Friedman, 1997; McClendon, Prentice-Dunn, Blake & McMath, 2002; Mahler, Kulik, Gibbons, Gerrard & Harrell, 2003; Miller, Ashton, McHoskey & Gimbel, 1990; NHMRC, 1996).

However, contrary to the belief that tanning is attractive, it actually causes premature aging and other negative effects to one's appearance (The Cancer Council, Victoria, 2004). The part of the body that gets sunburnt most frequently is the face and

thus exposure to the sun is the leading cause of premature aging. Exposure to UV rays causes cells to die off more rapidly, which causes the skin to age faster. The visible signs of aging caused by UV exposure have been known to emerge in people as early as 15 years of age. In Australia, people are prone to sun damage and premature aging, due to the extreme levels of UV radiation exposure throughout the year, and not just the summer months (The Cancer Council, Victoria, 2004).

Research has shown that not only is a tan important for improved personal appearance, but this belief has been found to outweigh the risks of developing skin cancer. These findings have been interpreted according to the health belief model, which posits the likelihood someone will take preventative action depends on the threat of the health problem and the pros and cons of taking action (Caltabiano & Sarafino, 2002).

Based on a health belief model, it would make sense, then, to highlight the deleterious effects of tanning on one's personal appearance in future health campaigns. For example, Jones and Leary (1994) conducted a study which examined the effectiveness of health-based versus appearance-based messages on university students' intentions to protect themselves against excessive sun-exposure. (Appearance-based messages tended to focus on people's reasons for tanning *in the first place*; that is, people's concerns for their appearance being affected by sun exposure). The participants were randomly allocated to one of three groups. The first group was given an essay to read describing health risks of excessive exposure to the sun. The second group was given an essay to read that described the deleterious effects of tanning on physical appearance. The third group was a control group which was given an essay to read describing the process of tanning. The most effective intervention was group two, which combined the message that tanning, rather than enhancing one's physical appearance, actually deleteriously affected one's looks as a result of premature aging. In addition, for the participants who read the essay on the

deleterious effects of tanning, Jones and Leary found that for participants who were concerned about their appearance, the effects were even more significant. In summary, the results showed that appearance-based messages were more effective in changing intentions to protect against sun-exposure, compared to health-based messages or a control group.

Past research, including that of Jones and Leary (1994) highlights the need to consider people's *reasons* for tanning, the primary reason being the enhancement of one's own personal appearance. This means that personal appearance should be a factor when designing interventions to promote sun protection. Recently, the direction that many studies have taken is to include personalised images that show sun damage that is not normally visible to the naked eye. This has been achieved through the use of UV photography. UV photographs have been used in previous clinical trials to show the negative effects sun exposure has on the skin (Fulton, 1997). UV photos show underlying skin damage caused by UV exposure that cannot be seen by the naked eye, such as epidermal pigmentation, which includes brown spots and a freckled appearance. The underlying skin damage caused by chronic and long-term UV radiation is called photoaging. Photoaging includes formation of brown spots on the skin, fine and deep wrinkling, blackheads, whiteheads, prominent blood vessels, yellow colouring of the skin, loss of elasticity of the skin, parched appearance, dryness and itchiness, basal cell carcinomas, squamous cell carcinomas and malignant melanomas. Indeed, photoaging damage can occur from as little as 10 minutes exposure to UV radiation (Kaminester, 1996). The UV photograph, therefore, provides a personalised view of underlying skin damage, which may be used to augment the health-based message. This personalisation of the intervention has been found to raise interest amongst participants, which in turn increases the likelihood that a greater deal of attention will be given to the intervention (Mahler, Kulik, Gibbons, Gerrard, & Harrell, 2003; Rossi, Blais, & Weinstock, 1994).

The personalisation of an appearance-based message was tested in a study conducted by Rossi et al. (1994). It was found that personalisation of the appearance-based message resulted in a high degree of interest and that people were eager to participate. The aim of the intervention was to promote individual precautionary behaviours regarding skin cancer prevention. The most interesting thing to note from Rossi et al.'s study was that the highest participation rate came from the photography intervention in which people were shown ultraviolet photographs of their own face. The researchers recorded a high degree of interest among potential participants for this personalised intervention and found the participants were more likely to absorb the information if they were interested in the content. In addition, the participants were shown the immediate consequences of their behaviour. Unlike other interventions that do not show the immediate negative consequences of sun exposure, this strategy was able to reach the participants instantaneously. Having a UV photograph taken was also a highly personal reminder that they could take home with them and show family and friends, which could create discussion regarding sun protective behaviours (Rossi et al., 1994).

These results suggest that the personalised interventions using appearance-based messages therefore can increase interest, intentions and behaviour regarding tanning, as well as increasing knowledge. Other studies reviewed support this finding, but in addition have found significant increases in motivation (Pagoto, McChargue, & Faqua, 2003). That is, people have been found to be more motivated to change sun exposure behaviours. The use of UV photographs targeted the most fundamental reason for intentional sun exposure, which was to increase personal appearance. This was done by showing the negative immediate as opposed to delayed consequences of tanning regarding one's personal appearance. The researchers also found that measuring motivation pre- and post-intervention was helpful in discovering the *process* of change regarding behaviour

compared to the direct measures of behaviour. These findings were important because the results showed a positive significant change in motivation and behaviour.

When consequences of behaviour are immediate, there is a greater likelihood of behaviour change than when consequences are delayed (Tarpy & Sawabin, 1974). In other words, if one believes they are more vulnerable and can see the damage immediately, then they are more likely to change their behaviour. It stands to reason that delaying the consequences of a particular behaviour reduces its impact. The use of UV photographs addresses this issue because the photographs immediately show any damage caused through sun exposure, thereby increasing one's perception of their vulnerability towards sun damage. If we can emphasise the negative consequences of exposure on appearance then this approach may be more effective (Mahler et al., 2003).

Threat appeals may also help explain why a personalised intervention using appearance-based messages would be effective. The emotional components of threat appeals stress the harmful consequences that will occur if a recommendation is not followed. This is done by inducing fear. Inducing fear about the negative consequences of one's actions (or lack of actions) is said to motivate a person to comply with the advocated recommended behaviours to avoid the negative consequences (Devos-Comby & Salovey, 2002). This strategy can lead to two different responses. If the threat appeal also contained an effective method of how to avoid the negative outcome, known as self-efficacy, people would be motivated to comply with the threat appeal. However, if the threat appeal did not contain any strategies to avoid the negative consequences, people may rationalise their current behaviour so that the threat becomes irrelevant.

A review of the literature concerning the effectiveness of personalised interventions in changing intentions, motivations, attitudes and fear arousal concerning sun protection indicates that personalised interventions should indeed be considered in any campaign to

promote the sun-safe message. The interventions that focused on health-based and education-based strategies have resulted in limited success. This evidence is supported in the statistics that show a continued increase in the incidences of skin cancer (NHMRC, 1996). Therefore, in the present study a personalised personal appearance message is explored to examine whether intentions, attitudes, motivation and fear arousal can be influenced. In addition, comments from participants who had their UV picture taken were recorded. It is likely that a great deal of insight about participants' thoughts regarding tanning may be revealed given the interactive nature of the UV photographic session. It has been found previous strategies failed to consider the most important influential factor concerning people and intentional sun exposure, being to enhance personal appearance. An understanding of immediate versus delayed consequences, threat appeals and the health belief model, all help support the rationale that interventions concerning sun protection that focus on a personalised strategy, specifically, through the use of UV photographs, should be most effective.

Method

Participants

The participants were 80 people recruited through a "snowball" process. That is, word-of-mouth and personal appeals from the researcher were used to recruit participants. The sample comprised of 40 males and 40 females. The participants' ages ranged from 17 to 60 years ($M = 29$, $SD = 1.48$). Each participant was randomly assigned into one of four groups, each consisting of 20 participants. The groups were Control; Education; Photoaging; and Personalised Photoaging. It was a requirement of the Personalised Photoaging group that photographs be taken of participants (see, for example, Appendix A). It must be noted at this early stage that a large number of participants refused to take part in the Personalised Photoaging group so the people who comprised this group were self-selected to a large extent. The recruitment of participants into the Personalised Photoaging group was extremely difficult for several reasons. The primary reason was because the photoaging images are extremely unflattering to the model. To a certain extent, this reflects the effectiveness of such an intervention.

Materials

A covering letter, which described the study and sought permission for participation was presented to participants. This letter confirmed that the study complied with the Ethics Committee of the Faculty of Community Services, Education and Social Sciences at Edith Cowan University. Five questionnaires, described below, were used. These questionnaires were developed by Jones (2002), Caccetta (2002) and Kubiak (2003). An important component of the present research involved recording comments made by participants as they had their pictures taken, or as they viewed the presentations. The researcher recorded comments made by participants regarding the intervention at post-test in a notebook.

Measure of Dependent Variables. In order to measure the effect that the intervention had on participants, responses regarding intentions, attitudes, motivation and fear arousal at both pre-test and post-test were rated using a 5-point Likert scale (Appendix B).

Personal Survey. The personal survey consisted of 16 questions and is based on Vail Smith and Felts' (1993) Sun and Skin Inventory (Appendix C). The first 10 questions required the participants to circle the most appropriate response. Questions were in relation to skin types, suntanning behaviours and sunscreen use. If participants reported using sunscreens, they were required to answer a further 6 questions by circling a yes or no answer. This survey was done during the pre-test session.

Current Attitudes. The current attitudes questionnaire consisted of 11 statements that participants were required to place a slash (/) anywhere along a 5-point Likert scale (Appendix D). Choices ranged from 'Strongly Disagree' to 'Strongly Agree'. The statements consisted of attitudes towards the appearance of tanned skin and the use of sunscreens. This questionnaire was filled out during the pre-test session.

Knowledge Questionnaire. The knowledge questionnaire consisted of 16 multiple choice questions based upon the information contained in the intervention (Appendix E). In addition, demographic information concerning the participants' age, gender, race, relationship status, hair and eye colour were reported. This questionnaire assessed the participants' level of knowledge retention and was filled out during the post-test session.

