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# **Dying For A Tan:**

**Explaining Intentions to Use Sunscreen with the Theory of Planned  
Behaviour, Threats to Appearance and Mortality,  
And the Theory of Terror Management.**

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**Katharine Elizabeth Mills**

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## Abstract

Skin cancer has become one of the most prevalent forms of cancer throughout the world (Arthey & Clarke, 1995), with New Zealand leading the world in both melanoma-related deaths and incidences. It has been indicated that 80 per cent of skin cancers could be avoided through appropriate sun prevention. Decreasing the amount of sun exposure has become the primary objective of skin cancer prevention. The present study applied the variables of the Theory of Planned Behaviour, specifically perceived behavioural control, subjective norm and attitudes, and the additional constructs of conscientiousness and anticipated regret to explain intentions for sunscreen use. An appearance-based intervention and a health-based intervention were investigated to assess changes in intentions to use a sunscreen. Finally, the Theory of Terror Management was examined to assess if this theory could help to explain sunscreen use. To examine the above issues three types of questionnaires (a mortality-based intervention, an appearance-based intervention and a control condition) were administered to beachgoers in New Zealand ( $N=145$ ) and the United Kingdom ( $N= 277$ ). The theory of planned behaviour significantly explained 53.1 per cent of participants' intentions to use a sunscreen amongst New Zealand beachgoers, and 44.9 per cent amongst British beachgoers. Specifically, raising an individual's perceived behavioural control, subjective norm and attitude towards sunscreen could be positive ways to increase sunscreen use. Furthermore, the concepts of conscientiousness and anticipated regret explained a further 14.6% and 10.9% for the New Zealand and British samples respectively. No significant results for the use of mortality and appearance-based interventions were found, and the Theory of Terror Management was not significantly found to explain sunscreen intentions. Despite various limitations, the present research has gained useful information opening the doors for future research



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## **Chapter One**

### **Rising Concerns About Skin Cancer**

Skin cancers are the most prevalent form of cancer in the world (Arthey & Clarke, 1995). The incidence of skin cancers has been steadily increasing for several decades, making it the most rapidly rising rate of any cancer in the Western World (Blobe, 1997).

There are three major types of skin cancer: basal cell carcinoma, squamous cell carcinoma and melanoma. Basal and squamous cell carcinomas are considered 'non-melanoma' skin cancers, and 90 per cent of cases have a high cure rate (Kiesling & Friedman, 1987). Basal cell carcinoma is characterised by slow growth that almost never metastasises. Squamous cell carcinoma, although occurring less frequently than basal cell carcinoma, can easily spread to internal organs and lymph glands, and is therefore potentially the more dangerous of the two. However, the most serious form of all skin cancers is melanoma, the so-called 'black cancer', and although it is less common, it is by far the most dangerous. Melanoma begins on the skin's surface, most often in a mole, but quickly metastasises to internal organs. Signs of melanoma include enlargement, colour changes, bleeding or itchiness of an originally harmless pigmented mole (nevus), freckle or birthmark (Cody & Lee, 1990; Kiesling & Friedman, 1987). Currently, malignant melanoma can only be cured by surgical removal, and if left untreated is fatal (Blobe, 1997).

Using the World Health Organisation (WHO) databases death certification data was obtained and compared between 55 countries worldwide. Exceedingly high skin cancer mortality was registered in both New Zealand and Australia, with New Zealand having the highest rate of female mortality, and Australia leading the male mortality rate (Levi, Lucchini, Negri & La Vecchia, 1991).

Consequently, with New Zealand leading the world in melanoma-related deaths (Douglas, Mc Gee & Williams, 1997) the country's population is becoming

increasingly alarmed about the issue. There are approximately 1000 cases of melanoma diagnosed every year (7 per cent in people aged under 30, and 21 per cent in people younger than 40), and one in 31 New Zealanders can expect to be diagnosed as having melanoma before the age of 75 (Ministry of Health (MOH), 2002). Melanoma is the third most common form of cancer for females in New Zealand and the fourth most diagnosed cancer for New Zealand males. Specifically it affects 32.1 females per 100,000 and 28.1 per 100,000 males (MOH, 2002). Adding concern to these figures the annual incidence of melanoma among the non-Maori New Zealand population has doubled over the last ten years (Douglas, McGee & Williams, 1997).

Non-melanomas however, have experienced a decreased death rate over the same period. As the rates for basal cell and squamous cell carcinoma are not recorded in the cancer registration, we are not fully aware of the entire damage of sun exposure in New Zealand. It has however, been estimated that approximately 50 deaths per year are caused by other preventable skin cancers (Douglas, Mc Gee & Williams, 1997). The fact that the death rates are low and are continuing to decline for the non-melanoma skin cancers is good news, but the comparatively higher and rising death rates for melanoma is alarming. In New Zealand, males have a mortality rate of 5.8 per 100,000 people, and females 3.5 per 100,000 annually. In total each year in New Zealand approximately 200 people die from melanoma (MOH, 2002). So how does New Zealand compare with other countries in regard to this frightening statistic?

In Australia, the cumulative lifetime risk of developing malignant melanoma is currently 1 in every 40 people, with an incidence rate reaching more than 30 per 100,000 people per year in Queensland alone (Marks, 1998; Jones et al, 2001). In America, skin cancer accounts for 40 per cent of all cancers (Detweiliwe, Bedell, Salovey, Pronin & Rothman, 1999). It is the most common form of cancer in the United States, with an estimated 1,000,000 cases diagnosed annually (American Cancer Society, 1998). Between 1979 and 1989 in England, Wales, Scotland and Northern Ireland there was a yearly rise of the incidence of malignant melanoma of approximately 6 per cent (Graham-Brown, 1998). In 1995 the deaths of 697 men and 698 women in England and Wales were attributed to malignant

melanoma (Office for National Statistics, 1995, in Ness Frankel, Gunnell & Smith 1999).

The worldwide escalation of this disease has been attributed to increased exposure to ultraviolet radiation (UVR) from the sun, which has resulted from various factors. The clothing trends today are more liberal, allowing more skin to be exposed, a “healthy tan” has become fashionable in recent years; and the harshness of the UV rays has increased with the depletion of the ozone layer. Although many factors are directly, and indirectly, responsible for the development of various forms of skin cancer, the major cause is exposure to UV light. Strong scientific evidence signifies a positive association between sunexposure, sunburn and melanoma, particularly in white skinned populations (International Agency for Research on Cancer (IARC), 1992). Combined studies have revealed that UV rays are in fact responsible for up to 90 per cent of all skin cancers (MOH), 2002). Adding support to this finding, a study conducted by Elwood and Jopson (1997) looked at fifty studies, in which the association between sunexposure, sunburn and melanoma was assessed. Results showed a positive association between melanoma and intermittent sun exposure, and a clear and significant positive association was also found for people with a history of sunburn.

Skin cancer is one of the few malignancies in which the causes are readily identifiable and preventable. The American Cancer Society estimates that approximately 90 per cent of all skin cancers could be prevented if people protected their skin from the sun’s rays (Melia & Bulman, 1995; Blobe, 1997). As treatments are limited and varied in success rates, prevention is currently the best source for tackling this widespread disease. Therefore, decreasing the amount of sun exposure has become the primary objective of behavioural research in skin cancer prevention.

Since the 1980’s the Cancer Society worldwide has stringently highlighted the relationship between sun exposure and skin cancer, successfully increasing the public’s knowledge and awareness. Alongside raising public awareness, information targeting safe sun behaviours has also been campaigned, aiming to

prevent dangerous sun exposure. Such recommendations have included avoiding outdoor activities between 11 am and 3 pm, when ultraviolet ray transmission is the highest; seeking shade whilst outdoors; using protective clothing to block sun exposure; using sunscreens with a minimum sun protection factor (SPF) of 15, and using a waterproof sunscreen whilst near, or in the water (Crane, Schneider, Yohn, Morelli & Plomer, 1999).

Although exposure to ultraviolet (UVR) has been identified as the chief environmental risk factor for skin cancer among Caucasians (IARC, 1992), people remain slow to change their behaviours with regard to sun exposure. It seems that whilst knowledge is both important and necessary, it is not enough to result in behavioural changes. After evaluating sun education programmes in the UK, the Health Education Authority concluded that although the public is reasonably comfortable with the messages it receives, it does not necessarily take any notice of them (Graham-Brown, 1998). Ness, Frankel, Gunnell and Smith (1999) found that the public have been slow to accept the message that exposure to sunlight is potentially bad for the health, and that despite increased knowledge many people will still sunbathe with the intention of getting a suntan. In a survey undertaken in England in 1995, 40 per cent of those aged 16-24 reported being sunburnt, and slightly fewer than 40 per cent regarded this as being of concern to them (Ness, Frankel, Gunnell & Smith 1999).

Skin cancer is primarily the responsibility of every individual. While an inherited pale skin type means some people are more susceptible to skin cancer than others, the development of skin cancer is chiefly behavioural (Stern, Weinstein & Baker 1986). A person who takes the recommended precautions greatly reduces their chance of contracting skin cancer (Melia & Bulman, 1995). Therefore, adopting preventative behaviours is crucial to reducing the risk of skin cancer.

Included amongst such precautions is the use of sunscreen, which is widely accepted as a preventative to sunburn. Research has proven that sunscreens delay the onset of photo carcinogens (Kligman, Akin & Kligman, 1980; in Westerdahl, Ingvar, Masback & Olsson, 2000), inhibits the mutation of the p53 gene in keratinocytes (Ananthaswamy et al., 1997) and also hinders the incidence of

keratoses in humans (Naylor et al., 1995), all of which help to prevent sunburn. The American Academy of Dermatology, the Australian College of Dermatology and the Canadian Dermatology all report that one of the most powerful weapons in our fight against skin cancer is sun avoidance through sunscreens (Skolnick, 1991). A statistical study at Harvard University concluded that regular use of an SPF 15 sunscreen during the first 15 years of life would reduce a person's risk of developing the most common skin cancers by 78 per cent (Zarrow, 1988).

As sunscreens are effective in protecting against UV exposure, they also help to prevent the damages of UV rays. As well as skin cancer, sun exposure also causes photo-ageing of the skin, including processes such as premature ageing, premature freckling, fine wrinkling and dilation of the capillaries. Irregular pigmentation commonly referred to as liver spots, often develop during later years in photo-damaged skin (Blobe, 1997).

There is currently little research examining sunscreen use in New Zealand, and due to its high incidence of melanoma this raises a concern. As sunscreen use has been identified as important in reducing sun damage, finding out what motivates people to take such precautions would be invaluable to cancer prevention programmes. Therefore further research is clearly needed in this area, looking closely at what motivates people to take such precautionary measures. Studying background information about individual sunscreen use and examining models of health behaviour should provide insight into current sunscreen use. Information regarding individuals' sunscreen use would be invaluable in helping develop better health interventions to promote sunscreen use, and provide valuable guidance for future campaigns. By focussing such research on a study with a New Zealand population, would further help to target these vulnerable populations.



## Chapter Two

### The Appearance of a Suntan

Most efforts to promote safe sunscreen practices have involved educational interventions designed to convince people that exposure to the sun increases the likelihood of skin cancer. Due to the very strong positive relationship between melanoma and sun exposure, it makes sense that people would take the necessary precautions in order to protect themselves from this potentially fatal disease. However, although such health based educational programmes have promoted an increase in knowledge (Arthey & Clarke, 1995), research indicates that, although people are widely aware of the dangers, they are still voluntarily exposing themselves to the sun (Keesling & Friedman, 1987), intentionally seeking to gain a tan. Intentions to tan are therefore, unsurprisingly, related with low sunscreen use, which in turn increases one's vulnerability to the varying health risks associated with exposing one's self to the sun. In order to change, or counteract such behaviours, it would first be important to understand the nature of people's desire for a suntan.

#### 2.1 Attitudes regarding tanning

Generally, attitudes towards suntans reflect the widely held opinions that have been placed on the appearance of a tan. Over time the appearance of a tan has been considered important in signifying healthiness, status and attractiveness.

During the past 100 years a suntan has been associated with good health. This is a theory attributable to varying sources. In 1903, Finsen developed, and won a Nobel Prize for, light-therapy which he proposed treated infectious diseases, and in particular lupus vulgaris (Randle, 1997). Later, in the 1930s and 40s, leading medical advice given to mothers was that deficiencies children develop are more often than not caused by lack of sunlight (Randle, 1997). More popularly, sunbathing began as part of heliotherapy, originating from the work of Rollier (1927). Rollier was the first to note that patients with certain diseases, such as tuberculosis, improved dramatically in health after periods of sun exposure (Keesling & Friedman, 1987). Although the medical benefits of heliotherapy were

discredited in the 1940s and 50s, a suntan remained popular, as did the belief that a suntan made one appear healthier (Keesling & Friedman, 1987).