Powerpoint Slide Show Presentations. Four different Powerpoint slide shows were presented on a 61cm TV screen via a DVD player. Each slide show ran from approximately 6 to 8 minutes (refer to the CD-ROM in Appendix F). The Control group was presented with a slide show that contained a general health message that included the

benefits of good nutrition, exercise and hygiene. The Education group was presented with a slide show that contained a skin cancer message that focused on the harmful effects of excessive sun exposure, like the message found in the "Slip, Slop, Slap" campaign. The Photoaging group was presented with the identical slide show as the Education group. In addition, slides containing photographs depicting vivid contrasts between faces taken with normal light versus ultraviolet light were also presented. The UV photographs revealed existing damage to skin not visible to the naked eye. A four minute video clip (taken from a 20/20 ABC programme) was also viewed, which presented a vivid photoaging story. The Personalised Photoaging group was shown the identical slide show as the Photoaging group. In addition, photographs were taken of the participants using an ultraviolet camera to depict the vivid contrast of their faces using normal light versus ultraviolet light.

The study took place in a room free from distraction, with adequate lighting, a chair and table, a DVD player and TV.

Procedure

Appropriate appointment times were arranged between the researcher and participant as to when the study would take place. The participants were given a covering letter to read, which explained the nature of the study and requested permission from the participant to take part in the study. If the participant was being placed in the personalised group, a slightly different letter was given to them. This letter stated that a photograph would be taken of their face. Seven participants refused to take part in this group but agreed to take part in the study if no photograph was taken. Therefore it should be noted that some participants self selected themselves to not participate in the personalised group. Apart from this factor, participants were randomly assigned into one of the four groups, to make up a total of 10 males and 10 females within each group. Participants were asked to sit at the desk and read the covering letter, which explained what the study entailed. Upon

reading the letter and agreeing to take part in the study verbally, participants then filled out the first three questionnaires in the questionnaire booklet. These were the pre-test questionnaires, being the measurement of dependent variables at pre-test, the attitudes questionnaire and the personal survey. Instructions were written on the questionnaires as to how to fill out the forms. The researcher clarified how to fill out the forms if participants asked. Participants were asked to let the researcher know when they had completed the first three questionnaires. Once this first set of questionnaires were completed, the researcher then played the relevant powerpoint presentation on DVD. If the participant was in group four, a photograph of the participant using the UV camera was taken immediately following the powerpoint presentation. Once the intervention had been completed, participants filled in the remaining two questionnaires in the questionnaire booklet, being the post-test questionnaire and the knowledge questionnaire. The researcher then asked for the participants' comments on the intervention. These comments were recorded by the researcher in a notebook.

The appointments took place in a variety of settings, such as in the participants' workplace, home, the researcher's home and at university, whilst maintaining the environmental setting described above.

Results

Baseline Information

Participants completed a Current Attitudes Questionnaire. The participants' attitudes were recorded to provide a general overview of their current opinions and are not the primary focus of the present study. Hence, this information will only be described briefly. The questionnaire measured attitudes regarding ratings of attractiveness to tanned skin, sunbathing habits and sunscreen use.

Table 1

Percentage Scores on Current Attitudes Questionnaire

	Attitude	Strongly Disagree %	Disagree %	Neutral %	Agree %	Strongly Agree %
1	I look better with a suntan	2.6	7.6	32.5	**42.8**	15
2	I enjoy sunbathing	18.9	**30.1**	26.3	21.4	3.8
3	Suntans look healthy	0	8.8	33.9	**53.9**	3.8
4	I look thinner with a suntan	17.6	25.1	**31.4**	25.1	1.3
5	I'm not worried about getting skin cancer	28.9	**43.8**	18.9	7.6	1.3
6	Sunscreens are too inconvenient to use on a regular basis	13.9	**65.2**	16.4	12.6	2.5
7	I'm not worried about the possibility of sun exposure causing my skin to age prematurely	16.4	**47.6**	17.6	16.4	2.5
8	Sunscreens are too expensive to use on a regular basis	33.9	**46.4**	17.5	2.5	0
9	Suntanned skin is more attractive than skin that is not tanned	2.5	18.8	35.2	**37.6**	6.3
10	It's more important for me to have a tan now, than worry about wrinkles resulting form sun damage later	28.8	**42.7**	25.1	3.8	0
11	Sunscreens are only necessary with prolonged intentional sun exposure – like at the beach	**32.7**	42.6	12.6	10.1	2.5

Note. The highest score for each statement is shown in bold.

Table 1 sets out the participants' responses (by percentage) to each of the questions. These percentages indicate that the majority of participants agreed they looked better with a tan, that suntans looked healthy, that they were worried about getting skin cancer, that exposure to the sun would cause their skin to age prematurely, and that tanned skin is more attractive than skin that was not tanned. In addition, the majority of participants disagreed that sunbathing was enjoyable, that sunscreens were too expensive and inconvenient and

should only be used with prolonged intentional sun exposure. No statistically significant difference in attitudes was found between the groups.

A Personal Survey was also completed by participants at baseline, which surveyed information such as skin type, colour and complexion, number of moles, incidences of sunburn, skin cancer, salon tanning and sunscreen use. The results indicated that the majority of participants considered themselves to have an average complexion (38.5%), be just as likely as other to develop sunburn (55%), have the same number of moles to other people they know (52.6%), develop sunburn approximately once during the average summer (45%), had no incidence of familial skin cancer (59%), never intentionally sunbathed during the past summer (66.7%), considered themselves to be an outdoors type person (66.7%), had never visited a tanning salon (88.5%), generally used at least 15+ sunscreen (92.3%), used sunscreen when exposed to the sun for at least one half hour (51.3%), and those that used sunscreen did so to prevent sunburn (96%) and to prevent skin cancer (84.6%).

Analyses of Dependent Variables

Eighty participants took part in the study but only 78 participants completed all questionnaires (Control group = 20, Education group = 20, Photoaging group = 19 and Personalised Photoaging group = 19).

A one-way between-groups analysis of variance (ANOVA) was conducted to compare scores between the Control group, the Education group, the Photoaging group and the Personalised Photoaging group, on each of the four dependent variables at pre-test (Appendix G) and post-test (Appendix H) and these results will be reported first. In a later section, the repeated measures analyses for the dependent variables will be reported. Assumptions for the ANOVA were deemed satisfactory. Table 2 sets out the mean scores for pre-test and post-test.

Table 2

Mean Scores for Pre-test and Post-test

Dependent Variable	Control Group		Education Group		Photoaging Group		Personalised Photoaging Group	
	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
Intention								
M	2.58	2.38	2.61	3.22	2.83	3.33	3.01	3.75
SD	0.81	0.75	1.08	0.93	0.75	0.89	0.84	0.65
Attitude								
M	2.10	3.25	2.18	4.39	2.05	4.20	2.05	4.34
SD	0.91	1.03	1.16	0.83	1.20	0.97	0.98	0.66
Motivation								
M	3.95	2.35	3.56	3.08	3.66	3.08	3.62	3.12
SD	0.81	0.82	1.29	0.87	1.02	0.93	1.11	0.73
Fear								
M	2.85	1.32	2.93	2.30	2.65	2.28	2.86	2.07
SD	1.07	0.64	1.46	1.15	0.93	1.03	1.24	0.94

Intentions. No statistical significance was found between the four groups regarding the pre-test statement "At this time, I intend to try and change my present level of sun exposure", F (3, 74) = 1.006, $p > .05$. At post-test, answers to the question "This presentation has influenced my intention to change my present level of sun exposure", indicated a statistical significance between groups, F (3, 74) = 9.7061, $p < .05$. Post hoc comparisons using Tukey's HSD tests revealed a significant difference in the Control group (M = 2.38) compared to the Education group (M = 3.22), the Photoaging group (M = 3.33), and the Personalised Photoaging group (M = 3.76). That is the Education group, Photoaging group and Personalised Photoaging group had significantly higher scores for intention than the Control group. No significant difference was recorded between the Education group, the Photoaging group and the Personalised Photoaging group. An upward trend in scores, however, was recorded for these groups respectively. That is, the Control group (M = 2.38) scored significantly lower than the Education group (M = 3.22),

which scored lower than the Photoaging group (M = 3.33), which scored lower than the Personalised Photoaging group (M = 3.75).

Attitudes. No statistical significance was found between the four groups regarding the pre-test statement "I think it is okay to spend lots of time exposed to the sun", F (3, 74) = .062, $p > .05$. At post-test, answers to the question, "After viewing the presentation, do you feel that reducing overexposure to the sun is a wise thing to do", indicated a statistically significant difference between groups, F (3, 74) = 7.23, $p < .05$. Post hoc comparisons using Tukey's HSD tests revealed a significant difference in the Control group (M = 3.25) compared to the Education group (M = 4.39), the Photoaging group (M = 4.20) and the Personalised Photoaging group (M = 4.34). No statistically significant difference was recorded between the Education group, the Photoaging group and the Personalised Photoaging group.

Motivation. Regarding the dependent variable of motivation, no statistical significance was found between the four groups regarding the pre-test statement "I often think about protecting myself from exposure to the sun, F (3, 74) = .516, $p > .05$. The post-test answers to the question, "The presentation has given me the motivation I need to reduce my time out in the sun", indicated a statistically significant difference between groups, F (3, 74) = 3.87, $p < .05$. Post hoc comparisons using Tukey's HSD tests revealed a significant difference in the Control group (M = 2.35) compared to the Education group (M = 3.08), the Photoaging group (M = 3.09) and the Personalised Photoaging group (M = 3.12). No statistical significant difference was recorded between the Education group, the Photoaging group and Personalised Photoaging group.

Fear Arousal. Again, no statistical significance was found between the four groups regarding the pre-test statement "I am fearful about overexposure to the sun", F (3, 74) = .184, $p > .05$. The post-test answers to the question, "During the presentation, how

uneasy did you feel", indicated a statistically significant difference between groups, F (3, 74) = 4.49, $p < .05$. Post hoc comparisons using Tukey's HSD tests revealed a significant difference in the Control group ($M = 1.32$) compared to the Education group ($M = 2.30$), the Photoaging group ($M = 2.28$) and the Personalised Photoaging group ($M = 2.08$). No statistically significant difference was recorded between Education group, the Photoaging group and Personalised Photoaging group.

Repeated Measures Analysis: Pre-test vs Post-test

A one-way repeated measures analysis of variation (ANOVA) was also conducted to compare scores between the pre-test and post-test dependent variables for each of the four groups (Appendix I). Assumptions for the ANOVA were deemed satisfactory.

Control Group. No statistically significant difference was found regarding intentions, F (1, 19) = .61, $p > .05$. The Control group's pre-test intentions ($M = 2.58$) were not significantly different to their post-test intentions ($M = 2.38$). A statistically significant difference was found regarding attitudes, F (1, 19) = 8.53, $p < .05$, indicating that there was an increase in the attitude that it would be wise to reduce overexposure to the sun from pre-test scores ($M = 2.10$) to post-test scores ($M = 3.25$). A statistical difference was also found in motivation, F (1, 19) = 35.30, $p < .05$. That is, there was a decrease in motivation to reduce time out in the sun from pre-test scores ($M = 3.95$) to post-test scores ($M = 2.35$). Fear arousal scores were also significantly different, F (1, 19) = 35.78, $p < .05$. There was a decrease in fear arousal from pre-test scores ($M = 2.85$) to post-test scores ($M = 1.32$).

Education Group. The Education group's intentions were significantly different, F (1, 19) = 8.48, $p < .05$. That is, the Education group's pre-test intention scores ($M = 2.61$) increased at post-test ($M = 3.22$). Attitude scores were also statistically significantly different, F (1, 19) = 31.09, $p < .05$, indicating that there was an increase in attitude scores

that it would be wise to reduce overexposure to the sun from pre-test scores (M = 2.18) to post-test scores (M = 4.39). However, no statistical difference was found regarding motivation scores, F (1, 19) = 1.91, $p > .05$. There was no difference in scores regarding motivation to reduce time out in the sun from pre-test scores (M = 3.56) to post-test scores (M = 3.08). The Education group's fear arousal scores were statistically significantly different, F (1, 19) = 5.30, $p < .05$. There was a decrease in fear arousal from pre-test scores (M = 2.93) to post-test scores (M = 2.30).

Photoaging Group. A statistically significant difference was found in the Photoaging group's intentions, F (1, 18) = 4.43, $p < .05$. That is, the Photoaging group's pre-test intention scores (M = 2.83) increased at post-test (M = 3.33). This was also the case for the attitudes scores, F (1, 18) = 25.12, $p < .05$, meaning there was an increase in attitude scores that it would be wise to reduce overexposure to the sun from pre-test scores (M = 2.05) to post-test scores (M = 4.20). Motivation was also found to significantly change, F (1, 18) = 4.54, $p > .05$, indicating that there was a decrease in scores regarding motivation to reduce time out in the sun from pre-test scores (M = 3.66) to post-test scores (M = 3.09). Fear arousal, however, showed no significant difference, F (1, 18) = 2.34, $p >$ .05. No statistical difference in fear arousal from pre-test scores (M = 2.65) to post-test scores (M = 2.28) was recorded.

Personalised Photoaging Group. The Personalised Photoaging group's intentions to change level of sun exposure changed significantly changed after intervention, F (1, 18) = 18.93, $p < .05$. That is, the Personalised Photoaging group's pre-test intention scores (M = 3.01) increased at post-test (M = 3.75). Intervention scores also significantly changed, F (1, 18) = 45.20, $p < .05$, indicating that there was an increase in attitude scores that it would be wise to reduce overexposure to the sun from pre-test scores (M = 2.05) to post-test scores (M = 4.34). No statistically significant difference was found

in motivation scores, $F(1, 18) = 3.38, p > .05$. There was no statistical difference in scores regarding motivation to reduce time out in the sun from pre-test scores ($M = 3.62$) to post-test scores ($M = 3.12$). Fear arousal scores did change significantly, $F(1, 18) = 5.11, p < .05$, as scores indicated that there was a reduction in fear arousal scores from pre-test ($M = 2.86$) to post-test ($M = 2.07$).

Knowledge Questionnaire

A one-way analysis of variance (ANOVA) was conducted to compare knowledge questionnaire scores between groups regarding number of correct questions (Appendix J). Assumptions for the ANOVA were deemed satisfactory. The maximum correct score was 16. Table 3 sets out the mean scores for Knowledge.

Table 3

Mean Scores for Knowledge Questionnaire

Dependent Variable	Control Group	Education Group	Photoaging Group	Personalised Photoaging Group
Knowledge				
M	7.05	12.65	10.68	11.89
SD	1.46	1.98	3.33	2.33

A significant difference was found between groups, $F(3, 74) = 21.95, p < .05$. Post hoc comparisons using Tukey's HSD tests revealed a significant difference between knowledge scores in the Control group ($M = 7.05$) compared to the Education group ($M = 12.65$), the Photoaging group ($M = 10.68$), and the Personalised Photoaging group ($M = 11.89$). No significant difference was found between the Education, the Photoaging and the Personalised Photoaging groups.

Discussion

This exploratory study assessed whether a personalised intervention (Personalised Photoaging) would be more effective in changing intentions, attitudes, motivation and fear arousal towards sun protection compared to a control intervention, an education-based intervention, and an appearance-based intervention (Photoaging). The results showed that after the intervention had taken place, the Education group, the Photoaging group and the Personalised Photoaging group were more effective in changing intentions, attitudes, motivation and fear arousal than the Control group. No statistically significant differences were found between the Education group, the Photoaging group and the Personalised Photoaging group regarding post-test scores on the dependent variables. However, although there were no statistically significant differences recorded, trends in the predicted directions were found.

In the sections to follow, these trends will be discussed, using the health belief model to help put into context these findings. This will be followed by a discussion regarding the Current Attitudes Questionnaire findings. Then, an understanding of the comments from participants is explored in the context of the Personalised Photoaging intervention and finally, results are discussed in relation to sampling issues.

Trends

The Photoaging group's intentions, motivation and fear arousal scores were greater than the Education group. Consistent with the hypothesis that a personalised message would be most effective, the Personalised Photoaging group's intentions, motivation and fear arousal scores were greater than the Photoaging group.

In relation to attitude scores, no statistically significant differences between the Education group, the Photoaging group and the Personalised Photoaging group were recorded, although trends were found in the predicted direction. The Personalised

Photoaging group scored higher in attitude scores than the Photoaging group. That is, after intervention, the Personalised Photoaging group believed more strongly that it was a wise thing to reduce overexposure to the sun. In addition, the Education group demonstrated higher scores than the Personalised Photoaging group. This is a somewhat mixed result but scores show very little difference between the Education group (M = 4.39) and the Personalised Photoaging group (M = 4.34). Therefore, in relation to attitude, little support was found to support the hypothesis that a personalised intervention would be more effective in changing attitudes towards sun protection than the other types of intervention.

Within each group, it was found that intentions and attitudes statistically significantly increased in each of the Education, Photoaging and Personalised Photoaging groups. In relation to attitudes, the Control group also showed a significant increase. Scores showed that the greatest change in scores came from the Personalised Photoaging group, followed by the Education group, then the Photoaging group. Again, this finding supports the hypothesis that a personalised intervention could be the most effective strategy in changing intentions and attitudes.

Regarding motivation, scores were found to increase between the groups in post-test. However, within each group, motivation scores all decreased. This decrease was found to be significant only for the Control and Photoaging groups. Therefore, it was found that the interventions undertaken in the Control and Photoaging groups were significantly effective in *reducing* motivation levels. Although no significant reduction was recorded in the Education and Personalised Photoaging groups regarding motivation, a downward trend was also noted. Therefore, in all four groups, motivation levels decreased. The pre-test scores on this dependent variable were fairly high (M = 3.70). That is, it would seem participants were already motivated to protect themselves from exposure to the sun. The post-test question regarding motivation asks whether the

presentation has given them the motivation to reduce time out in the sun. Perhaps the reason why the participants did not agree the presentation had given them the motivation to reduce time out in the sun was because they were already motivated to do so.

These findings can be interpreted according to the health belief model. After the intervention, fear arousal scores all significantly *reduced* post-test, except for the Photoaging group, which group showed no significant difference. According to this model, the likelihood someone will take preventative action depends on the threat of the health problem. Therefore, this model supports the finding that motivation did not significantly increase because fear levels were not aroused enough to effect change. This is an interesting finding because as noted previously, many participants chose not to partake in the Personalised Photoaging group because they did not want to see a UV photograph of themselves. This, in itself, can be interpreted as those participants showing fear. Therefore, some caution needs to be taken when interpreting the fear arousal findings due to self-selection, and due to contradictory evidence discussed in comments from participants set out below.

In relation to the Current Attitudes Questionnaire, although no significant differences were recorded regarding participants' attitude scores, the Personalised Photoaging group scored highest concerning the following statements, "I look better with a tan" ($M = 3.8$), "Suntans look healthy" ($M = 3.7$), "I look thinner with a tan" ($M = 2.9$) and "It's more important for me to have a tan now, than worry about wrinkles resulting from sun damage later" ($M = 2.3$). These attitudes may have affected post-test scores for the Personalised Photoaging group. That is, this group may have been slightly more resistant to intervention because of their beliefs regarding the importance of a tan.

Comments from Participants

Another important component of this exploratory study was to gain a qualitative insight into what participants thought about this new personalised approach. All participants made comments to the researcher about the intervention. These comments were in vast contrast to the statistical results recorded on the Likert measure. Between groups, an overwhelming difference in verbal responses regarding the interest generated after intervention was recorded. For example, some participants in the Control group apologised to the researcher, saying things to the effect that they were sorry but they found the intervention boring. Several participants in the Education group commented on the various factual information espoused in the intervention and stated how interesting it was. Participants in the Photoaging group expressed their fascination with the photographs displayed in this intervention and said things to the effect that it would be interesting to see their own face under ultraviolet light. Every single participant in the Personalised Photoaging group stated they were very interested in looking at their own face in a UV photograph. After seeing their own face, many participants exclaimed their horror regarding the contrast seen between the UV photograph compared to the normal light photograph. However, there were some participants who were relieved after seeing their ultraviolet photograph, that is, those photographs that showed little difference between the two pictures.

In the Personalised Photoaging group, once the intervention had been completed, participants would talk about past incidences of sunburn, what exposure they had had to the sun and what sun-safe practices their parents used to practice. This intervention generated the most amount of interest regarding sun-safe behaviours. Many participants have, since taking part in the intervention, approached the researcher to say that they have been thinking about the intervention, talked about the intervention with their family and

friends and changed sun protection behaviours, for example, whilst gardening on the weekend, one participant went inside and placed sunscreen on her face because when she felt the sun, it reminded her about the intervention.

Sampling Issues

The sample used in this study was predominately recruited due to their availability to the researcher, which sample included family, friends and work colleagues. Due to very similar studies being conducted in recent years at this university (Cacetta, 2002; Jones, 2002; Kubiak, 2003), the majority of potential participants listed on the Volunteer Registry were unable to participate in the study because they had already previously taken part in similar studies using almost identical questionnaires. Therefore, the current sample was well known to the researcher and this may have affected test results. For example, it was found that all participants' levels of fear were actually reduced. Due to the relationship the researcher had with the majority of participants, fear arousal may not have been as provoked compared to participants dealing with an unknown researcher.