As a result of such work, having a tan became associated with good health, and paler skin became associated with bad health. A suntan has therefore become a cultural signifier of healthiness, so much so that people report feeling “healthy” with a tan (Keesling & Friedman, 1987), despite the fact that they are also aware of the associated health risks. Although professionals in health care and health promotion have embraced the notion that sun exposure is bad for health, the public have been slow to accept this message. Thus, there is a confounding belief in health and beauty, as individuals have a desire to look healthy, over a desire to actually be healthy.

Suntans have also been associated with wealth, and were a status symbol among Caucasians in the early part of the century. In a time when the majority of people worked outdoors, having pale porcelain skin was fashionable, because it indicated that a person had wealth and could afford not to work outdoors (Keesling & Friedman, 1987). However, after the industrial revolution, many of the working class spent their days in factories; therefore having a dark suntan became associated with being wealthy, and having an abundance of leisure time to spend outdoors (Randle, 1997).

A suntan later became a highly regarded fashion statement, and promoting a suntan cosmetically as an appealing feature has become a product of the 20<sup>th</sup> Century. This is initially reported to have begun with Coco Chanel, the French fashion designer in 1920s, who stated that “the 1929 girl must be tanned” and a “golden tan is the index of chic” (Vogue, 1929; cited in Randle, 1997). By the 1950s the fashion to tan was widespread throughout the western world. Many believed that it was imperative for the successful executive to be well-tanned in order to illustrate a superior physique, intelligence and a moral character (Harrity & Craven, 1958; cited in Keesling & Friedman, 1987). This popular opinion continued to increase, and by the 1960s and 70s sunbathing was a definite part of the western world’s culture (Randle, 1997). Present attitudes today regarding a suntan have not changed much, although our awareness of the health risks have.

## **2.2 Empirical Research**

Keesling and Friedman (1987) conducted the first research into sunbathing, using an interview and questionnaire procedure with beach-goers in California, USA. From this research Keesling and Friedman (1987) came to the following conclusion regarding sunbathing; having a suntan is related to maintaining an image of the self as active, healthy and being an attractive person. Furthermore, having a tan and spending time sunbathing are closely related to belonging to certain social networks. Therefore, sunbathers are friends with other people who are tanned, and are influenced by comments regarding their tan from these people. This in turn helps to confirm that their behavioural choice regarding sunbathing is correct. Of particular interest was the finding that “sunbathers seemed less concerned with their actual health, than the appearance of their health” (Keesling & Friedman, 1987, p491).

Johnson and Looking-Bill (1984), conducted a questionnaire-based research, and found that positive stereotypes were associated with tanning. More specifically their findings indicated that 72 per cent of their participants thought they looked more attractive tanned than when they were untanned, and 78 per cent believed they looked healthier. Supporting this, Hill, Theobald, Borland, White and Marks (1990) found that 66 per cent thought they looked better with a suntan, more than half the respondents from their study said they felt healthier with a suntan, but only 18 per cent thought they actually were healthier. Such beliefs are therefore likely to affect behaviour

Miller, Ashton, McHoskey and Gimbel (1990) recently examined personality impressions and risk factors associated with the presence of a suntan. Using a vignette procedure, college students were asked to record their impressions of a target person with a “dark tan suntan” or a person where no reference to a suntan was made. Subjects perceived those with a dark tan as being generally more socially attractive than targets in the no tan category. Attitudes and beliefs about sun tanning were also surveyed, and it was found that subjects with higher reported levels of a tan were more likely to endorse the positive stereotype of a tan as attractive. Furthermore, such participants did not seem to be bothered by the risks associated with tanning in the sun, and there was even some evidence of

resistance or denial to skin cancer warnings. Miller et al (1990) reported that their subjects believed that benefits of sun tanning outweighed the potential risks.

Broadstock, Borland, Gason (1992) explored the relationship between the level of suntan and perceptions of healthiness and attractiveness. In this study the subjects were presented with a series of slides, showing various pairs of models, each with a different darkness of suntan. Subjects were asked to indicate the healthier and more attractive model in each photo. From this study the results indicated that a medium tan was the most attractive and healthiest, however, models with dark tans were rated more positively than models with no tan. This suggests that the desire for a tan is motivated by its positive image. Broadstock et al. (1992) also looked at personality impressions associated with the presence of a suntan through vignettes, with a sample of adolescents. Subjects formed more positive impressions of the target people described as having a suntan, when compared to the control target, where no tan was mentioned. The results of this study suggest that a suntan is an important physical feature, affecting adolescent's perceptions of healthiness and attractiveness. This finding is consistent with the argument that it is this positive stereotype that motivates intentional sun exposure and tanning.

Frequently reported in health literature are the marked differences in health behaviours and beliefs, between males and females. Overall, females have been found to be generally more concerned with health behaviours, engaging in more preventative medical behaviours than males. It is therefore unsurprising that Keesling and Friedman (1987) found females have a higher knowledge of skin cancer, and are more likely to engage in skin protective behaviours, including using sunscreen more often. Furthermore, they also found that females perceived a lighter tan to be more attractive and healthier than both a dark tan and no tan.

Adding weight to these findings, Scholfield, Freeman, Dixon, Borland and Hill (2000) monitored sun protective behaviours among young adults in Australia. Clear gender differences were found in this study, consistent with previous studies. Females were found to have better sunscreen behaviours, which the authors attributed to the fact that females care more about their skin than males. From this study it was concluded that females avoid excess exposure to sunshine

that causes wrinkles and will use a sunscreen more often than males. However, contradictory to this research Broadstock et al. (1992) found in their study that girls actively seek a tan more often than males, as the desire to be tanned is associated with a positive image, and girls are more concerned with their appearance than boys.

Research in this area generally has focused on adolescents and college students, effecting how widely such findings can be generalised to. However, adolescents are the group who, as a whole, spend most of their time in the sun (Johnson & Lookingbill, 1984), and are most determined to get a suntan (Marks & Hill, 1988; in Douglas, McGee & Williams, 1997). Unfortunately, a recent study of teenagers in the U.S found that most of the participants did not use adequate precautions in regard to excessive sun exposure (Banks, Silverman, Schartz & Tunnessen, 1992), and a survey carried out in England in 1995 found that 40 per cent of those aged 16-24 reported being sunburnt in the last 12 months, with only 40 per cent regarding this as being important to them (Ness, Frankel, Gunnell, Smith, 1999). It is also at this younger time of our lives when many of the damages that will lead to skin cancer later in life will occur (Martin, Jacobsen, Lucas, Branch, & Ferron, 1999), as during our childhood and adolescent years we receive about 50 per cent of our lifetime of sun exposure (Steen, Peay & Owen, 1998). Although adolescents have been shown to have a high level of knowledge regarding sun exposure, they still seem to engage in very few skin protective behaviours (Arthey & Clarke, 1995), raising further concerns for health professionals. From such research it can be concluded that prevention interventions have had a small influence on the health behaviours of many people within this age group, and more research is required into greater effective interventions. Furthermore, so that findings may be more broadly generalised, further research is needed amongst a wider range of ages, comparing interventions between varying age groups.



## **Chapter Three**

### **Health Behaviour Models and Additional Constructs**

Adopting health protective behaviours has been shown to be based on beliefs, attitudes and intentions (Steen, Peay & Owen, 1998). A number of theoretical models have been used to try and understand why people do, or do not, adopt precautionary behaviours. These include the health belief model, the theory of reasoned action and the theory of planned behaviour. Furthermore, variables such as intention, anticipated regret and conscientiousness have been found to help predict an array of health behaviours. These models and constructs will be discussed and will also be used to see if they can help to explain sunscreen use.

#### **3.1 Health Models**

The theory of reasoned action (TRA), developed by Ajzen and Fishbein (1980), is based on the notion that intention is the main determinant of behaviour. Intention is defined as the motivation required in order to perform a particular behaviour (Armitage & Connor, 2000). Therefore, the greater one's intention to perform a certain behaviour, the more likely it is that the performance of that behaviour will occur. Within this framework, intention is determined by attitudes and subjective norms (Armitage & Conner, 2000). The TRA has been used to predict a wide range of health related behaviours, including smoking, weight loss and seatbelt use. Hill and Rassaby (1984) used this theory to examine participant intentions to use hats, sunscreen and wear shirts when in the sun. From this study the components of the TRA were generally found to predict these behaviours, with intention accounting for 50-80 per cent of the variance (Hill & Rassaby 1984). Leary (1999) found from her research that sunscreen was moderately to strongly correlated with intention and planning.

The TRA is extended in the theory of planned behaviour (TPB), to include measures of perceived behavioural control as determinants of both intention and behaviour (Armitage & Conner, 2000). As with the theory of reasoned action, the TPB states that people's intentions to engage in health behaviours are affected by

several factors, including their attitudes, subjective norms, perceived behavioural control and self-efficacy.

Attitude towards behaviour, in terms of this model, is defined as an expression of one's positive or negative evaluations for performing a particular behaviour, whereas the subjective social norm reflects one's personal perception of the social expectations to adopt a given behaviour (Godin & Kok, 1996). The TPB proposes that strong intentions will be formed when individuals have both favourable attitudes and subjective norms, regarding the target behaviour (Abraham, 1999). Perceived behavioural control is also reported to influence intention, as well as the attitudinal and normative components of the model. Perceived Behavioural control reflects personal beliefs about how easy or difficult it is to perform a specific behaviour. These factors can either be external, for example time and money, or internal factors, for example information, skills and ability (Godin & Kok, 1996). Perceived behavioural control is based on the rationale that the greater a person's perceived control is, the more likely it will be that the enactment of the behaviour in question will occur (Armitage & Conner, 2001). Self-efficacy is also viewed as a notion conceptually related to perceived behavioural control, and has been defined as people's belief in their capabilities to achieve different levels of performance attainment (Godin & Kok, 1996). People's beliefs in their capability will affect the choices they make, how much effort they invest in their activities and how long they persevere in the face of barriers. Hillhouse, Adler, Drinnon & Turrisi (1997) used TPB variables in their study of students in the USA found that attitudes, subjective norms and perceived behavioural control accounted for 37 per cent of the variance in intentions to use sunscreen. Intentions in turn accounted for 49 per cent of the variance in behaviour.

### **3.2 Empirical research**

In regard to practising safe sun protective behaviours, a number of correlational studies provide support for elements of TPB. Subjective norms, included in TPB, have been found to influence sun protection behaviours. Sunbathers were more likely to have friends who sunbathed and also held beliefs that their peers thought they should have a tan. Obviously such attitudes have been found to predict

intentions to get a suntan. Similarly, having a tan and spending time sunbathing were closely related to belonging to a social group; individuals often associated with others who had tans, maybe as a way of confirming their behavioural choice with regards to sunbathing.

The TPB has been used extensively to predict a variety of health behaviours. A meta-analysis of the existing literature revealed that TPB, and specifically the factors of attitude, subjective norms and perceived behavioural control, accounted for 39 per cent of the variance in behavioural intention, and for 27 per cent of the variance in the behaviours themselves (Armitage & Conner, 2001). Although the efficacy of TPB is relatively high, there is still a large proportion of variance in behaviour and intentions that cannot be explained in terms of this theory. This has resulted in new research ideas, with novel constructs being investigated in order to increase the predictive power of the model.

### **3.3 Additional Constructs Impinging on Sunscreen Use**

A recent study by Jones, Abraham, Harris, Schulz, Chrispin (2001) sought to derive a model of the cognitive antecedents of sunscreen use. The study combined ideas from a number of models, including the TPB, and investigated the influence of knowledge, perceived threat, the importance of short-term negative consequences, norms, self-efficacy, intentions and planning applied to sunscreen behaviours in Australian and British populations. From this study it was found that the importance of short-term negative consequences (preventing sunburn, sunstroke and skin drying) were found to have the greatest direct effects on intention and planning. Self-efficacy had moderate effect on intentions, whereas the effects of knowledge, norms and threat were very small (Jones et al., 2001).

Anticipated regret (AR), a term referring to various regrets, worries and concerns that people take into account before making a decision, has proved to be a powerful predictor of behaviour. AR has been found to increase the capacity of TPB to predict intentions for various behaviours. Richard, De Vries, and Van Der Pligt (1998) found that AR was an independent determinant of contraceptive use, distinguishable from the components of TPB. Armitage & Connor (2001) used a

simple model consisting of the components of TPB and AR. Together AR and TPB helped to explain 65 per cent of the variance in behavioural expectations. This was a noticeable increase from using TPB alone, which only explained 39 per cent of the variance (Armitage & Connor, 2001). AR has additionally been found to explain variance in intentions regarding reckless driving, eating junk food, using drugs and drinking alcohol (Richard et al, 1996). Abraham and Sheeran (in press) found that whilst TPB variables and past behaviours explained 51 per cent of variance in intentions to exercise, including AR in the model significantly increased its predictive power by a further 5 per cent. The evidence clearly indicates that AR could be a significant predictor of intentions to exercise (Abraham & Sheeran, in press), to engage in safe sex practices (Richard et al, 1998), and to eat a healthy diet (Richard et al, 1995). At this stage it is not clear whether the effects of AR can be generalised to all health behaviours, or even sun protective behaviours, thus further research is required in this area.

Conscientiousness has also been found to be a reliable predictor of sun protective behaviours (Castle, Skinner & Hampson 1999). Castle et al., (1999) conducted a cross sectional analysis of a health leaflet, using the health belief model and personality factors as a guide to see if individual personality differences affected sun protective behaviours. To assess individual differences Saucier's (1994) mini-marker measures was used to assess the big five personality dimensions (extroversion, agreeableness, emotional stability, conscientiousness and intellect). Castle et al (1999) found that subjects who gained high scores on conscientiousness were also found to engage in better sun protective behaviours. This finding adds growing evidence to the significance of the dimension of conscientiousness for health (Marshall, Wortman, Vickers, Kusulus & Hervig, 1994; cited in Castle et al., 1999), suggesting that more conscientious individuals will engage in better health protective behaviours, to avoid health risks.

Castle et al., (1999) further found that females who tried to acquire a tan, acquired lower scores on the big five dimension of intellect, describing themselves as less complex, philosophical, deep, creative, imaginative and intellectual. Such findings suggest that individuals who place more importance on acquiring a tan, place less importance on other attributes, such as those described above (Castle et al., 1999).

Conscientiousness, anticipated regret and the theory of planned behaviour may help to explain why people do or do not take precautionary health behaviours. More research is needed however, to explain specifically how these models and constructs help explain sunscreen use. Understanding how these models and constructs explain this behaviour should help campaigners to develop more effective interventions to increase the behaviour of sunscreen use.



## Chapter Four

### Mortality and Appearance-Based Interventions

As skin cancer rarely occurs in people who avoid excessive sun exposure, or use appropriate sun protective measures (Stern et al., 1986), developing preventative interventions has become an important target for cancer campaigns. Having established some underlying beliefs about tanning we are now able to focus on interventions that may help to change the current behaviours in regard to sunscreen use. Examining various interventions will help campaigners to develop more effective, and worthwhile methods to increase sunscreen use.

#### **4.1 Mortality-Based Interventions**

Most efforts to promote increased sunscreen use have involved educational interventions, designed to convince people that exposure to the sun will increase the likelihood of skin cancer. Educational interventions teach individuals that by taking the recommended precautionary measures, for example using sunscreen, they will dramatically decrease their chances of developing skin cancer. Such interventions work on the notion that by stressing the relationship between UV radiation and skin cancer and providing people with the knowledge about the health risks associated with tanning, will motivate people to change their behaviours accordingly. Thus, according to many campaigners, the key to preventing skin cancer is through education; education about the risks, and education about what each individual can do to avoid these risks. Keesling and Friedman (1987) suggested that education about skin cancer was an effective intervention in ceasing sun bathing and using sunscreen. Various studies offer support for this rationale.

##### *4.1.1 Empirical research for Mortality-Based Interventions*

Katz & Jernigan (1991) developed an educational programme to increase high school students' awareness about the risk factors of skin cancer, the preventative measures that can be taken to decrease these risks, and how to detect for early warning signs of skin cancer. This study found that most students were largely unaware of the risks of tanning and developing skin cancer. Katz & Jernigan

concluded from their work, that there was a need to develop public awareness, in order to decrease the risks of developing skin cancer. This study provides a strong rationale for mortality based interventions. Although this study acknowledges the importance of informing people about the risks, it did not look to see if such information works to actually change behaviours in the sun.

Robinson (1990) provided interactive oral and written educational information regarding sunscreen use and changing habits of outdoor activities. After a year a questionnaire was given to the participants' and it was found that 62 per cent of the participants had started using sunscreen regularly, 56 per cent had changed their outdoor behaviours and 38 per cent had shown no behavioural changes. However, the sample used in this study was limited to people who had had a nonmelanoma cancer surgically removed in the last few years. Thus, it is unknown how much of the behaviour changes found in this study are attributable to the surgery alone, or the surgery plus the education. Further research could replicate this study with participants from a wider population group, who had not had a cancer surgically removed. This would then find out how much of an effect educating people of the health risks has on behavioural changes.

Mahler, Fitzpatrick, Parker, and Lapin (1997) investigated the relative effects of a health-based intervention versus an appearance-based intervention designed to promote sunscreen use. Participants in the experimental group viewed either one of two slide shows, either emphasizing the risks of developing skin cancer and providing information on how to prevent this fatal disease, or looking at what sun exposure potentially does to appearances. After viewing the slide show the participants completed a questionnaire, assessing their intentions to use sunscreen in the future. Participants in the control group did not view a slide show, and instead immediately completed the questionnaire. Results from this study indicated that participants in either of the experimental groups reported greater intentions to use sunscreen than subjects in the control group. Overall this study found the health-based intervention to be an effective way of increasing intentions to use sunscreen (Mahler et al., 1997).

As people are generally concerned about their well being and health, it makes sense that if people are informed about the health risk involved with sun exposure they would attempt to decrease sun exposure, and increase intentions to use sunscreen. Although the discussed studies offer support for this rationale, more research is required to see if providing information on the health risks associated with sun exposure and how to decrease the risks, will actually increase intentions and behaviours to practice sun safe behaviours.

#### **4.2 Appearance-Based Interventions**

Research has indicated that tanning is an important part to many people's appearance, in order to make them look more attractive and healthier. Due to the fact that suntanned people are frequently perceived as being more healthy and attractive than individuals without a tan, it is not surprising that a tan is a desirable feature. As a result of these values attached to suntans, individuals willingly lie in the sun seeking a tan, often completely fully aware of the potential health risks. It is these attitudes attached to tans that remain barriers to skin cancer campaigns designed to reduce sun exposure.

Current interventions tend to focus on the various health risks associated with tanning, and in doing so have proceeded to raise individual awareness, but still remain ineffective in changing a large number of the populations' behaviour. Research on other health problems, such as smoking, has found that simply informing people that their behaviour is unhealthy, produces behaviour changes in only a small percentage of people, and generally only those individuals who are motivated to change their behaviour already (Prochaska & DiClemente, 1983). We have no reason to expect that messages that stress the health risks involved with exposing one's self to the sun would be more effective in reducing people's time spent tanning, than health risks involved with other behaviours.

In the Robinson (1990) study mentioned previously 38% of the participants did not show any behaviour changes in respect to using sunscreen or altering outdoor behaviours after intensive education sessions regarding sun exposure, increasing sunscreen use and changing outdoor behaviours. It was reported that these participants had difficulty perceiving the benefits of the recommended behaviours.

Such participants saw the immediate results of such behaviours as reducing their tans, which they thought to be an important attribute, making them feel and look better (Robinson, 1990).

When people are motivated to tan to enhance their attractiveness to themselves and others, interventions that stress the health risks are most likely to be ineffective (Jones & Leary, 1994). As appearance has been identified as a reason why people continue to intentionally seek a tan, stressing the negative effects of the sun on physical appearances could be a more effective way to promote increased intentions to engage in sunscreen use. Due to the importance appearance seems to play in a large number of people's lives, such interventions should be more effective than messages that stress the negative effects of the sun exposure on one's health. Varying research provides support for this idea.

#### *4.2.1 Supporting Empirical Research*

Novick (1997) used a computer-enhanced stimulus to encourage application of sunscreen. Sunbathers were demonstrated the negative effects of exposure to the sun by showing them individually computer-altered images of their own faces, aged and disfigured by skin lesions. The images were aged by approximately 25 years, with the ageing process resembling one caused by prolonged sun exposure. The realistic lesions of various forms of melanoma were also transported onto the images. Participants were then monitored to assess their sunscreen use. Viewing the images of one's own disfigured and aged skin resulted, at least in the short-term, in an increased use of sunscreen, as well as an improved thoroughness of sunscreen application. This study provides support, for the use of appearance-based interventions. However, the fact that the participants were knowingly being monitored may have created what is known as the Hawthorne Effect, which is when participants are aware they are being observed, which may in turn directly influence and effect the behaviour in question (Arthey & Clarke, 1995). Nonetheless, despite the limitations, such research is encouraging for appearance-based interventions.

In the study mentioned earlier, Mahler, Fitzpatrick, Parker, and Lapin (1997) investigated the relative effects of a health-based intervention versus an appearance-based intervention designed to promote sunscreen use. Participants in the experimental group viewed one of two slide shows either one that focussed on using sunscreen to prevent wrinkles, lesions and age spots, or focusing on the prevention of skin cancer. Results from this study indicated that participants in either of the experimental groups reported greater intentions to use sunscreen than subjects in the control group. Furthermore, participants in the appearance-based group were more likely to tell their friends about what they had learnt. Overall the study found an appearance-based intervention to be an effective way of increasing intentions to use sunscreen (Mahler et al., 1997), although it was not significantly different to the health-based intervention.

Jones and Leary (1994) compared the effectiveness of the health-based messages and appearance-based messages for intentions to protect oneself from the sun. This study found that the effectiveness of appearance based interventions were dependant on the person's motivation to be attractive. The appearance-based intervention was less successful in creating sun intention behaviours for those who had high appearance motivation, however overall appearance based interventions had a positive effect. This study however was limited in its sample, having only undergraduate students in the sample, and focusing only on self reported beliefs and intentions regarding tanning (Jones & Leary, 1994).

Given the degree to which tanning is motivated by concerns about one's appearance, it is reasoned that people who are concerned with how they look, will be more persuaded by information regarding the detrimental effects of tanning on their appearance, rather than by information regarding risks to their health. If this is true, then using an intervention that focuses on appearance should be an effective intervention to help increase sun protective behaviours. However, as limited research has been conducted in this area, more research is needed before such assumptions can be made.



## **Chapter Five**

### **Terror Management Theory**

A theory that has been used to explain a range of behaviours is Terror Management Theory (TMT). TMT has helped to explain both health related behaviours and risky behaviours, and although it takes a completely different approach to interventions discussed previously, it may be more applicable to sunscreen use.

#### **5.1 Terror Management Theory**

TMT, primarily derived from the work of anthropologist Ernest Becker, begins by stating that like animals, humans are born with an instinctive propensity for self-preservation and continued existence, which enhances their probability of survival. Differing from animals however, humans have unique intellectual abilities and cognitive capacities, which help to regulate their behaviour (Greenberg, Solomon, Pyszczynski, 1997). It is these cognitive capacities that enable us as humans to be self-conscious and aware of our existence, which not only regulates behaviour, but also makes one mindful of potential death, making one realise how vulnerable one is. This recognition of the inevitability of one's own death can become a source of potential terror, which can be further exacerbated by the fact that death may occur at any time, through accident or disease. This knowledge, alongside our lack of control over death and our animal instinct for self-preservation, has the potential to create great terror and anxiety (Greenberg, Solomon & Pyszczynski, 1997).

Becker (1973) argued that individual members of our species would be paralysed by this terror unless we developed some means of managing this problem (Goldenberg, McCoy, Pyszczynski, Greenberg, Solomon, 2000). The behaviour aimed at resolving this conflict, or at least bringing it under control, is explained through Terror Management Theory (TMT). Becker (1975) hypothesised that humans confront the problem of death symbolically through culture. From this perspective culture is defined as a humanly created symbolic construction shared

by a group of people to minimise such anxiety (Greenberg, Solomon & Pyszczynski, 1997), and much of human behaviour and culture operates as a buffer against this terror (Silvia, 2001). Developing cultural worldviews helps to provide a basis for minimising anxiety, by creating meaning, order, stability and permanence within the world.

These cultural worldviews make it possible to feel significant, which thereby works to increase one's self-esteem. This is done through the adoption of the worldviews and social roles, as well as the satisfaction one gains from being associated with such standards of value and culture (Solomon, Greenberg & Pyszczynski, 1991). When individuals live up to such standards it confers a sense of immortality, both literally and symbolically. Literally, through beliefs about an afterlife and symbolically, by feeling that they are a valuable member of something more meaningful, important and longer-lasting than their individual lives, for example children, money and culturally valued achievements (Goldenberg et al., 2000).

TMT thus puts forward that a cultural anxiety buffer, created through self-esteem and cultural worldviews, functions to protect the individual from potential terror created from the awareness of their inevitable death. From this perspective two basic assumptions arise, both of which are necessary for effective terror management. Assumption one is that the individuals must have faith in a meaningful conception of reality; that is, immerse themselves in the cultural worldview. Furthermore, assumption two states, individuals must have the belief that they are living up to the standards of value prescribed by the worldview (Greenberg, Solomon & Pyszczynski, 1997).

Furthermore, arising from these assumptions it is evident that individuals manage this terror through the mechanism of self-esteem. Self-esteem serves as a psychological function, providing protection against deeply-rooted anxiety and offering strong support for the TMT proposition. Self-esteem, from a TMT perspective, is the perception that one is a valuable member of a meaningful universe (Greenberg, Solomon & Pyszczynski, 1997). It is therefore a cultural construction, and is the main mechanism by which culture performs its anxiety

buffering function (Greenberg, Solomon & Pyszczynski, 1997). As a result of this, the theory maintains that a great deal of individual and social behaviour is directed towards preserving faith in a cultural worldview and increasing self-esteem.