In relation to the Personalised Photoaging group, many participants chose not to take part in this intervention. They did not want to have their photograph taken for fear of what they would look like. These people were then placed in a different group. Therefore, self-selection by the participants regarding which group they would be placed in occurred. Again, this may have affected results. For example, fear arousal levels may have been increased prior to the intervention taking place. In turn, motivation, attitudes and intentions may be been effected.

In conclusion, it was found that in order for a sun-safe message to be most effective, it might not in fact need to be personalised to the extent that a personalised UV photograph be taken and shown to a participant. Seeing a UV picture, even of someone else, means that an appearance-based message augments the health/education message.

The Personalised Photoaging group was statistically as effective as the Education group and Photoaging group, with some upward trends recorded. Qualitatively, on the other hand, differences in verbal responses to the interventions were striking. Although this qualitative aspect of the exploratory study cannot be analysed, it is clear that future research be conducted into personalising health messages to further assess the qualitative aspects of the photoaging strategy.

References

Caccetta, J. (2002). *The effectiveness of an appearance-based intervention on sun protection.* Unpublished manuscript, Edith Cowan University, Western Australia.

Caltabiano, M. L., & Sarafino, E. P. (2002). *Health psychology: Biopsychosocial interactions. An Australian perspective.* Milton: John Wiley & Sons Australia, Ltd.

Cancer Foundation of Western Australia. (1997).

Devos-Comby, L., and Salovey, P. (2002). Applying persuasion strategies to alter HIV-relevant thoughts and behavior. *Review of General Psychology, 6,* 287-304.

Fulton, J. (1997). Utilizing the ultraviolet (UV Detect) camera to enhance the appearance of photodamage and other skin conditions. *American Society for Dermatologic Surgery Inc,. 23,* 163-169.

Hillhouse, J. J., & Turrisi, R. (2002). Examination of the efficacy of an appearance-focused intervention to reduce UV exposure. *Journal of Behavioural Medicine, 25(4),* 395-409.

Jackson, K., and Aiken, L. (2000). A psychosocial model of sun protection and sunbathing in young women: The impact of health beliefs, attitudes, norms and self-efficacy for sun protection. *Health Psychology, 19,* 469-478.

Jones, A. R. (2002). *The effects of photoaging in promoting sun-safe behavioural change.* Unpublished manuscript, Edith Cowan University, Western Australia.

Jones, J. L., & Leary, M. R. (1994). Effects of appearance-based admonitions against sun exposure on tanning intentions in young adults. *Health Psychology, 13,* 86-90.

Kaminester, L. (1996). Current concepts: Photoprotection. *Archives of Family Medicine, 5,* 289-295.

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

Kubiak, J. (2003). *Effects of a combined appearance and health-based intervention on attitudes towards sun exposure.* Unpublished manuscript, Edith Cowan University, Western Australia.

Lamanna, L. (2004). College students' knowledge and attitudes about cancer and perceived risks of developing skin cancer. *Dermatology Nursing, 16,* 161-164, 175-176.

Leary, M. R., & Jones, J. L. (1993). The social psychology of tanning and sunscreen use: Self-presentational motives as a predictor of health risk. *Journal of Applied Social Psychology, 23,* 1390-1406.

McClendon, B. T., Prentice-Dunn, S., Blake, R., & McMath, B. (2002). The role of appearance concern in responses to intervention to reduce skin cancer risk. *Health Education, 102,* 76-83.

Mahler, H. I. M., Kulik, J. A., Gibbons, F. X., Gerrard, M., & Harrell, J. (2003). Effects of appearance-based interventions on sun protection intentions and self-reported behaviours. *Health Psychology, 22,* 199-209.

Miller, A. G., Ashton, W. A., McHoskey, J. W., & Gimbel, J. (1990). What price attractiveness? Stereotype and risk factors in suntanning behaviour. *Journal of Applied Social Psychology, 20,* 1272-1300.

Moghaddam, F. (1998). *Social psychology: Exploring universals across cultures.* New York: W.H. Freeman and Company.

National Health and Medical Research Council (NHMRC). (1996). *Primary prevention of skin cancer in Australia: Report of the sun protection programs working party.* Canberra: Australian Government Publishing Service.

Pagoto, S., McChargue, D., and Faqua, W. (2003). Effects of a multicomponent intervention on motivation and sun protection behaviours among Midwestern beachgoers. *Health Psychology, 22,* 429-433.

Rossi, J., Blais, L., and Weinstock, M. (1994). The Rhode Island sun smart project: Skin cancer prevention reaches the beaches. *American Journal of Public Health, 84,* 672-674.

Sinni-MiKeehen, B. (1995). Health effects and regulation of tanning salons. *Dermatology Nursing, 7,* 307-312.

Tarpy, R. M., & Sawabini, F. L. (1974). Reinforcement delay: A selective review of the last decade. *Psychological Review, 81,* 984-997.

The Cancer Council, Victoria. (2004). *Students: General cancer* [on-line]. Available: www.accv.org.au.

Vail-Smith, K., & Felts, W. M. (1993). Sunbathing: College students' knowledge, attitudes, and perception of risks. *Journal of American College Health, 42,* 21-26.

Appendix A

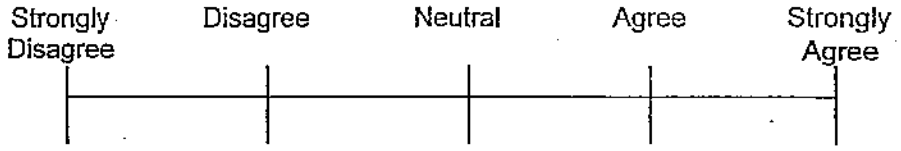
Normal light

Photoage light

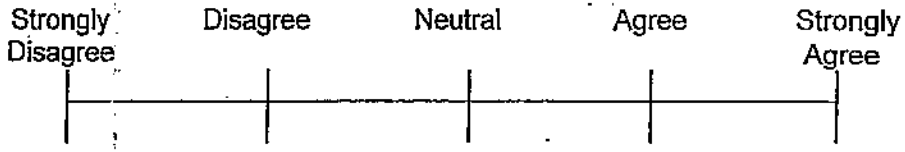
QUESTIONNAIRE

Please put a slash (/) anywhere along the line for your response to the statements

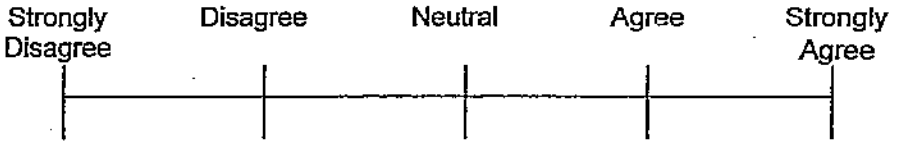
1. At this time, I intend to try and change my present level of sun exposure.



2. I think it is okay to spend lots of time exposed to the sun.



3. I often think about protecting myself from exposure to the sun.

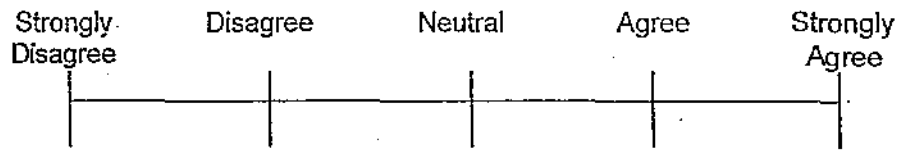


4. I am fearful about overexposure to the sun.

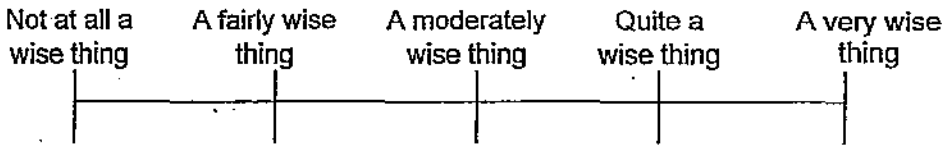
QUESTIONNAIRE

Please put a slash (/) anywhere along the line for your response to the statements

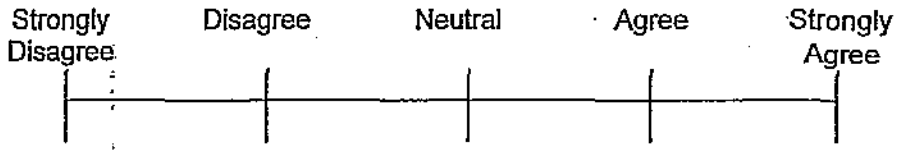
1. This presentation has influenced my intention to change my present level of sun exposure.



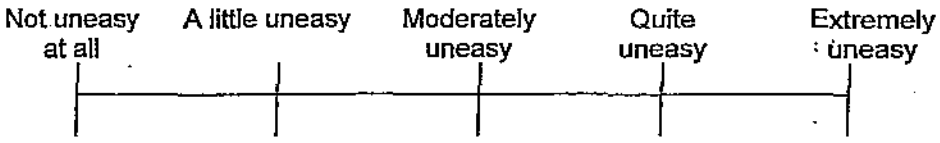
2. After viewing the presentation, do you feel that reducing overexposure to the sun is a wise thing to do?.



3. The presentation has given me the motivation I need to reduce my time out in the sun.



4. During the presentation, how uneasy did you feel?



PERSONAL SURVEY – Please circle your response

1. Compared to other individuals of my race I consider my complexion to be:
a) much darker than average;
b) a little darker than average;
c) average;
d) a little lighter than average;
e) very light, I am fair-skinned.

2. Compared to most people I know, I:
a) am less likely to develop sunburn;
b) am just as likely to develop sunburn;
c) am much more likely to develop sunburn.

3. Compared to most people I know, I have:
a) fewer moles than most;
b) about the same number of moles as most;
c) more moles than most.

4. Approximately how many times during the average summer do you develop a sunburn?
a) never;
b) once;
c) twice;
d) three or more.

5. Has anyone in your family ever been diagnosed with skin cancer?
a) no;
b) yes.

6. During this past summer how often did you intentionally sunbathe?
a) never;
b) once a month;
c) once a week;
d) two times a week;
e) three or more times a week.

7. During your leisure time, do you consider yourself to be:
a) an outdoors type person;
b) an indoors type person.

8. Have you ever visited a tanning salon?
a) no;
b) yes.
(If yes, how often do you visit a tanning salon?
a) only during the cold seasons;
b) only during the hot seasons;
c) all year round.)