Individuals live up to internalised standards of value prescribed by their accepted culture worldviews, in order to qualify for the security and death transcendence afforded by the culture. It is these standards from our cultural worldview by which we evaluate others and ourselves. As the cultural anxiety buffer is a social creation that is humanly created, transmitted and maintained, individuals are highly dependant on others for validation and maintenance (Greenberg, Solomon, Pyszczynski, & McGregor, 1997). People seek to perceive themselves as being competent and moral in order to gain social approval, and it is this need that is a central component of TMT. As self-esteem is motivated by a basic instinctive need to belong, other people's perceptions of us are initially important determinants. People require consensual validation of others of their own self and worldviews in order to maintain faith in such perceptions. Therefore others opinions and approval are important determinants to establish and reinforce self-esteem.

The notion of the need of self-esteem exists because of the anxiety buffering function it serves to TMT. This function is unique to TMT, and TMT is the only theoretical perspective that provides an explanation for why and how anxiety and self-esteem are related (Greenberg, Solomon, Pyszczynski, Rosenblatt, Burloing, Lyon, Simon & Pinel, 1992).

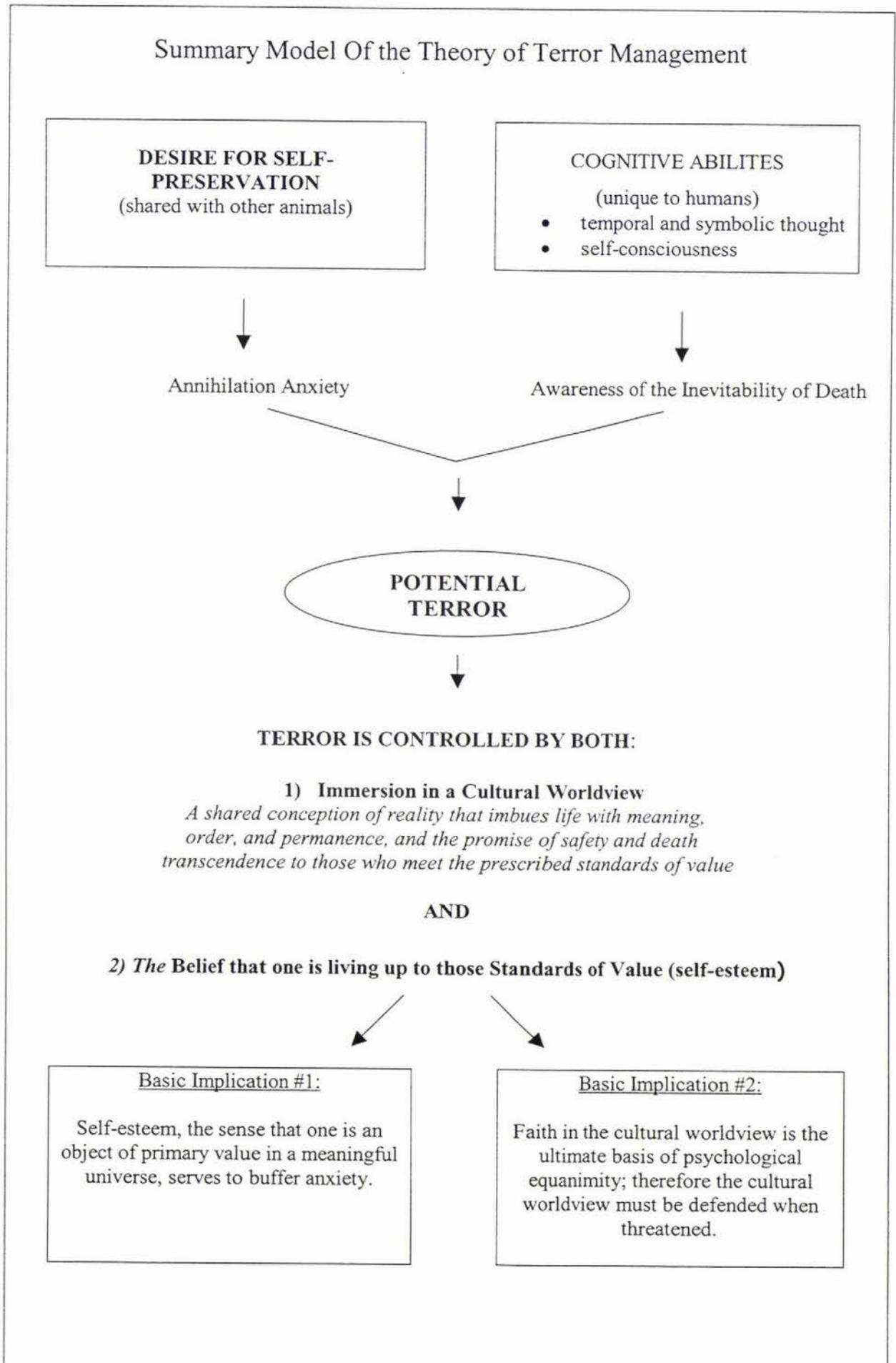
Self esteem functions as the anxiety buffer enabling the individual to function, despite awareness of ones own mortality, but only if one perceives themselves to be living up to the prescribed standards of value (Solomon, Greenberg & Pyszczynski, 1991a). The anxiety buffer is created throughout childhood, and comes from the cultural conceptions conveyed through language and behaviour from parents, teachers, peers and television (Ardnt & Goldenberg, 2002). Children quickly learn that living up to the cultural standards in the worldview leads to desirable outcomes, and failing leads to undesirable outcomes and

feelings of anxiety (Solomon, Greenberg & Pyszczynski, 1991b). In short, as children we learn to control our distress and anxieties by embedding ourselves in the symbolic reality conveyed by our parents and significant others and culminates as a culturally constructed anxiety buffer that makes it possible to function as a secure functioning adult (Ardnt & Goldenberg, 2002).

### *5.1.1 Summary of Terror Management Theory*

In Conclusion, TMT explains how humans control potential terror that may arise as a result of knowledge of one's potential inevitable death, conflicting with one's instinctive nature for self-preservation. Because of the need for self-preservation, anything that threatens one's continued existence becomes a source of intense anxiety. According to TMT, a dual component known as the cultural anxiety buffer has evolved to fulfil this function. TMT states that to protect ourselves from this potential terror we, as humans, immerse ourselves into a cultural worldview. This shared cultural construction allows individual to lead relatively anxious free lives, retaining a sense of immortality to the extent that we can perceive ourselves to be living up to cultural standards of individual value. Thus the most important function of the cultural worldview is to manage the terror associated with this awareness of death (Greenberg, Solomon & Pyszczynski, 1997). The cultural worldview is accomplished through the cultural mechanism of self-esteem. As a result of the protection provided by both the cultural worldview and self-esteem, people are motivated to maintain faith in their cultural worldviews and furthermore satisfy any standards of value associated with their worldview. This is clearly illustrated in Figure 1.

**Figure 1:** Model summarising TMT. (Taken From: Greenberg, Solomon & Pyszczynski, 1997).



## **5.2 Empirical Research of Terror Management Theory**

The bulk of empirical Research supporting TMT has focussed on two central hypotheses, the mortality salience hypothesis, and the anxiety buffer hypothesis, which are closely related.

### *5.2.1 The Mortality Salience Hypothesis*

The mortality salience hypothesis states that if a psychological structure (worldview or self-esteem) provides protection from mortality concerns, then reminding people of their death should increase their need for that particular structure (Greenberg, Solomon, Pyszczynski, 1997). TMT argues that the most important function of the cultural worldviews is to reduce anxiety associated with the awareness of death, thus reminding people of their own death (mortality salience) means that people should cling more tightly to their own cultural worldviews. This in turn should lead people to engage in activities that would enhance or maintain their positive self-esteem. In support for this reasoning, more than 75 studies have been conducted that have shown that reminding people of their own death have resulted in participants clinging strongly to their cultural worldviews, as well as increasing their defences, protecting their cultural worldviews (Goldenberg et al., 2000). Specifically participants responded more negative to those that threatened their worldviews and more positively to those people who supported and upheld their worldviews (Greenberg, Solomon, Pyszczynski, Rosenblatt, Veeder, Kirkland & Lyon, 1990). Supporting this, Solomon, Pyszczynski & Lyon (1989) found that judges gave harsher punishments for moral transgressors, as they threatened their worldview by explicitly violating the judge's own standards of value. Subsequent studies have also replicated and extended this finding (eg Florian & Mikulincer, 1997).

Extending such findings, mortality salience studies have also shown that individuals are more likely to have positive evaluations of in-group members as well as people who praise ones own culture, and more negative evaluation of out group members and those who criticise ones culture (Greenberg et al., 1990; Harmon-Jones, Greenberg, Solomon & Simon, 1996). Furthermore Ochsman and Mathy (1994) found that members who have the same worldviews are more

approachable, whereas members of an out-group were often avoided (Greenberg, Solomon, Pyszczynski, 1997).

Other studies have found that increased aggression was shown against those who challenged one's beliefs (McGregor, Lieberman, Solomon, Greenberg, Arndt, Simon, & Pyszczynski, 1998), and that after exposure to mortality salience participants conform to more recently prime cultural standards (Greenberg, Simon, Pyszczynski, Solomon & Chatel, 1992), and are less likely to violate cultural standards and experience greater anxiety if they do so (Greenberg, Poteus, Simon, Pyszczynski & Solomon, 1995).

Due to the fact that self esteem provides protection against death related anxiety, and is acquired by living up to the standards of value, it follows that reminders of one's mortality would intensify efforts to meet such standards. Greenberg, Poteus, Simon, Pyszczynski & Solomon (1995) found that individuals were more uncomfortable when violating cultural norms when mortality was made salient. This research shows that TMT, and its conformity to cultural standard is, at least in part, motivated by protection from anxiety.

As self-esteem provides protection against anxiety, making mortality salient leads people to engage in activities that enhance or maintain their positive image. Recent studies have found that this even goes as far as to include risky behaviours. Risky behaviours have the potential to increase one's self esteem because they can lead people to engage in activities that recognition and acceptance is gained, which in turn may enhance or reinforce one's positive self esteem. Although risky behaviours can also be self destructive, as long as the individual participating in such behaviours believes that the potential gain outweighs that of the potential loss, risky behaviours will be considered as a way of increasing one's self esteem (Taubman Ben-Ari, Florian & Mikulincer, 1999).

In an attempt to explain risky behaviours in terms of TMT, Ben-Ari et al., (1999) investigated the mortality salience hypothesis using reckless driving as an example of risky behaviour. It was predicted that that mortality salience would lead people, who perceive driving as relevant to their self-esteem to engage in a

more reckless driving. The results supported this main hypothesis, showing that for participants who considered driving as relevant to their self-esteem, the mortality salience intervention did result in a higher reported tendency to reckless driving. Ben-Ari et al (1999) further supported the mortality salience hypothesis by using an analogue measure of reckless driving as opposed to self-report. Driving speed in a car simulator was used as indicator of reckless driving, and making mortality salient led individuals who perceived driving as relevant to their self-esteem to increase their driving speed in a car simulator. Ben-Ari et al (1999) also believed that providing positive feedback about driving skills would weaken the effect of mortality salience. Since positive feedback would directly increase one's self-esteem, there would be no need to engage in reckless driving. The results showed that introducing self-enhancing feedback in the form of encouragement and praise did reduce the tendency for reckless driving, thus supporting the ideas of TMT (that people will strive to enhance their self-esteem as a form of terror management).

To further examine the effects of mortality salience on reckless driving Taubman Ben-Ari, Florian & Mikulincer (2000) carried out a similar study. From this second study it was found that participants drove faster in a simulator after being exposed to a video on mortality and road crashes, but intentions to drive recklessly were reported as fewer. From this study the researchers postulated that as well as boosting self-esteem through reckless driving, participants could also increase their self-esteem by conforming to cultural and societal standards (Ben-Ari et al., 2000). This research clearly indicates that mortality salience produces a host of predictable effects on a wide range of attitudes and behaviours, (Greenberg, Solomon, Pyszczynski, 1997).

### *5.2.2 The Anxiety Buffer Hypothesis*

The second central hypothesis of TMT, which is closely tied into the mortality salience hypothesis, is the anxiety buffer hypothesis. This hypothesis states that if psychological structures provide protection against anxiety, then strengthening that structure should make one less prone to exhibit anxiety, or anxiety related behaviours, in response to threats. Additionally if this is the case, then weakening

that structure should make an individual more prone to anxiety, or anxiety related behaviours in response to various threats. (Harmon-Jones, Simon, Greenberg, Solomon, Pyszczynski & Mc Gregor, 1997). More specifically to TMT, the anxiety buffer states that if the psychological structures (world view or self esteem) provide protection from mortality concerns, then strengthening these structures should reduce anxiety in response to specific reminders of death.