9. Do you generally use:
a) sunscreen with at least an SPF of 15;
b) sunscreen with less than an SPF of 15.

10. Which of the following is true regarding your use of sunscreens?
a) I use sunscreen whenever I know I will be exposed to the sun for at least one-half hour;
b) I usually use sunscreen when I go to the beach or sunbathe but rarely at any other time;
c) I use sunscreens when I'm sunbathing or at the beach early in the summer but, as I tan, I either stop using them or choose a lotion with a lower SPF number;
d) I rarely, if ever, use sunscreens.

If you use sunscreens, please answer the following questions. Otherwise ignore questions 11-16.

When I use sunscreens I do so for the following reasons:

11. To prevent sunburn.
Yes / No

12. To protect myself from skin cancer.
Yes / No

13. To prevent wrinkles.
Yes / No

14. Because a healthcare provider advised me to.
Yes / No

15. To moisturise my skin.
Yes / No

16. So that I can get a good tan.
Yes / No

QUESTIONNAIRE - Please put a slash (/) anywhere along the line for your response to the statements

SUN EXPOSURE

*We are interested in what **YOU** think about sun exposure.*

This questionnaire is designed to assess your knowledge, attitudes and behaviours related to intentional exposure to the sun.

Your participation in the study is strictly voluntary and your answers will be confidential.

*Please make sure you answer **every item.***

*FOR THE PURPOSES OF THIS QUESTIONNAIRE **SUNBATHING IS DEFINED AS ANY INTENTIONAL EXPOSURE OF THE SKIN TO THE SUN FOR THE PURPOSE OF TANNING.***

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	I look better with a suntan.					
2.	I enjoy sunbathing.					
3.	Suntans look healthy.					
4.	I look thinner with a suntan.					
5.	I'm not worried about getting skin cancer.					
6.	Sunscreens are too inconvenient to use on a regular basis.					
7.	I'm not worried about the possibility of sun exposure causing my skin to age prematurely.					
8.	Sunscreens are too expensive to use on a regular basis.					
9.	Suntanned skin is more attractive than skin that is not tanned.					
10.	It's more important for me to have a tan now, than worry about wrinkles resulting from sun damage later.					
11.	Sunscreens are only necessary with prolonged intentional sun exposure – like at the beach.					
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

QUESTIONNAIRE – Please circle your answer to the following questions

1. The period of time in the sun that poses a potential risk is:
a) 3 minutes;
b) 5 minutes;
c) 10 minutes;
d) 15 minutes.

2. The sun is strongest between the hours of:
a) 10am-12pm;
b) 11am-12pm;
c) 10am-3pm;
d) 12pm has the greatest risk.

3. In winter, the sun:
a) cannot cause harm;
b) can cause some degree of damage;
c) is not as harmful as in summer;
d) through prolonged exposure, can be equally as dangerous as in summer.

4. UVR is __ times higher in summer compared to winter?
a) 2;
b) 3;
c) 5;
d) 8.

5. Approximately 60% of skin damage happens in the first:
a) 12 years of life;
b) 15 years of life;
c) 20 years of life;
d) 25 years of life.

6. If detected early, skin cancer:
a) has a 99% cure rate;
b) has a 50/50 chance of being cured;
c) has a 79% cure rate;
d) still cannot be fully cured.

7. The number of new cases of skin cancer reported yearly are approximately:
a) 80,000;
b) 160,000;
c) 270,000;
d) 320,000.

8. Under UV light:
a) the true nature of your skin is revealed;
b) the skin looks worse than what it actually is;
c) skin damage can occur;
d) nothing changes.

9. Skin cancer results in:
a) uncontrollable growths all over the skin;
b) moles and blemishes;
c) a deadly disease;
d) the spread of abnormal cells.

10. Permanent changes to the skin may not become apparent until:
a) 10-20 years of age;
b) 15-20 years of age;
c) 20-30 years of age;
d) 40-50 years of age.

11. In Australia, the risk of skin cancer in a lifetime is:
a) 1 out of 3;
b) 2 out of 3;
c) 3 out of 5;
d) every second person.

12. UVR:
a) only affects the surface of the skin;
b) can penetrate deep into skin layers;
c) can penetrate deep into the skin only when there has been excessive overexposure;
d) does cause damage to the skin but it is never permanent.

13. Approximately__people die yearly as a result of skin cancer
a) 900;
b) 1000;
c) 1200;
d) 1300.

14. Which skin cancer is the most common?
a) squamous cell carcinoma;
b) melanoma;
c) non-malignant condition;
d) basal cell carcinoma.

15. The skin cancer that is the most dangerous is:
a) melanoma;
b) basal cell carcinoma;
c) squamous cell carcinoma;
d) all skin cancers.

16. Which statement is correct?
a) there is no harm in an occasional sunburn;
b) the invisible effects of sunburn remain and can impact on appearance;
c) only excessive sunburn causes damage;
d) sunbum can be dangerous for people with fair skin.

Participant

Age: _____

(Please circle your answers)

Gender: Male / Female

Race:
a) Caucasian
b) Asian
c) Hispanic
d) African
*e) Other*_____

Relationship status:
a) Single
b) Not Single

*Hair colour:*_____

*Eye colour:*_____
(please print legibly)

Appendix F

CD Data Record

This appendix contains the CD for all reported data.

1. PowerPoint presentations for Control, Education, Photoaging and Personalised Photoaging slide shows.
2. SPSS raw data file.
3. ANOVA Pre-test.
4. ANOVA Post-test.
5. Repeated Measures ANOVA Pre-test vs Post-test.
6. ANOVA Knowledge.
7. Video clip of a 20/20 ABC Programme shown to the Photoaging and Personalised Photoaging groups.

Appendix G

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
PRE1	Control	20	2.5850	.60834	.18097	2.2062	2.9638	1.00	4.50
	Edu	20	2.6100	1.08623	.24289	2.1016	3.1184	1.00	4.00
	Edu+PA	19	2.8368	.75367	.17290	2.4736	3.2001	2.00	4.00
	Edu+PA+Photo	19	3.0105	.84780	.19450	2.6019	3.4192	2.00	4.50
	Total	78	2.7564	.88561	.10028	2.5567	2.9561	1.00	4.50
PRE2	Control	20	2.1050	.91506	.20461	1.6787	2.5313	1.00	4.00
	Edu	20	2.1800	1.16601	.26073	1.6343	2.7257	1.00	5.00
	Edu+PA	19	2.0526	1.20479	.27640	1.4719	2.6333	1.00	5.00
	Edu+PA+Photo	19	2.0526	.98453	.22587	1.5781	2.5272	1.00	4.00
	Total	78	2.0987	1.05393	.11933	1.8611	2.3363	1.00	5.00
PRE3	Control	20	3.9550	.81012	.18115	3.5759	4.3341	2.50	5.00
	Edu	20	3.5650	1.29910	.29049	2.9570	4.1730	1.00	5.00
	Edu+PA	19	3.6632	1.02698	.23560	3.1682	4.1581	2.00	5.00
	Edu+PA+Photo	19	3.6263	1.11198	.25510	3.0904	4.1623	1.50	5.00
	Total	78	3.7038	1.06842	.12075	3.4634	3.9443	1.00	5.00
PRE4	Control	20	2.8500	1.07042	.23935	2.3490	3.3510	1.00	4.00
	Edu	20	2.9300	1.46901	.32848	2.2425	3.6175	1.00	5.00
	Edu+PA	19	2.6579	.93054	.21348	2.2094	3.1064	1.00	4.00
	Edu+PA+Photo	19	2.8632	1.24509	.28564	2.2630	3.4633	1.00	5.00
	Total	78	2.8269	1.17911	.13351	2.5611	3.0928	1.00	5.00

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
PRE1	2.682	3	74	.053
PRE2	.309	3	74	.819
PRE3	1.351	3	74	.265
PRE4	3.011	3	74	.035

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
PRE1	Between Groups	2.368	3	.789	1.006	.395
	Within Groups	58.026	74	.784		
	Total	60.392	77			
PRE2	Between Groups	.214	3	.071	.062	.980
	Within Groups	85.316	74	1.153		
	Total	85.530	77			
PRE3	Between Groups	1.793	3	.598	.516	.673
	Within Groups	85.776	74	1.159		
	Total	87.569	77			
PRE4	Between Groups	.791	3	.264	.184	.907
	Within Groups	106.263	74	1.436		
	Total	107.053	77			

Post Hoc Tests

Multiple Comparisons

Tukey HSD

Dependent Variable	(I) GROUP	(J) GROUP	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
PRE1	Control	Edu	-.0250	.28002	1.000	-.7610	.7110
		Edu+PA	-.2518	.28368	.811	-.9975	.4938
		Edu+PA+Photo	-.4255	.28368	.443	-1.1712	.3201
	Edu	Control	.0250	.28002	1.000	-.7110	.7610
		Edu+PA	-.2268	.28368	.854	-.9725	.5188
		Edu+PA+Photo	-.4005	.28368	.496	-1.1462	.3451
	Edu+PA	Control	.2518	.28368	.811	-.4938	.9975
		Edu	.2268	.28368	.854	-.5188	.9725
		Edu+PA+Photo	-.1737	.28730	.930	-.9288	.5814
	Edu+PA+Photo	Control	.4255	.28368	.443	-.3201	1.1712
		Edu	.4005	.28368	.496	-.3451	1.1462
		Edu+PA	.1737	.28730	.930	-.5814	.9288
PRE2	Control	Edu	-.0750	.33955	.996	-.9675	.8175
		Edu+PA	.0524	.34399	.999	-.8518	.9585
		Edu+PA+Photo	.0524	.34399	.999	-.8518	.9565
	Edu	Control	.0750	.33955	.996	-.8175	.9675
		Edu+PA	.1274	.34399	.983	-.7768	1.0315
		Edu+PA+Photo	.1274	.34399	.983	-.7768	1.0315
	Edu+PA	Control	-.0524	.34399	.999	-.9585	.8518
		Edu	-.1274	.34399	.983	-1.0315	.7768
		Edu+PA+Photo	.0000	.34637	1.000	-.9158	.9156
	Edu+PA+Photo	Control	-.0524	.34399	.999	-.9565	.8518
		Edu	-.1274	.34399	.983	-1.0315	.7768
		Edu+PA	.0000	.34637	1.000	-.9156	.9158
PRE3	Control	Edu	.3900	.34046	.663	-.5049	1.2849
		Edu+PA	.2918	.34491	.832	-.6147	1.1984
		Edu+PA+Photo	.3287	.34491	.776	-.5779	1.2352
	Edu	Control	-.3900	.34046	.663	-1.2849	.5049
		Edu+PA	-.0982	.34491	.992	-1.0047	.8084
		Edu+PA+Photo	-.0613	.34491	.998	-.9679	.8452
	Edu+PA	Control	-.2918	.34491	.832	-1.1984	.6147
		Edu	.0982	.34491	.992	-.8084	1.0047
		Edu+PA+Photo	.0368	.34931	1.000	-.8813	.9550
	Edu+PA+Photo	Control	-.3287	.34491	.776	-1.2352	.5779
		Edu	.0613	.34491	.998	-.8452	.9679
		Edu+PA	-.0368	.34931	1.000	-.9550	.8813
PRE4	Control	Edu	-.0800	.37894	.997	-1.0760	.9160
		Edu+PA	.1921	.38390	.959	-.8169	1.2011
		Edu+PA+Photo	-.0132	.38390	1.000	-1.0222	.9959
	Edu	Control	.0800	.37894	.997	-.9160	1.0760
		Edu+PA	.2721	.38390	.893	-.7369	1.2811
		Edu+PA+Photo	.0668	.38390	.998	-.9422	1.0759
	Edu+PA	Control	-.1921	.38390	.959	-1.2011	.8169
		Edu	-.2721	.38390	.893	-1.2811	.7369
		Edu+PA+Photo	-.2053	.38879	.952	-1.2271	.8166
	Edu+PA+Photo	Control	.0132	.38390	1.000	-.9959	1.0222
		Edu	-.0668	.38390	.998	-1.0759	.9422
		Edu+PA	.2053	.38879	.952	-.8166	1.2271