A large quantity of empirical research has found supporting evidence for this hypothesis. Specifically studies have found a negative relationship between self esteem and general anxiety, death anxiety and physical and mental problems associated with anxiety (Solomon, Greenberg & Pyszczynski, 1991). Furthermore studies have found that threats to self esteem increase anxiety (Greenberg , Pyszczynski, & Solomon, 1986; in Solomon, Greenberg & Pyszczynski, 1991a), that defensive responses to self-esteem are mediated by anxiety (e.g., Gollwitzer, Earle & Stephan, 1982; in Harmon-Jones et al., 1997), and that the use of self-esteem defences reduce anxiety (Mehlman & Snyder, 1985).

Fairly recent experiments have found that increasing self esteem has been shown to reduce self reports of anxiety after watching a gory video (Greenberg et al., 1992), has increased physiological arousal while anticipating electrical shocks (Greenberg & Solomon, Pyszczynski, Rosenblatt, Burling, Lyon & Simon, 1992), and increased defensive distortions to deny one's likelihood of an early death (Greenberg, Pyszczynski, Solomon, Pinel, Simon. & Jordan, 1993).

In accordance with anxiety-buffer hypothesis, Greenberg et al (1992) argued that if self-esteem served as an anxiety-buffering function, then when exposed to threatening stimuli subjects whose self-esteem has been raised should exhibit less anxiety than subjects whose self-esteem has not been altered. Greenberg et al (1992) carried out a study to provide evidence in support of their claims. The study was designed to test the hypothesis that increasing self-esteem would reduce anxiety in response to threat. 52 male students were selected for the study and randomly allocated to experimental conditions. Subjects' self-esteem was manipulated by providing them with either highly positive or neutral feedback on a fictional personality test. The feedback was very general in nature so that it

could plausibly apply to all the subjects. After this self-esteem manipulation, subjects were exposed to a half an hour-long video. Whilst half of the participants watched a graphic video depicting death-related scenes, including actual footage of autopsy and an electrocution of an inmate on death row, the remainder of subjects watched a neutral video. After viewing the video, subjects' anxiety levels were assessed using self-reported scores on the anxiety inventory. Subjects also filled out the Rosenberg Self-Esteem Scale as a check on the self-esteem manipulation. Subjects in the increased self-esteem condition exhibited higher levels of self-esteem than those in the neutral self-esteem condition. More importantly, the results revealed that after watching the death video, the reported anxiety levels had increased among the participants in the neutral feedback condition. The video had no effect on the anxiety levels of increased-self-esteem subjects.

In summary, by demonstrating that a boost to self-esteem makes people less susceptible to experience anxiety in the face of threatening images of death. The results of this study confirmed that self-esteem reduces susceptibility to anxiety in response to threat, thus supporting the anxiety-buffer hypothesis, providing direct support for the Terror Management Theory.

Greenberg et al., (1993) have shown that both experimentally increased and dispositionally high levels of self esteem lead to an elimination of the otherwise robust tendency for subjects to distort their self reports of emotionality in whatever direction they were led to believe is associated with a long life expectancy.

Such studies provides converging evidence that increased self-esteem reduces susceptibility to anxiety, and anxiety-mediated behaviours in response to threats, therefore providing support for the self-esteem as an anxiety buffer.

### **5.3 Terror Management Theory and Sunscreen use**

It is clear in contemporary western culture, that the body's appearance is highly valued; cultures not only value attractiveness, but also reinforce those who meet the prescribed values of beauty. According to TMT, by transforming our bodies into cultural symbols, we are able to defend against the fears associated with our vulnerability and ultimate mortality (Goldenberg et al., 2000). TMT suggests that by valuing and satisfying cultural standards of attractiveness, people can deny their creaturely animal nature, thereby warding off the fear of death (Goldenberg et al., 2000).

If the symbolic body serves as a buffer against anxiety surrounding death, it follows that people who believe they are meeting cultural standards for the body would cling to this aspect of self in response to reminders of death. The current study therefore, employs the TMT framework to examine the effects of threat appeal on sun exposure. Within this framework, it is conceptualised that the sun tanning threats may play the same role in mortality salience inductions that it has played in previous TMT studies. Specifically, by making people aware of their own vulnerability and mortality while exposing themselves to the sun, should activate terror management mechanisms, promoting activities that enhance one's positive self-esteem. This may include risk behaviours, including seeking and maintaining a suntan, as a tan could be seen as a way to enhance one's self esteem.

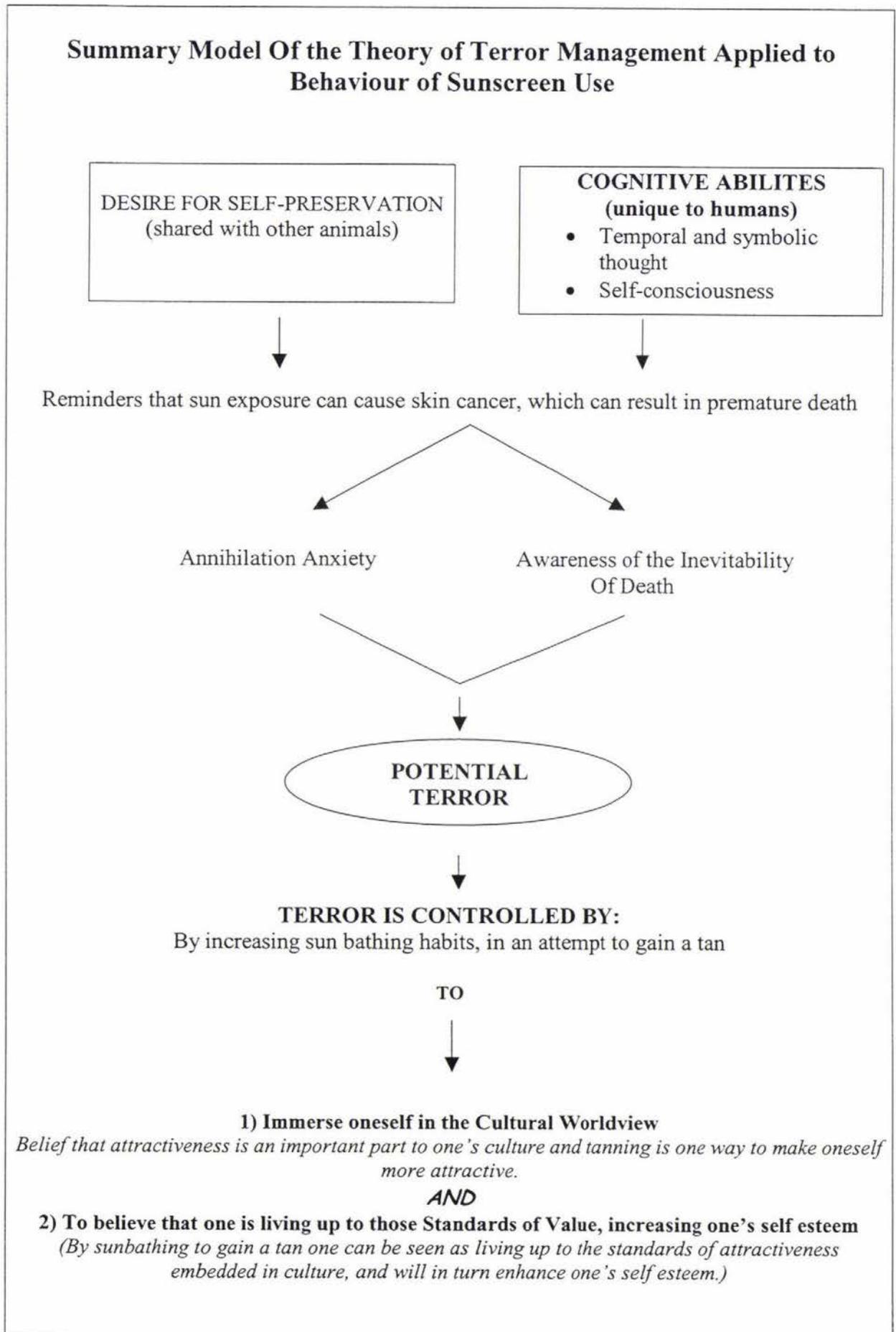
Reminders of mortality salience should increase the focus on standards and behaviours pertinent to the body among those who believe their bodies meet the internalised standards of value, and decrease such focus among those who believes their body's fall short of such standards. By making people aware of their own mortality, should therefore result in a desire to increase their self-esteem, and since the body's appearance (especially a tanned body) seems to be an important source of self-esteem, obtaining a tan can be one way of achieving increased self esteem. Goldenberg et al (2000) investigated the effects of mortality salience on the desire to increase self-esteem through one's physical body. They found that for those with high body esteem, mortality salience resulted in increased identification with their physical bodies. That is, the mortality salience intervention increased identification with one's source of self-worth and increased

the appeal of the activities relevant to these sources. Goldenberg et al (2000) concluded that physical appearance can serve as a terror management function, but only if individuals feel that they are meeting the cultural standards for the body appearance. If one considers the current trends with respect to having a tan and its implications for the individual, it is reasonable to assume that majority of individuals would consider that having a tan would increase the chance that their body appearance meets the standards set by the society, thus boosting their self-esteem.

Many current health promotions concentrate their efforts of increasing sunscreen use by making people think about their mortality through the use of cancer based interventions. According to TMT, it is through such interventions, that campaigners may in fact be increasing the behaviour they are trying to decrease. TMT implies that alerting people to the potentially lethal effects of sunbathing would result in individuals attempting to increase their self-esteem, and as a tan can easily boost one's self-esteem; individuals are therefore likely to increase their sunbathing behaviours, and decrease sunscreen intentions, this is further illustrated in Figure 2.

Although there is no evidence to suggest that TMT would apply to sunscreen use, it would be beneficial to find out, as this may be a possible reason why many interventions had been largely unsuccessful. However, before such assumptions can be made, research is needed to see if TMT can be applied to sunscreen use. If TMT was applicable to sunscreen use, skin cancer campaigners may in fact have to rethink their strategies of intervention.

Figure 2: The TMT model adapted to explain how sunscreen use can be explained through the theory of terror management





## Chapter Six

### Rational for the Proposed Study

#### 6.1 Overview of Introduction

Skin cancer has become one of the most prevalent forms of cancer throughout the world (Arthey & Clarke, 1995), with New Zealand leading the world in both melanoma related deaths and incidences. Exposure to the sun's UV rays has been found to be responsible for 90 per cent of all skin cancers related to the sun (The Cancer Foundation, 1995). However, it has been indicated that 80 per cent of skin cancers can be avoided through appropriate sun prevention (Melia & Bulman, 1995). Skin cancer rarely occurs in people who avoid excessive sun exposure or use appropriate sun protective methods (Stern et al., 1985). It is these facts that have sparked the interests and attention of the Cancer Society, and led to the development of campaigns to raise people's awareness of such issues.

Since the beginning of such campaigns, research has indicated that although people have become aware of the relationship between skin cancer and sun exposure, they generally remain slow to change their behaviours, and continue to expose themselves to the sun, often intentionally seeking a tan. Consequently, decreasing the amount of sun exposure has become the primary objective of skin cancer prevention. Included amongst such precautions is the use of sunscreen, which is widely accepted as a preventative to sunburn.

Various models have been used to explain a range of health behaviours and these include the Theory of Planned Behaviour (TPB), however, only limited studies have examined how this model relates to sunscreen use. Alongside this model, the constructs of anticipated regret and conscientiousness have been additionally found to effect sunscreen use. Only a very small number of studies have considered these factors, thus further research is required in applying these additional constructs to sunscreen use, and examining them over and above the TPB.

A major barrier in the way of campaigns aiming to increase sunscreen use is the ideas that tanned bodies are more popular, healthier and attractive than those that

are untanned (Randle, 1997). Past research has indicated that the popularity of sunbathing has been increasing steadily over time, and studies have found that the degree to which people engage in excessive tanning is more strongly related to their concerns with being physically attractive, rather than to their knowledge of associated risks involved in obtaining a tan (Leary & Jones, 1993). As a result people may seek and maintain a suntan because it makes them feel more attractive and furthermore by doing so, increase their vulnerability to skin cancer.

Since the 1980's campaigning has informed the general public about research illustrating the relationship between the sun's UV rays and skin cancer however, despite this new information, tanning is still seen as a positive attribute that people actively seek. Campaigns, initiated by health professionals, aim to reverse the trend in tanning. Although, such campaigning has increased people's awareness and knowledge, they have yet to succeed in changing the trends and opinions of tanning. Furthermore, it is the values aforementioned attached to suntans that remain barriers to the skin cancer campaigns designed to reduce sun exposure.