Homogeneous Subsets

PRE1

Tukey HSD[a,b]

GROUP	N	Subset for alpha = .05
		1
Control	20	2.5850
Edu	20	2.6100
Edu+PA	19	2.8368
Edu+PA+Photo	19	3.0105
Sig.		.443

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 19.487.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

PRE2

Tukey HSD[a,b]

GROUP	N	Subset for alpha = .05
		1
Edu+PA	19	2.0526
Edu+PA+Photo	19	2.0526
Control	20	2.1050
Edu	20	2.1800
Sig.		.983

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 19.487.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

PRE3

Tukey HSD[a,b]

GROUP	N	Subset for alpha = .05
		1
Edu	20	3.5650
Edu+PA+Photo	19	3.6263
Edu+PA	19	3.6632
Control	20	3.9550
Sig.		.572

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 19.487.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

PRE4

Tukey HSD[a,b]

GROUP	N	Subset for alpha = .05
		1
Edu+PA	19	2.6579
Control	20	2.8500
Edu+PA+Photo	19	2.8632
Edu	20	2.9300
Sig.		.893

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 19.487.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Appendix H

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
POST1	Control	20	2.3800	.75436	.16868	2.0270	2.7330	1.00	4.00
	Edu	20	3.2250	.93913	.21000	2.7855	3.6645	1.00	5.00
	Edu+PA	19	3.3316	.89758	.20591	2.8990	3.7642	2.00	5.00
	Edu+PA+Photo	19	3.7579	.65601	.15050	3.4417	4.0741	2.00	5.00
	Total	78	3.1641	.94950	.10751	2.9500	3.3782	1.00	5.00
POST2	Control	20	3.2550	1.02878	.23004	2.7735	3.7365	1.00	5.00
	Edu	20	4.3950	.83318	.18630	4.0051	4.7849	2.00	5.00
	Edu+PA	19	4.2053	.97210	.22301	3.7367	4.6738	2.00	5.00
	Edu+PA+Photo	19	4.3421	.65778	.15320	4.0203	4.6640	3.00	5.00
	Total	78	4.0436	.98976	.11207	3.8204	4.2667	1.00	5.00
POST3	Control	20	2.3500	.82622	.18475	1.9633	2.7367	1.00	4.00
	Edu	20	3.0800	.87756	.19623	2.6693	3.4907	1.00	5.00
	Edu+PA	19	3.0895	.92909	.21315	2.6417	3.5373	2.00	5.00
	Edu+PA+Photo	19	3.1211	.73679	.16903	2.7659	3.4762	2.00	5.00
	Total	78	2.9051	.89165	.10096	2.7041	3.1062	1.00	5.00
POST4	Control	20	1.3250	.64980	.14525	1.0210	1.6290	1.00	3.00
	Edu	20	2.3000	1.15758	.25884	1.7582	2.8418	1.00	5.00
	Edu+PA	19	2.2642	1.03723	.23796	1.7843	2.7841	1.00	4.00
	Edu+PA+Photo	19	2.0789	.94868	.21718	1.6227	2.5352	1.00	4.00
	Total	78	1.9923	1.02803	.11851	1.7603	2.2243	1.00	5.00

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
POST1	1.137	3	74	.340
POST2	.849	3	74	.472
POST3	.912	3	74	.440
POST4	3.224	3	74	.027

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
POST1	Between Groups	19.603	3	6.534	9.706	.000
	Within Groups	49.817	74	.673		
	Total	69.419	77			
POST2	Between Groups	17.097	3	5.699	7.229	.000
	Within Groups	58.335	74	.788		
	Total	75.432	77			
POST3	Between Groups	8.306	3	2.769	3.872	.012
	Within Groups	52.911	74	.715		
	Total	61.218	77			
POST4	Between Groups	12.561	3	4.187	4.492	.006
	Within Groups	68.974	74	.932		
	Total	81.535	77			

Post Hoc Tests

Multiple Comparisons

Tukey HSD

Dependant Variable	(I) GROUP	(J) GROUP	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
POST1	Control	Edu	-.8450*	.25946	.009	-1.5270	-.1630
		Edu+PA	-.9516*	.26285	.003	-1.6425	-.2607
		Edu+PA+Photo	-1.3779*	.26285	.000	-2.0688	-.6870
	Edu	Control	.8450*	.25946	.009	.1630	1.5270
		Edu+PA	-.1066	.26285	.977	-.7975	.5843
		Edu+PA+Photo	-.5329	.26285	.187	-1.2238	.1580
	Edu+PA	Control	.9516*	.26285	.003	.2607	1.6425
		Edu	.1066	.26285	.977	-.5843	.7975
		Edu+PA+Photo	-.4263	.26520	.384	-1.1260	.2734
	Edu+PA+Photo	Control	1.3779*	.26285	.000	.6870	2.0688
		Edu	.5329	.26285	.187	-.1580	1.2238
		Edu+PA	.4263	.26520	.384	-.2734	1.1260
POST2	Control	Edu	-1.1400*	.28077	.001	-1.8780	-.4020
		Edu+PA	-.9503*	.28444	.007	-1.6979	-.2026
		Edu+PA+Photo	-1.0871*	.28444	.002	-1.8347	-.3395
	Edu	Control	1.1400*	.28077	.001	.4020	1.8780
		Edu+PA	.1897	.28444	.909	-.5579	.9374
		Edu+PA+Photo	.0529	.28444	.998	-.6947	.8005
	Edu+PA	Control	.9503*	.28444	.007	.2026	1.6979
		Edu	-.1897	.28444	.909	-.9374	.5579
		Edu+PA+Photo	-.1368	.28806	.964	-.8940	.6203
	Edu+PA+Photo	Control	1.0871*	.28444	.002	.3395	1.8347
		Edu	-.0529	.28444	.998	-.8005	.6947
		Edu+PA	.1368	.28806	.964	-.6203	.8940
POST3	Control	Edu	-.7300*	.26740	.039	-1.4328	-.0272
		Edu+PA	-.7395*	.27089	.039	-1.4515	-.0275
		Edu+PA+Photo	-.7711*	.27089	.029	-1.4831	-.0590
	Edu	Control	.7300*	.26740	.039	.0272	1.4328
		Edu+PA	-.0095	.27039	1.000	-.7215	.7025
		Edu+PA+Photo	-.0411	.27089	.999	-.7531	.6710
	Edu+PA	Control	.7395*	.27089	.039	.0275	1.4515
		Edu	.0095	.27089	1.000	-.7025	.7215
		Edu+PA+Photo	-.0316	.27435	.999	-.7527	.6895
	Edu+PA+Photo	Control	.7711*	.27089	.029	.0590	1.4831
		Edu	.0411	.27089	.999	-.6710	.7531
		Edu+PA	.0316	.27435	.999	-.6895	.7527
POST4	Control	Edu	-.9750*	.30530	.011	-1.7774	-.1726
		Edu+PA	-.9592*	.30929	.014	-1.7721	-.1463
		Edu+PA+Photo	-.7539	.30929	.079	-1.5669	.0590
	Edu	Control	.9750*	.30530	.011	.1726	1.7774
		Edu+PA	.0158	.30929	1.000	-.7971	.8287
		Edu+PA+Photo	.2211	.30929	.891	-.5918	1.0340
	Edu+PA	Control	.9592*	.30929	.014	.1463	1.7721
		Edu	-.0158	.30929	1.000	-.8287	.7971
		Edu+PA+Photo	.2053	.31323	.913	-.6180	1.0286
	Edu+PA+Photo	Control	.7539	.30929	.079	-.0590	1.5669
		Edu	-.2211	.30929	.891	-1.0340	.5918
		Edu+PA	-.2053	.31323	.913	-1.0286	.6180

*. The mean difference is significant at the .05 level.