The Theory of Terror Management (TMT) has been applied to risky behaviours. TMT states that when a person is reminded of their mortality they will try to increase their self-esteem, in order to buffer the anxiety that is created from being reminded of one's potential death. If TMT applies to the behaviour of sunscreen use, then when people are informed about the fact that sun exposure can result in skin cancer and death, they will be triggered to increase their self-esteem to control their anxiety associated with this mortality reminder. As one mode of increasing self-esteem is through appearance, people may be triggered to actually expose themselves to the sun to gain a tan, as a tan is seen as a way to make one more attractive. If this is the case then campaigners are in fact encouraging the behaviour they are trying to decrease.

## **6.2 The Present Study**

New Zealand has one of the highest incidences of melanoma in the world, yet very little research has been conducted examining sunscreen use within New Zealand. The present study therefore, aims to study sunscreen behaviours within New Zealand, as well as a British population, to create a comparison for the New Zealand population.

The Theory of Planned Behaviour (TPB) will be used as a basic guide for examining sunscreen behaviours. However, another study running parallel to the current study will look at this model applied to sunscreen use in greater depth. The present study aims to examine the variable of intention to use sunscreen alongside the constructs of TPB, specifically the constructs of subjective norm, perceived behavioural control and attitudes toward sunscreen use. Additionally, the constructs of anticipated regret and conscientiousness will be further examined to see if they can further explain intentions to use sunscreen over and above the TPB.

In addition, the present study aims to look at mortality interventions that are commonly used to promote sunscreen use. Health-based interventions are common interventions used to promote sunscreen use by various campaigners within our community, and it is thought that by informing people of the possible health risks associated with exposing oneself to the sun, people would take the necessary precautions to protect themselves from these risks. However, although studies have found that since the start of such campaigns people's awareness has raised, limited studies have examined if such information has actually changed people's behaviours and increased sunscreen use. Although mortality and health-based interventions should be effective in increasing intentions to use as sunscreen, it may only be effective for people who are less concerned with appearances, as having a tan would not be such an impinging factor.

As people strive to be more attractive and fit in with what media portrays as a "desirable image", looking at interventions that use an appearance-based prevention approach may be a more effective technique to get people to increase

their use of sunscreen. The present study aims to do this by focussing on the negative consequences of sunbathing on a person's appearance, specifically emphasising photo ageing, wrinkles and skin lesions. This should prove to be more effective in promoting sensible sun behaviours for those who value their appearance, rather than those interventions that focus on the health risks.

Finally, the present study aims to look at the Theory of Terror Management and apply it to sunscreen use. Taking a completely different angle with the mortality-based intervention, TMT states that awareness of one's own mortality would manifest itself into anxiety and people would strive to reduce this negative emotional state by conforming to social norms and increasing their self-esteem (Goldenberg et al, 2000). As being tanned is clearly perceived as a desirable social norm (Koblenzer, 1998; Arthey & Clarke, 1993, Kiesling and Friedman, 1987), and contributes to the positive image of an individual (Broadstock et al, 1992; Leary & Jones, 1993; Kiesling & Friedman, 1987), sunbathing can be a relatively simple way of increasing one's self-esteem (Goldenberg et al, 2000). Since using suntan lotion slows down the process of tanning, people may be less inclined to use it when in a state of anxiety. If TMT is applicable to sunscreen use, it may help offer an explanation as to why many interventions have been unsuccessful in increasing people's sunscreen use. However, before such assumptions can be made, research is needed to see if TMT can be applied to sunscreen use.

In summary, the present study further aims to look at the TPB and the additional constructs of conscientiousness and anticipated regret to see how these variables can be applied to sunscreen use. An appearance-based intervention will also be examined and compared to a health-based intervention, to see which intervention is more successful in increasing intentions to use sunscreen. Furthermore, the present study also aims to examine TMT, to see if this theory can be applied to sunscreen use. It is hoped that by briefly looking at TPB and comparing health-based and appearance-based interventions, better techniques to encourage sunscreen use can be developed within New Zealand.

### **6.3 Hypotheses of the Present Study**

#### *6.3.1 Hypothesis One:*

It is hypothesised that the model of the constructs of the Theory of Planned Behaviour (TPB), specifically subjective norm, perceived behavioural control and attitudes to sunscreen, will explain and predict intentions to use a sunscreen.

#### *6.3.2 Hypothesis Two:*

It is further hypothesised that anticipated regret (AR) and conscientiousness will increase the predictive power of intentions to use a sunscreen, after the TPB constructs have been accounted for.

#### *6.3.3 Hypothesis Three:*

It is hypothesised that by stressing the potential negative effects of sun exposure on one's health, and by emphasising the fact that people die as a result of sun exposure, people's intentions to use sunscreen will increase when compared to a control group.

#### *6.3.4 Hypothesis Four:*

It is hypothesised that stressing the negative effects of sun exposure on one's skin appearance will be effective in increasing intentions to use sunscreen when compared to a control group.

#### *6.3.5 Hypothesis Five:*

Hypothesis five predicts that intentions to use sunscreen will be greater for those people who scored higher on the appearance measures, indicating that a tan is important to their appearance after being exposed to the appearance based intervention. It is additionally hypothesised that females will score higher overall on the appearance measures, and further increase intentions after being exposed to the appearance intervention.

### *6.3.6 Hypothesis Six:*

It is hypothesised that the theory of terror management will explain intentions to use sunscreen, thus reminding people of their mortality will decrease intentions to use sunscreen when compared to a control group.

### *6.3.7 Hypothesis Seven:*

Hypothesis seven predicts that when participants are reminded of their mortality, participants with low self-esteem will decrease intentions more so than participants with high self-esteem, as these people will need to increase their self esteem more as it was lower to start with. It is also hypothesised that participants who deem a tan as important to appearances will decrease intentions further than those who do not deem a tan as important to appearances, as gaining a tan will be a more relevant way of increasing their self-esteem.

## **Chapter Seven**

### **Method**

#### **7.1 Study Design**

Abraham (1999) stated when observing a person's attitudes one cannot directly examine this, thus examiners must rely on asking people what they think. As the current study is proposing to look at theorised structures and processes that are used to explain a person's actions, a questionnaire was used for data collection.

The study involved participants from both New Zealand (NZ) and the United Kingdom (UK). Participants were placed randomly in one of three conditions: the mortality salience intervention, the appearance-based intervention or the control group condition. The appearance-based intervention investigated the relationship between appearance and the behaviour of using sunscreen. The mortality salience condition investigated both the relationship between a health-based intervention and the behaviour to use sunscreen, as well as looking at terror management theory as applied to sunscreen use. The control group was used for a base-line and comparison group.

#### **7.2 Research Setting**

The New Zealand participants were recruited on Mount Maunganui Beach in the Bay of Plenty, New Zealand. Researchers approached all people at the beach on a sunny day during early April, between the hours of 11am and 2pm. This time was chosen as it is the warmest part of the day and also when the sun is at its most harmful stage. Similarly, a different researcher on Brighton and Hove Beaches in Britain recruited the UK participants.

A beach setting was chosen for the place of data collection, as this is a place where people are exposing themselves to UV rays directly. It is a place where sunscreen use is promoted and is a place where participants are likely to be intentionally sunbathing. A beach setting therefore, seemed an ideal place to obtain relevant information from people regarding their sunscreen use. Data collected at the location, rather than in a lab or a completely different location, is often better understood by the participants, and therefore, is more accurate

(Cozby, 1997). The questions in the questionnaire inquired about attitudes and behaviours in direct reference to the beach on that particular day.

### **7.3 Participants**

Researchers approached all people that were in a specific area of Mount Maunganui Beach. Participants were asked if they would like to participate in our research by completing a questionnaire. Approximately 95 per cent of the beachgoers asked to participate in the study agreed to complete the questionnaire. In the UK sample the researcher approached all people wearing swimwear on the beach, receiving an overall response rate of 90 per cent.

As indicated by Table 1, The NZ sample consisted of 151 people (56 males and 95 females). The mortality condition had a total of 61 participants (24 males and 37 females). The appearance condition had 41 participants (18 males and 23 females) and the control group had 49 participants (14 males and 35 females). All participants were 16 years of age or above; this being the age of inclusion for the study. The age of the participants (see Table 2) ranged from 16 to 82 years, with a mean age of 35.44. The mean age in the 'mortality' group was 36.41 (ranging from 16 to 74), in the 'appearance' group the mean age was 33.42 years (ranging from 16 to 71) and in the control group the mean age was 35.88 years (ranging from 16 to 82). The nationality was dominantly New Zealander (n=114). A number of British participants were also recruited in NZ (n=), and the remaining participants were from a wide range of nationalities, with majority of these identifying themselves as a European. Although classified for the purposes of this study as "other", the nationalities included Swedish, French, Canadian, American, Australian, Swiss, Irish and South African. The spread between the three conditions for nationality can be seen in Table 2.

**Table 1:**

*Number of participants in each condition for the UK and NZ sample.*

Condition	New Zealand Population		British Population	
	Number of Participants	%	Number of Participants	%
Mortality	61	40.4	91	33
Appearance	41	27.2	96	34.5
Control	49	32.5	90	32.5
Total	151	100.0	277	100.0

**Table 2:**

*Differences in Gender, Age and Nationality between the three conditions for the NZ and UK participants.*

	NZ condition			UK condition		
	Mortality (n = 61)	Appearance (n =41)	Control (n =49)	Mortality (n =91)	Appearance (n =96)	Control (n =90)
<b>Gender</b>						
Male	24	18	14	34	42	34
Female	37	23	35	57	54	56
<b>Nationality</b>						
NZ	47	27	40	5	2	1
British	7	3	4	78	81	84
Other	14	14	9	8	13	5
<b>Age (years)</b>						
16-23	17	17	11	11	8	23
24-34	33	20	33	50	42	41
35-44	11	3	3	17	34	16
45+	-	-	1	13	12	9

#### **7.4 Procedure**

The following procedure was initially peer reviewed by three senior lecturers at Massey University, Palmerston North, NZ to ensure it meet the current ethical standards. Suggestions from this process were adhered to, and the recommended changes were made. This led to the cancer pamphlet (see Appendix C), being given out after participants had completed the mortality questionnaire that discussed melanoma and skin cancer in detail. The pamphlet provided more information on melanoma, including contact details for interested or concerned participants.

After researchers approached the potential participants on the beach, it was explained to them that the researcher was conducting a study on sunscreen use as part of their university studies. All information was given to the subjects orally, but a written information sheet was also available and offered to participants, see Appendix A.

After all information was provided potential participants were invited to take part in the study by completing a questionnaire, which took approximately ten minutes. Participation was voluntary and it was made clear to all participants that they could withdraw from the study at any point throughout the study. Confidentiality and anonymity was assured to potential respondents, and as no names were asked for by researchers or recorded anywhere on the questionnaires, this was further guaranteed.

If a participant refused to participate, the researchers thanked them anyway, and then the next person on the beach was approached. By agreeing to participate in the study and completing a questionnaire, informed consent was assumed. Participants were also offered the opportunity to be sent a copy of the study's results upon completion of the study. If participants were interested they filled in their name and address on a separate piece of paper. These forms were then safely stored away separately to the questionnaires, to further assure anonymity.

Participants who agreed to complete the questionnaire were provided with a clipboard, pen and questionnaire. The researchers stayed nearby and were

available to the respondent if they required assistance with any aspects of the questionnaire. Participants were randomly assigned to one of three conditions, either being one of the two experimental conditions, or the control group.

Upon the completion of the questionnaires, participants were thanked for both their time and their cooperation. As participants in the mortality salience condition were exposed to information regarding skin cancer, upon the completion of these questionnaires participants were also offered an information sheet on this topic, which included contact details if the participants required further information, see Appendix B.

### **7.5 The Questionnaire**

Three types of questionnaires were used in this study, for the different conditions. The three groups in the study included the mortality salience condition, the appearance-based interventions condition and the control group condition. The questionnaire, designed specifically for this study, was divided into three parts. The first and third part of the questionnaire was identical for all participants (see Appendix D and F), and the second part varied, dependant on the condition the participant was in (see Appendix E).

Several items were also reverse scored throughout the questionnaire to ensure participants were reading and answering the questions correctly. These items were later reversed back to be consistent with the other questions by the researcher.

#### *7.5.1 Part One: Pre-intervention Measures.*

Part one of the questionnaire looked at demographic information, attitude, subjective norms, perceived behavioural control, self esteem, appearance attitudes in relation to how important a tan is to appearances, intentions to use sunscreen and anticipated regret. All of this information was obtained before the intervention, to provide a base for comparison, as at this point all information should be similar for all groups.

### Demographic Information:

Demographic information obtained from the participants included age, gender and nationality. These questions were all directly asked, with a blank left for participants to record their answers.