Homogeneous Subsets

POST1

Tukey HSD[a,b]

GROUP	N	Subset for alpha = .05	
		1	2
Control	20	2.3600	
Edu	20		3.2250
Edu+PA	19		3.3316
Edu+PA+Photo	18		3.7579
Sig.		1.000	.187

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 19.487.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

POST2

Tukey HSD[a,b]

GROUP	N	Subset for alpha = .05	
		1	2
Control	20	3.2550	
Edu+PA	19		4.2053
Edu+PA+Photo	19		4.3421
Edu	20		4.3950
Sig.		1.000	.909

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 19.487.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

POST3

Tukey HSD[a,b]

GROUP	N	Subset for alpha = .05	
		1	2
Control	20	2.3500	
Edu	20		3.0800
Edu+PA	19		3.0895
Edu+PA+Photo	19		3.1211
Sig.		1.000	.999

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 19.487.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

POST4

Tukey HSD[a,b]

GROUP	N	Subset for alpha = .05	
		1	2
Control	20	1.3250	
Edu+PA+Photo	19	2.0789	2.0789
Edu+PA	19		2.2842
Edu	20		2.3000
Sig.		.079	.891

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 19.487.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Appendix I

Within-Subjects Factors

Measure: MEASURE_1

INTEND	Dependent Variable
1	PRE1
2	POST1

Between-Subjects Factors

		Value Label	N
GROUP	1	Control	20
	2	Edu	20
	3	Edu+PA	19
	4	Edu+PA+Photo	19

Box's Test of Equality of Covariance Matrices[a]

Box's M	12.110
F	1.280
df1	9
df2	62051.80
Sig.	.242

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

a.
Design: Intercept+GROUP
Within Subjects Design: INTEND

Multivariate Tests[b]

Effect		Value	F	Hypothesis df	Error df	Sig.
INTEND	Pillai's Trace	.156	13.649[a]	1.000	74.000	.000
	Wilks' Lambda	.844	13.649[a]	1.000	74.000	.000
	Hotelling's Trace	.184	13.649[a]	1.000	74.000	.000
	Roy's Largest Root	.184	13.649[a]	1.000	74.000	.000
INTEND * GROUP	Pillai's Trace	.129	3.662[a]	3.000	74.000	.016
	Wilks' Lambda	.871	3.662[a]	3.000	74.000	.016
	Hotelling's Trace	.148	3.662[a]	3.000	74.000	.016
	Roy's Largest Root	.148	3.662[a]	3.000	74.000	.016

a. Exact statistic

b.
Design: Intercept+GROUP
Within Subjects Design: INTEND

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
INTEND	1.000	.000	0	.	1.000	1.000	1.000

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b.
Design: Intercept+GROUP
Within Subjects Design: INTEND

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
INTEND	Sphericity Assumed	6.649	1	6.649	13.649	.000
	Greenhouse-Geisser	6.649	1.000	6.649	13.649	.000
	Huynh-Feldt	6.649	1.000	6.649	13.649	.000
	Lower-bound	6.649	1.000	6.649	13.649	.000
INTEND * GROUP	Sphericity Assumed	5.352	3	1.784	3.662	.016
	Greenhouse-Geisser	5.352	3.000	1.784	3.662	.016
	Huynh-Feldt	5.352	3.000	1.784	3.662	.016
	Lower-bound	5.352	3.000	1.784	3.662	.016
Error(INTEND)	Sphericity Assumed	36.046	74	.487		
	Greenhouse-Geisser	36.046	74.000	.487		
	Huynh-Feldt	36.046	74.000	.487		
	Lower-bound	36.046	74.000	.487		

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	INTEND	Type III Sum of Squares	df	Mean Square	F	Sig.
INTEND	Linear	6.649	1	6.649	13.649	.000
INTEND * GROUP	Linear	5.352	3	1.784	3.662	.016
Error(INTEND)	Linear	36.046	74	.487		

Levene's Test of Equality of Error Variances[a]

	F	df1	df2	Sig.
PRE1	2.682	3	74	.053
POST1	1.137	3	74	.340

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a.
Design: Intercept+GROUP
Within Subjects Design: INTEND

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	1372.476	1	1372.476	1414.598	.000
GROUP	16.617	3	5.539	5.709	.001
Error	71.787	74	.970		

Post Hoc Tests

GROUP

Multiple Comparisons

Measure: MEASURE_1
Tukey HSD

(I) GROUP	(J) GROUP	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Control	Edu	-.4350	.22025	.207	-1.0139	.1439
	Edu+PA	-.6017*	.22313	.042	-1.1882	-.0152
	Edu+PA+Photo	-.9017*	.22313	.001	-1.4882	-.3152
Edu	Control	.4350	.22025	.207	-.1439	1.0139
	Edu+PA	-.1667	.22313	.878	-.7532	.4198
	Edu+PA+Photo	-.4667	.22313	.165	-1.0532	.1198
Edu+PA	Control	.6017*	.22313	.042	.0152	1.1882
	Edu	.1667	.22313	.878	-.4198	.7532
	Edu+PA+Photo	-.3000	.22597	.549	-.8939	.2939
Edu+PA+Photo	Control	.9017*	.22313	.001	.3152	1.4882
	Edu	.4667	.22313	.165	-.1198	1.0532
	Edu+PA	.3000	.22597	.549	-.2939	.8939

Based on observed means.

*. The mean difference is significant at the .05 level.

Homogeneous Subsets

MEASURE_1

Tukey HSD[a,b,c]

GROUP	N	Subset 1	Subset 2
Control	20	2.4825	
Edu	20	2.9175	2.9175
Edu+PA	19		3.0842
Edu+PA+Photo	19		3.3842
Sig.		.217	.165

Means for groups in homogeneous subsets are displayed.
Based on Type III Sum of Squares
The error term is Mean Square(Error) = .485.

a. Uses Harmonic Mean Sample Size = 19.487.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

c. Alpha = .05.

Within-Subjects Factors

Measure: MEASURE_1

ATTITUDE	Dependent Variable
1	PRE2
2	POST2

Between-Subjects Factors

		Value Label	N
GROUP	1	Control	20
	2	Edu	20
	3	Edu+PA	19
	4	Edu+PA+Photo	19

Box's Test of Equality of Covariance Matrices[a]

Box's M	8.760
F	.926
df1	9
df2	62051.80
Sig.	.501

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

a.
Design: Intercept+GROUP
Within Subjects Design: ATTITUDE

Multivariate Tests[b]

Effect		Value	F	Hypothesis df	Error df	Sig.
ATTITUDE	Pillai's Trace	.573	99.176[a]	1.000	74.000	.000
	Wilks' Lambda	.427	99.176[a]	1.000	74.000	.000
	Hotelling's Trace	1.340	99.176[a]	1.000	74.000	.000
	Roy's Largest Root	1.340	99.176[a]	1.000	74.000	.000
ATTITUDE * GROUP	Pillai's Trace	.072	1.912[a]	3.000	74.000	.135
	Wilks' Lambda	.928	1.912[a]	3.000	74.000	.135
	Hotelling's Trace	.078	1.912[a]	3.000	74.000	.135
	Roy's Largest Root	.078	1.912[a]	3.000	74.000	.135

a. Exact statistic

b.
Design: Intercept+GROUP
Within Subjects Design: ATTITUDE

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
ATTITUDE	1.000	.000	0	.	1.000	1.000	1.000

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b.
Design: Intercept+GROUP
Within Subjects Design: ATTITUDE

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
ATTITUDE	Sphericity Assumed	148.470	1	148.470	99.176	.000
	Greenhouse-Geisser	148.470	1.000	148.470	99.176	.000
	Huynh-Feldt	148.470	1.000	148.470	99.176	.000
	Lower-bound	148.470	1.000	148.470	99.176	.000
ATTITUDE * GROUP	Sphericity Assumed	8.586	3	2.862	1.912	.135
	Greenhouse-Geisser	8.586	3.000	2.862	1.912	.135
	Huynh-Feldt	8.586	3.000	2.862	1.912	.135
	Lower-bound	8.586	3.000	2.862	1.912	.135
Error(ATTITUDE)	Sphericity Assumed	110.780	74	1.497		
	Greenhouse-Geisser	110.780	74.000	1.497		
	Huynh-Feldt	110.780	74.000	1.497		
	Lower-bound	110.780	74.000	1.497		

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	ATTITUDE	Type III Sum of Squares	df	Mean Square	F	Sig.
ATTITUDE	Linear	148.470	1	148.470	99.176	.000
ATTITUDE *	Linear	8.586	3	2.862	1.912	.135
Error(ATTITUDE)	Linear	110.780	74	1.497		

Levene's Test of Equality of Error Variances[a]

	F	df1	df2	Sig.
PRE2	.309	3	74	.819
POST2	.849	3	74	.472

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a.
Design: Intercept+GROUP
Within Subjects Design: ATTITUDE

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	1472.626	1	1472.626	3315.247	.000
GROUP	8.725	3	2.908	6.547	.001
Error	32.871	74	.444		

Post Hoc Tests

GROUP

Multiple Comparisons

Measure: MEASURE_1
Tukey HSD

(I) GROUP	(J) GROUP	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Control	Edu	-.6075*	.14903	.001	-.9992	-.2158
	Edu+PA	-.4489*	.15098	.020	-.8458	-.0521
	Edu+PA+Photo	-.5174*	.15098	.005	-.9142	-.1205
Edu	Control	.6075*	.14903	.001	.2158	.9992
	Edu+PA	.1586	.15098	.721	-.2383	.5554
	Edu+PA+Photo	.0901	.15098	.933	-.3067	.4870
Edu+PA	Control	.4489*	.15098	.020	.0521	.8458
	Edu	-.1586	.15098	.721	-.5554	.2383
	Edu+PA+Photo	-.0684	.15290	.970	-.4703	.3335
Edu+PA+Photo	Control	.5174*	.15098	.005	.1205	.9142
	Edu	-.0901	.15098	.933	-.4870	.3067
	Edu+PA	.0684	.15290	.970	-.3335	.4703

Based on observed means.

*. The mean difference is significant at the .05 level.

Homogeneous Subsets

Tukey HSD[a,b,c]

GROUP	N	Subset 1	Subset 2
Control	20	2.6800	
Edu+PA	19		3.1289
Edu+PA+Photo	19		3.1974
Edu	20		3.2875
Sig.		1.000	.721

Means for groups in homogeneous subsets are displayed.
Based on Type III Sum of Squares
The error term is Mean Square(Error) = .222.

a. Uses Harmonic Mean Sample Size = 19.487.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

c. Alpha = .05.