### Attitude towards sunscreen:

Attitude towards sunscreen was measured from six items and consisted of the following statement: 'Using a sunscreen on the beach today would be: bad/good, harmful/beneficial, unpleasant/pleasant, unenjoyable/enjoyable, risky/safe, troubling/reassuring'. The responses to each item were given on a scale 1 – 7, with 1 indicating a 'negative attitude' and 7 indicating a 'positive attitude' to each statement. A reliability analysis was computed and a total mean for all seven answers computed for each person. Scores ranged from 1-7 ( $M = 5.5$ ,  $SD = 1.16$ , Cronbach's  $\alpha = .8027$ ).

### Subjective Norm

Subjective norm was assessed using one item: 'People who are important to me think I should use sunscreen when on the beach today'. The response unlikely/likely was measured on the scale of 1 – 7, with 1 indicating low subjective norm and 7 – high subjective norm. Scores ranged from 1-7 ( $M = 5.75$ ,  $SD = 1.69$ ).

### Perceived Behavioural Control (PBC)

PBC was measured with three items and consisted of the following statements: 'For me to use sunscreen when on the beach today would be difficult/intermediate/easy'; 'For me to use sunscreen often enough to ensure adequate protection today would be difficult/intermediate/easy' and 'How much control do you have over whether you use sunscreen when on the beach today? No control/some control/complete control'. Scores on this scale ranged from 1-7 ( $M = 5.81$ ,  $SD = 1.41$ , Cronbach's  $\alpha = .7153$ ).

### Self-Esteem

Self-esteem was assessed using one item derived from Robbins et al. (2001): 'I have high self-esteem'. The response not very true of me/very true of me was measured on the scale of 1 – 7, with 1 indicating low self-esteem and 7 – high self-esteem. Scores on this scale ranged from 1-7 ( $M=5.45$ ,  $SD =1.27$ )

### Appearance.

The appearance measure asked five questions enquiring about participants' opinions regarding how important a tan is to appearances. These included: 'Having a tan helps me feel better about myself – strongly disagree/strongly agree' 'Sun tanned people do not look more attractive – strongly agree/strongly disagree' [reverse-scored], 'I look slimmer when I have a tan – strongly disagree/strongly agree', ' I am more attractive when I have a tan – strongly disagree/strongly agree', 'suntanned people look healthier – strongly disagree/strongly agree' The response was measured on the scale of 1 – 7, with 1 indicating strong disagreement, and 7 indicating strong agreement. Scores on this scale ranged from 1-7 ( $M=4.44$ ,  $SD =1.19$ , Cronbach's  $\alpha =.7037$ )

### Anticipated Regret (AR)

Anticipated regret measure was derived from 4 items and consisted of statements such as: 'How would you feel later if you did not use sunscreen on the beach today? – worried/not worried, regret/no regret, tense/relaxed, upset/no upset'. The responses to each item were given on a Likert Scale ranging from 1–7, with 1 indicating 'high regret' and 7 'low regret'. ( $M = 4.55$ ,  $SD = 1.77$ , Cronbach's  $\alpha = .9138$ ).

### Intention to use sunscreen

The intention measure was derived from four items and consisted of the following items: 'I intend to use sunscreen on the beach today – strongly disagree/strongly agree', 'I intend to re-apply my sunscreen often enough to ensure adequate protection on the beach today – strongly disagree/strongly agree', 'I will try to re-apply my sunscreen often enough to ensure adequate protection on the beach today – likely/unlikely'. 'I plan to use sunscreen on the beach today – strongly

disagree/strongly agree'. The responses to each item were given on a scale 1 – 7, with 1 indicating 'low intention' and 7 'high intention' to use sunscreen. Scores on this scale ranged from 1-7 ( $M=4.52$ ,  $SD =1.94$ , Cronbach's  $\alpha =.8741$ )

### 7.5.2 Part two: *The Intervention*

After completing these questions the participants read a short extract, viewed two colour photos and completed a short quiz, containing five questions. The questions that followed the passage and pictures were multiple choice type questions, containing only one correct answer. The purpose of these questions, in all conditions, was to allow better encoding of the material, however the answers were not checked for correctness, or used in any statistical analysis. This part of the questionnaire varied between the three conditions, as the interventions were contained in the passage, the photos and the quiz. All interventions are in Appendix E.

The first experimental group was the mortality salience group, which looked closely at skin cancer. A short story was included about malignant melanoma, detailing the causes and the statistics of the death rate from this disease, including key phrases such as: '*the most lethal variety of skin cancer*'; '*80% of skin cancer deaths are from melanoma*'; '*advanced melanoma spreads to internal organs and may result in death*'; '*one person each hour dies from melanoma*'; '*7800 people were expected to die from the disease*'; '*melanomas occur on sun damaged skin*'. The intervention was aimed to increase mortality salience and to evoke the feelings of terror and anxiety relating to death. After reading the passage of text, participants looked at two photographs of skin areas affected by melanoma and answered five multiple-choice questions about skin cancer

Participants approached with the skin cancer intervention were pre warned that the photos may be disturbing before beginning the questionnaire, and thus were able to withdraw their consent at this point. Participants in the skin cancer intervention were also provided with an information pamphlet about skin cancer, and an address and phone number that participants with any concerns or queries could contact, see Appendix C.

The second experimental group was the appearance condition. Participants in this condition read a passage about the effects of photo-aging caused by UV rays. This extract emphasised premature aging as a consequence of sun damage. The 'appearance' group participants read a text about the effects of photo aging, including phrases such as: *'90 percent of the wrinkling, sagging, sough patches, skin discoloration...'*; *'premature aging of the skin caused by frequent unprotected exposure to sunlight'*; *'sunburn is nothing more than an acute photodamage'*; *'sun exposure plays the major role in causing undesirable skin changes of wrinkles, roughness leathery texture, sallowness'*; *'photoaging is seen most frequently and severely on parts of the body constantly exposed to sun – face, ears, neck...'*; *'photoaged skin is usually referred to as "old skin"'*; *'may have age spots'*. For a full intervention passage, see Appendix E.

The appearance intervention aimed to highlight the negative results of sunbathing in regards to appearance and to devalue the effects of tan on attractiveness. Accompanying this extract was two colour pictures of photo-aged skin, as a result of sun damage. Again several multi choice questions followed this extract, see Appendix E.

Finally, the control group looked at a neutral story about a setting. The New Zealand participants in the control group read a neutral story about Mount Maunganui, the place where the study was being conducted. This looked at the history and the present use of Mount Maunganui. Complimenting this were two photos of Mount Maunganui see below, and several questions about the story (Appendix E). The UK sample in the control group read a similar story, learning about the history and future of Brighton West Pier. Photos of Brighton West Pier were also viewed, and a short quiz was completed (Appendix E).

### *7.5.3 Part Three: Post Intervention Measures*

Part three of the questionnaire was identical throughout all the three conditions. This part came after the intervention, so any differences between the groups should occur at this point. The post-intervention measures looked at affective response, anticipated regret, intention, hair colour and skin type.

#### Affective Response

Affective response measure was derived from six items and measured participant's emotional response to the text and photographs they viewed as part of the intervention. The measure consisted of the statement: 'How did the pictures make you feel? – sad/happy, concerned/not concerned, tense/relaxed, frightened/not frightened, risky/safe, troubled/reassured'. The responses to each item were given on a scale 1 – 7, with 1 indicating 'negative emotions' and 7 'positive emotions'.

#### Anticipated Regret (AR)

Post-intervention anticipated regret measure was derived from the same four items as pre-intervention ones. The post-intervention items ranged from 1-5, ( $M = 4.30$ ,  $SD = 1.8$ , Cronbach's  $\alpha = .9295$ ).

#### Intention

Post intervention intention measure was derived from the exact same items as the pre-intervention intention items. The post intervention items ranged from 1-5 ( $M = 4.56$ ,  $SD = 2.15$ , Cronbach's  $\alpha = .9159$ ).

#### Conscientiousness

This was measured with nine items, following one stem. Participants read the stem: 'I see myself as someone who is...' and answered the items: 'does a thorough job', 'can be careless', 'is a reliable worker', 'tends to be disorganised', 'tends to be lazy', 'preservers until the task is finished', 'does things efficiently', 'makes plans and follows them', and 'is easily distracted' followed. These were

individually rated, ranging from 1 being strongly disagree to 5 strongly agree. This item ranged from 1-5 ( $M=3.93$   $SD=0.767$ , Cronbach's  $\alpha=.7385$ ).

### Hair colour and Skin Type

Participants indicated what colour their hair was by answering a single question: 'What is your natural hair colour' and choosing from five available options: black, brown, light brown, blond or fair, red. To identify skin type participants indicated how easily their skin burned as a result of unprotected sun exposure by answering a single question: 'How easily does your skin get sunburnt?' Participants gave their responses (easily/not at all easily) on a scale 1 – 7, with 1 indicating skin that burned easily and 7 indicating skin that did not burn easily. A small definition of what sunburnt meant in relation to this study was also included with this question, defining it as: "reddening of the skin from being in the sun that is still there the next day". This item was later coded into 'easily burns' or 'rarely burns'. Both hair colour and skin type for the UK and NZ samples can be seen in table 3.

Upon completion, researchers collected the questionnaires from the participants and thanked them for their time.

**Table 3:**

*Differences in hair colour and ease of skin burn for the NZ and UK participants in each condition*

	NZ Sample			UK Sample		
	Mortality	Appearance	Control	Mortality	Appearance	Control
<u>Hair Colour</u>						
Black	4	2	2	7	5	2
Brown	25	16	22	46	41	48
Light Brown	17	12	15	19	27	14
Fair/ Blond	8	11	9	18	22	24
Red	2	-	-	1	1	2
<u>Skin Type</u>						
Burns Easily	22	19	19	38	46	40
Rarely Burns	34	22	29	53	50	50

### **7.6 Statistical Analysis**

Statistical analysis was completed using SPSS 11.0 for windows. See the Chapter eight for the results of this.

## Chapter Eight

### Results

#### **8.1 Preliminary Analysis**

##### *8.1.1 Data management*

Initially the results were screened for missing data and outliers. If a participant did not answer all the questions in a measure, but had answered more than 50% of the questions, a mean was computed for the missing answers using SPSS. However, if a participant failed to answer 50 per cent of questions within a measure they were removed from that particular measure altogether. For example, if two out of three of the intention items were answered, the third answer was computed from the means of the other two questions, but if only one out of the three were answered, then the participant was removed from all tests regarding intention. If a participant had over 30% of their total questionnaire incomplete then they were removed completely from the study. This only occurred to a total of three participants for the NZ data ( $N=145$ ), and no participants for the UK data. The remaining missing data was randomly distributed. In addition, 6 participants were removed from the UK sample for being under the age of 16 years ( $N=277$ ).

Reliability analysis was conducted on the different measures. The alpha that resulted from this analysis is recorded next to each measure in the method section. Normality of distribution was examined using normal probability plots. Skewness and kurtosis statistics on all continuous variables were checked and met on all variables of hypothetical interest. No significant outliers were found to affect the data. The data was further checked to see if the individual assumptions of the specific tests used in the statistical analysis were met.

##### *8.1.2 Pre-Intervention Descriptive Statistics.*

To ensure that the spread between the participants was even across the three conditions, chi square tests for independence was conducted to test for differences on a nominal level between gender, nationality and ease of skin burn. As some of the variables did not meet the assumptions of the size of expected frequencies it was not possible to detect the differences between all groups on all variables. For

the NZ participants chi square analysis revealed no significant differences between the three groups for ease of sunburn [ $\chi^2(2) = 0.241$ , ns], gender [ $\chi^2(2) = 2.472$ , ns], nationality [ $\chi^2(2) = 0.581$ , ns], nor age [ $\chi^2(6) = 4.522$ , ns]. This analysis was repeated for the UK data, and Chi Square analysis once again found no significant differences for ease of sunburn [ $\chi^2(2) = .581$ , ns], gender [ $\chi^2(2) = 2.472$ , ns], nor age [ $\chi^2(6) = 4.522$ , ns]. The expected frequency assumptions were not met for nationality. Table 4 shows the number of participants in each of the three conditions for ease of skin burn, nationality, gender and age for both samples. As no significant differences were found through the chi-square analysis, it is assumed that the participants between the three conditions are similar in nationality, age, and gender how easily their skin burns.

**Table 4:**

*The age, nationality, gender and ease of sunburn of all participants in each condition*

Measure	NZ Sample			UK Sample		
	Mortality	Appearance	Control	Mortality	Appearance	Control
<b>Sunburn Ease</b>						
	(n = 56)	(n = 41)	(n = 48)	(n = 94)	(n = 96)	(n = 93)
Easily	30	24	27	40	46	41
Not easily	26	17	21	54	50	52
<b>Gender</b>						
	(n = 61)	(n = 41)	(n = 49)	(n = 91)	(n = 96)	(n = 90)
Female	37	18	14	57	54	56
Male	24	23	35	34	42	34
<b>Nationality</b>						
	(n = 61)	(n = 41)	(n = 49)	#(n = 91)	#(n = 93)	#(n = 86)
NZ European	47	27	40	5	2	1
UK European	7	3	4	78	78	80
Other	7	11	5	8	13	5
<b>Age</b>						
	(n = 61)	(n = 40)	(n = 48)	(n = 91)	(n = 96)	(n = 89)
16-23 years	13	14	9	11	8	23
24-34 years	16	8	15	50	42	41
35-44 years	17	8	11	17	34	16
45+ years	15	10	13	13	12	9

# Size of expected frequencies assumptions not met.

To ensure that there were no significant differences between the conditions before the interventions took place on the study variables, a one-way ANOVA was carried out on all pre-intervention scores between the three groups. As indicated by table 5, no significant differences were found. The participants between the three groups did not differ significantly before the interventions occurred, thus the participants were comparable at this stage.