Within-Subjects Factors

Measure: MEASURE_1

MOTIVATE	Dependent Variable
1	PRE3
2	POST3

Between-Subjects Factors

		Value Label	N
GROUP	1	Control	20
	2	Edu	20
	3	Edu+PA	19
	4	Edu+PA+Photo	19

Box's Test of Equality of Covariance Matrices[a]

Box's M	6.957
F	.735
df1	9
df2	62051.60
Sig.	.677

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

a.
Design: Intercept+GROUP
Within Subjects Design: MOTIVATE

Multivariate Tests[b]

Effect		Value	F	Hypothesis df	Error df	Sig.
MOTIVATE	Pillai's Trace	.281	28.958[a]	1.000	74.000	.000
	Wilks' Lambda	.719	28.958[a]	1.000	74.000	.000
	Hotelling's Trace	.391	28.958[a]	1.000	74.000	.000
	Roy's Largest Root	.391	28.958[a]	1.000	74.000	.000
MOTIVATE * GROUP	Pillai's Trace	.123	3.466[a]	3.000	74.000	.020
	Wilks' Lambda	.877	3.466[a]	3.000	74.000	.020
	Hotelling's Trace	.141	3.466[a]	3.000	74.000	.020
	Roy's Largest Root	.141	3.466[a]	3.000	74.000	.020

a. Exact statistic

b.
Design: Intercept+GROUP
Within Subjects Design: MOTIVATE

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
MOTIVATE	1.000	.000	0	.	1.000	1.000	1.000

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b.
Design: Intercept+GROUP
Within Subjects Design: MOTIVATE

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
MOTIVATE	Sphericity Assumed	24.462	1	24.462	28.958	.000
	Greenhouse-Geisser	24.462	1.000	24.462	28.958	.000
	Huynh-Feldt	24.462	1.000	24.462	28.958	.000
	Lower-bound	24.462	1.000	24.462	28.958	.000
MOTIVATE * GROUP	Sphericity Assumed	8.784	3	2.928	3.466	.020
	Greenhouse-Geisser	8.784	3.000	2.928	3.466	.020
	Huynh-Feldt	8.784	3.000	2.928	3.466	.020
	Lower-bound	8.784	3.000	2.928	3.466	.020
Error(MOTIVATE)	Sphericity Assumed	62.511	74	.845		
	Greenhouse-Geisser	62.511	74.000	.845		
	Huynh-Feldt	62.511	74.000	.845		
	Lower-bound	62.511	74.000	.845		

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	MOTIVATE	Type III Sum of Squares	df	Mean Square	F	Sig.
MOTIVATE	Linear	24.462	1	24.462	28.958	.000
MOTIVATE *	Linear	8.784	3	2.928	3.466	.020
Error(MOTIVATE)	Linear	62.511	74	.845		

Levene's Test of Equality of Error Variances[a]

	F	df1	df2	Sig.
PRE3	1.351	3	74	.265
POST3	.812	3	74	.440

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a.
Design: Intercept+GROUP
Within Subjects Design: MOTIVATE

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	1704.160	1	1704.160	1655.461	.000
GROUP	1.315	3	.438	.426	.735
Error	76.177	74	1.029		

Post Hoc Tests

GROUP

Multiple Comparisons

Measure: MEASURE_1
Tukey HSD

(I) GROUP	(J) GROUP	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Control	Edu	-.1700	.22667	.877	-.7663	.4263
	Edu+PA	-.2238	.22984	.765	-.8279	.3803
	Edu+PA+Photo	-.2212	.22984	.771	-.8253	.3829
Edu	Control	.1700	.22667	.877	-.4263	.7663
	Edu+PA	-.0538	.22984	.995	-.6579	.5503
	Edu+PA+Photo	-.0512	.22984	.996	-.6553	.5529
Edu+PA	Control	.2238	.22984	.765	-.3803	.8279
	Edu	.0538	.22984	.995	-.5503	.6579
	Edu+PA+Photo	.0026	.23277	1.000	-.6092	.6144
Edu+PA+Photo	Control	.2212	.22984	.771	-.3829	.8253
	Edu	.0512	.22984	.996	-.5529	.6553
	Edu+PA	-.0026	.23277	1.000	-.6144	.6092

Based on observed means.

Homogeneous Subsets

MEASURE_1

Tukey HSD[a,b,c]

GROUP	N	Subset 1
Control	20	3.1525
Edu	20	3.3225
Edu+PA+Photo	19	3.3737
Edu+PA	19	3.3763
Sig.		.765

Means for groups in homogeneous subsets are displayed.
Based on Type III Sum of Squares
The error term is Mean Square(Error) = .515.

a. Uses Harmonic Mean Sample Size = 19.487.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

c. Alpha = .05.

Within-Subjects Factors

Measure: MEASURE_1

FEAR	Dependent Variable
1	PRE4
2	POST4

Between-Subjects Factors

		Value Label	N
GROUP	1	Control	20
	2	Edu	20
	3	Edu+PA	19
	4	Edu+PA+Photo	19

Box's Test of Equality of Covariance Matrices[a]

Box's M	13.027
F	1.377
df1	9
df2	62051.80
Sig.	.192

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

a.
Design: Intercept+GROUP
Within Subjects Design: FEAR

Multivariate Tests[b]

Effect		Value	F	Hypothesis df	Error df	Sig.
FEAR	Pillai's Trace	.318	34.526[a]	1.000	74.000	.000
	Wilks' Lambda	.682	34.526[a]	1.000	74.000	.000
	Hotelling's Trace	.467	34.526[a]	1.000	74.000	.000
	Roy's Largest Root	.467	34.526[a]	1.000	74.000	.000
FEAR * GROUP	Pillai's Trace	.112	3.111[a]	3.000	74.000	.031
	Wilks' Lambda	.888	3.111[a]	3.000	74.000	.031
	Hotelling's Trace	.126	3.111[a]	3.000	74.000	.031
	Roy's Largest Root	.126	3.111[a]	3.000	74.000	.031

a. Exact statistic

b.
Design: Intercept+GROUP
Within Subjects Design: FEAR

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[a]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
FEAR	1.000	.000	0	.	1.000	1.000	1.000

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b.
Design: Intercept+GROUP
Within Subjects Design: FEAR

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
FEAR	Sphericity Assumed	26.735	1	26.735	34.526	.000
	Greenhouse-Geisser	26.735	1.000	26.735	34.526	.000
	Huynh-Feldt	26.735	1.000	26.735	34.526	.000
	Lower-bound	26.735	1.000	26.735	34.526	.000
FEAR * GROUP	Sphericity Assumed	7.227	3	2.409	3.111	.031
	Greenhouse-Geisser	7.227	3.000	2.409	3.111	.031
	Huynh-Feldt	7.227	3.000	2.409	3.111	.031
	Lower-bound	7.227	3.000	2.409	3.111	.031
Error(FEAR)	Sphericity Assumed	57.301	74	.774		
	Greenhouse-Geisser	57.301	74.000	.774		
	Huynh-Feldt	57.301	74.000	.774		
	Lower-bound	57.301	74.000	.774		

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	FEAR	Type III Sum of Squares	df	Mean Square	F	Sig.
FEAR	Linear	26.735	1	26.735	34.526	.000
FEAR * GROUP	Linear	7.227	3	2.409	3.111	.031
Error(FEAR)	Linear	57.301	74	.774		

Levene's Test of Equality of Error Variances[a]

	F	df1	df2	Sig.
PRE4	3.011	3	74	.035
POST4	3.224	3	74	.027

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a.
Design: Intercept+GROUP
Within Subjects Design: FEAR

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	606.333	1	606.333	568.687	.000
GROUP	6.125	3	2.042	1.281	.287
Error	117.936	74	1.594		

Post Hoc Tests

GROUP

Multiple Comparisons

Measure: MEASURE_1
Tukey HSD

(I) GROUP	(J) GROUP	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Control	Edu	-.5275	.28229	.250	-1.2695	.2145
	Edu+PA	-.3836	.28598	.540	-1.1352	.3681
	Edu+PA+Photo	-.3836	.28598	.540	-1.1352	.3681
Edu	Control	.5275	.28229	.250	-.2145	1.2695
	Edu+PA	.1439	.28598	.958	-.6077	.8956
	Edu+PA+Photo	.1439	.28598	.958	-.6077	.8956
Edu+PA	Control	.3836	.28598	.540	-.3681	1.1352
	Edu	-.1439	.28598	.958	-.8956	.6077
	Edu+PA+Photo	.0000	.28962	1.000	-.7612	.7612
Edu+PA+Photo	Control	.3836	.28598	.540	-.3681	1.1352
	Edu	-.1439	.28598	.958	-.8956	.6077
	Edu+PA	.0000	.28962	1.000	-.7612	.7612

Based on observed means.

Homogeneous Subsets

MEASURE_1

Tukey HSD[a,b,c]

GROUP	N	Subset 1
Control	20	2.0875
Edu+PA+Photo	19	2.4711
Edu+PA	19	2.4711
Edu	20	2.6150
Sig.		.261

Means for groups in homogeneous subsets are displayed.
Based on Type III Sum of Squares
The error term is Mean Square(Error) = .797.

a. Uses Harmonic Mean Sample Size = 19.487.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

c. Alpha = .05.

Appendix J

Descriptives

KNOWLEDG

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Control	20	7.05	1.468	.328	6.36	7.74	5	9
Edu	20	12.65	1.981	.443	11.72	13.58	9	16
Edu+PA	19	10.68	3.334	.765	9.08	12.29	4	14
Edu+PA+Photo	19	11.89	2.331	.535	10.77	13.02	7	16
Total	76	10.65	3.185	.361	9.83	11.27	4	16

Test of Homogeneity of Variances

KNOWLEDG

Levene Statistic	df1	df2	Sig.
5.836	3	74	.001

ANOVA

KNOWLEDG

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	367.900	3	122.633	21.952	.000
Within Groups	413.395	74	5.586		
Total	781.295	77			

Post Hoc Tests

Multiple Comparisons

Dependent Variable: KNOWLEDG

Tukey HSD

(I) GROUP	(J) GROUP	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Control	Edu	-5.60*	.747	.000	-7.56	-3.64
	Edu+PA	-3.63*	.757	.000	-5.62	-1.64
	Edu+PA+Photo	-4.84*	.757	.000	-6.83	-2.85
Edu	Control	5.60*	.747	.000	3.64	7.56
	Edu+PA	1.97	.757	.054	-.02	3.96
	Edu+PA+Photo	.76	.757	.751	-1.23	2.75
Edu+PA	Control	3.63*	.757	.000	1.64	5.62
	Edu	-1.97	.757	.054	-3.96	.02
	Edu+PA+Photo	-1.21	.767	.397	-3.23	.81
Edu+PA+Photo	Control	4.84*	.757	.000	2.85	6.83
	Edu	-.76	.757	.751	-2.75	1.23
	Edu+PA	1.21	.767	.397	-.81	3.23

*. The mean difference is significant at the .05 level.

Homogeneous Subsets

KNOWLEDG

Tukey HSD[a,b]

GROUP	N	Subset for alpha = .05	
		1	2
Control	20	7.05	
Edu+PA	19		10.68
Edu+PA+Photo	19		11.89
Edu	20		12.65
Sig.		1.000	.054

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 19.487.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.