**Table 5:**

*ANOVA test for Pre-Intervention Equivalence of Conditions for the UK and NZ Data.*

Measure	NZ Sample (N = 151)			UK Sample (N = 277)		
	df	F	Sig.	df	F	Sig.
Self-esteem	(2,146)	.017	.983	(2,277)	.481	.619
Anticipated Regret (AR)	(2,141)	.577	.563	(2,277)	.919	.400
Intention	(2,148)	1.41	.247	(2,277)	.822	.440
Attitude to sunscreens	(2,141)	.543	.397	(2,277)	.108	.898
Perceived Behavioural Control (PBC)	(2,148)	1.99	1.01	(2,277)	1.183	.308
Appearance	(2,148)	.802	.922	(2,274)	.560	.572

## **8.2 Post Intervention Results**

### *8.2.1 Analysis of Affective Response*

As a manipulation check, to ensure that the intervention had an effect on the participants, an ANOVA was computed comparing the mean results of the emotional affect questions that followed directly after the intervention in the mortality, appearance and control groups. In the NZ sample a significant difference was found between the three groups  $F(2, 136) = 112.9, p > 0.05$ . Tukey's HSD revealed that the participants in the mortality condition had the strongest effect, responding most negatively to the pictures ( $M=2.84, SD = 1.03$ ), indicated a lean towards feeling sad, concerned, tense, frightened, risky and troubled. The participants in the appearance condition also had similar responses ( $M = 3.35, SD = .99$ ), and although not as strong as the mortality condition, their responses indicated that the pictures still had a negative effect. The scores from the control group were more neutral, leaning towards more positive responses ( $M = 5.78, SD = .99$ ), indicating scores that showed less concern and worry.

In the UK data, similar results were obtained. The ANOVA, using the group as the independent variable and the affective response as the dependent variable, found significant results  $F(2, 274) = 74.20, p > .05$ . Tukey's HSD was used to determine the nature of the differences between the groups, and this analysis revealed that the participants in the mortality condition ( $M=2.7, SD = 1.23$ ), indicated feeling sad, concerned, tense, frightened, risky and troubled. The participants in the appearance condition ( $M = 3.0, SD = 1.16$ ), were skewed to the more negative responses, although were more neutral than the mortality group, thus the appearance condition did not have such a negative effect on the participants when compared to the mortality group. The scores from the control group ( $M = 4.67, SD = 1.17$ ) were more neutral, leaning towards more positive responses. As with the NZ data, this information concludes that the interventions did have an effect on the participants, dependent on which intervention they were assigned to.

### **8.3 Hypothesis Testing for the NZ sample**

#### *8.3.1 Hypotheses One*

Initially, correlations between the variables were tested. The Pearson's  $r$  correlation coefficients are shown in table 6. The variables of intention, subjective norm, PBC, Attitude and AR and all significantly correlated to each other. However, conscientiousness is only correlated to Intentions and PBC. Although not shown in the table, the correlation between the study variables and possible confounds, such as gender and age, were looked at and no significant correlations were found.

**Table 6:**

*Pearson's  $r$  correlations between the study variables and extraneous variables*

	Intention	Subjective Norm	PBC	Attitude	AR
Subjective Norm	.43**				
PBC	.67**	.26**			
Attitude	.47**	.37**	.42**		
AR	-.70**	-.49**	-.33**	-.33**	
Conscientiousness	.14*	.08	.19*	.12	-.025

\*\* = Correlation is significant at the 0.01 level (2 tailed)

\* = Correlation is significant at the 0.05 level (2 tailed)

To test hypothesis one and two, a multiple regression was calculated. In all analyses, the assumptions for hierarchical multiple regression were met, and there were no extreme outliers. Analysis of the residuals indicated that the assumptions of normality, linearity, and homoscedasticity were met and therefore no transformation of the variables was necessary.

Step One: In the regression analysis, the participants' total intention score was entered as the dependent variable. The constructs of the theory of planned behaviour (subjective norm, perceived behavioural control and attitude to sunscreen) were entered into step one of the equation. The variables of TPB together were significant in explaining sunscreen intentions  $F(3, 135) = 53.09$ ,  $p > .01$ , and explained 53.1% of the variance (Adjusted  $R^2$ ). Thus, 53.1 % of the

variation in intentions can be explained by the differences in variables of subjective norm, PBC and attitude to sunscreen.

As indicated by Table 7, PBC showed the greatest impact on intentions to use sunscreen (Beta = .565). The greater a participant's perceived behavioural control then the greater intentions the participant had to use sunscreen. Subjective norm obtained moderate impact on intentions to use sunscreen (Beta = .207), showing that the higher participant's subjective norm was, then the greater intentions to use sunscreen. Although attitudes towards sunscreen had the least impact on intentions to use sunscreen (Beta = .152), overall, it was found that the more favorable a participant's attitude was towards sunscreen, then the greater their intentions to use sunscreen were.

### *8.3.2 Hypothesis Two*

Step Two: Anticipated regret and conscientiousness were added to the above equation at step two to see if these constructs could further explain intentions to use sunscreen, over and above the variables of TPB. Again the relationships were significant,  $F(5, 133) = 58.96$ ,  $p < .001$ . The conscientiousness and anticipated regret variables explained a further 14.6% in variance ( $R^2$  change), and the total variance explained was 67.2% (Adjusted  $R^2$ ). Therefore the variables of conscientiousness and anticipated regret further increased the predictive power of the TPB model from 53.1% to 67.7% of variance explained.

PBC and subjective norm maintained their significant relationships to intentions to using sunscreen, however attitudes became insignificant at step two of the equation. Anticipated regret had the largest impact on intentions to use sunscreen at step two of the equation (Beta = -.456). The negative relationship indicated that the more regret a participant anticipates from not wearing sunscreen, then the greater the intentions to use sunscreen are. Conscientiousness had the least impact on explaining intentions to use sunscreen (Beta = .019). Results indicated that participants who scored both highly or moderately on the conscientiousness measures had higher intentions to use sunscreen.

**Table 7:**

*Multiple regression analysis of the effects of age, gender, TPB constructs (subjective norm, attitude to sunscreen, Perceived Behavioural control) and the variables of anticipated regret and conscientiousness on intentions to use sunscreen (n=151).*

	Step 1 $\beta$	Step 2 $\beta$
Subjective Norm	.207**	.125*
Perceived Behavioural Control	.565**	.428 **
Attitude to Sunscreen	.152*	.053
Anticipated regret		- .456 **
Conscientiousness		.019 *
<b>R<sup>2</sup></b>	.541	.689
<b>Adjusted R<sup>2</sup></b>	.531 **	.677 **
<b>R<sup>2</sup> change</b>		.146 **

\* $p < .05$     \*\* $p < .001$

### 8.3.3 Hypothesis Three

Hypothesis three states that informing participants about the negative effects of sun exposure on an individual's health and mortality, will increase their intentions to use a sunscreen. A one-way ANCOVA was calculated to examine the effect of the mortality intervention on the participant's intentions to use a sunscreen. Using the participants' condition (mortality or control) as the independent variable, intention after the intervention as the dependent variable, and controlling for the effect of intentions before the intervention, the ANCOVA was calculated. Pre-intervention intentions to use a sunscreen was significantly related to post-intervention intentions to use a sunscreen  $F(1,101)=103.679$ ,  $p < .001$ , and the main effect for the intervention was not significant in increasing intentions to use a sunscreen  $F(1, 101) = 0.128$ , ns. Therefore, those in the mortality condition ( $M = 4.88$ ,  $SD = 1.36$ ) did not differ significantly in intentions to use a sunscreen after the interventions had occurred when compared to a control group ( $M = 4.33$ ,  $SD = 1.46$ ). Differences in means can be seen in Table 8. Although intentions are slightly higher for the mortality group than the control, as non-significant results

were obtained these differences cannot be attributed to the intervention, therefore the null hypothesis is supported.

**Table 8:**

*Pre and Post Intervention Means for Intentions to Use Sunscreen Between the Three Conditions.*

	Mortality Intervention ( <i>n</i> = 61)	Appearance Intervention ( <i>n</i> = 41)	Control Intervention ( <i>n</i> = 49)
Pre Intervention Intention	4.75	4.23	4.49
Post Intervention Intention	4.88	4.33	4.41
Change in Intention	0.13	0.10	- 0.08

#### *8.3.4 Hypothesis Four*

Hypothesis four stated that informing the participants about the negative effects of sun exposure on skin appearance will be effective in increasing intentions to use a sunscreen when compared to a control group. A one-way ANCOVA was calculated to examine the effect of the appearance intervention on participants' intentions to use a sunscreen. Using the participants' condition (appearance or control) as the independent variable, intention after the intervention as the dependent variable, and controlling for the effect of intentions before the intervention, the ANCOVA was calculated. Pre-intervention intentions to use a sunscreen was significantly related to post-intervention intentions to use a sunscreen,  $F(1,86) = 134.66$ ,  $p < .001$ , but the main effect for the intervention was not significant,  $F(1, 86) = 0.685$ ,  $p < .05$ . Therefore, those in the appearance condition ( $M = 4.33$ ,  $SD = 1.61$ ) did not differ significantly in intentions to use a sunscreen after the interventions had occurred when compared to the control group ( $M = 4.41$ ,  $SD = 1.46$ ). Although intentions to use a sunscreen were lower for the appearance group than the control group, intentions for the appearance group did in fact increase by .1, whereas the control group decreased scores by

.08. However, as the null hypothesis is supported, these differences cannot be attributed to the differences in interventions.

### 8.3.5 Hypothesis Five

Hypothesis five predicted that intentions to use sunscreen will be greater for those people who scored higher on the appearance measures, indicating that a tan is important to appearances and are exposed to the appearance intervention. To test for this, participants were divided into two groups dependent on whether they believed a tan was important to appearances (cut off scores 1 – 4.49;  $n=46$ ), or if they did not think a tan was important to appearances (cut off scores 4.5 – 7;  $n=43$ ). An ANCOVA was calculated with intentions to wear a sunscreen as the dependent variable, the intervention condition and how important a tan is to appearances being the independent variables, and intentions to wear a sunscreen before the intervention being controlled for.

For participants in the appearance condition, intentions to use a sunscreen were higher for participants who valued their appearances ( $M = 4.74$ ,  $SD = 2.24$ ), when compared to the intentions of those who did not think a tan was important to their appearance ( $M = 3.94$ ,  $SD = 2.52$ ). Furthermore, participants in the control condition who reported a tan as being important to their appearances also reported higher post-intervention intentions to wear a sunscreen ( $M = 4.45$ ,  $SD = 2.09$ ), than those participants who indicated that a tan was not important to their appearance ( $M = 4.36$ ,  $SD = 2.27$ ). The difference between the two groups was not significant, thus, the appearance intervention did not effect intentions to use sunscreen,  $F(1,84)=1.123$ , ns. It was found however, that the intentions for people who reported a tan being important to appearances was significantly different, when compared to the people who did not think a tan was important to appearances,  $F(1,84) = 9.14$ ,  $p < .05$ , regardless of the intervention participants were exposed to. Participants who rated a tan as important to their appearances have higher intentions to use sunscreen ( $M = 4.57$ ,  $SD = 2.14$ ), than participants who did think a tan was important to appearances had lower intentions to use sunscreen ( $M = 4.16$ ,  $SD = 2.38$ ).

**Table 9:**  
*Comparing in Pre and Post Interventions to use Sunscreen for the Appearance and Control Interventions*

Variables	Pre-Intervention Intentions	Post Intervention Intentions	Difference in Intention
<b>Appearance</b>			
Tan Important ( $n = 19$ )	4.18	4.74	0.56
Tan not Important ( $n = 22$ )	4.26	3.94	- 0.32
<b>Control</b>			
Tan Important ( $n = 24$ )	4.25	4.45	0.20
Tan not Important ( $n = 24$ )	4.72	4.36	-0.36
<b>Appearance and Control</b>			
Tan Important ( $n = 43$ )	4.22	4.57	0.35
Tan not Important ( $n = 46$ )	4.50	4.20	- 0.30

To further investigate the effects of the appearance intervention on participants, gender was examined to see if there was a difference between females and males who thought a tan was important to their appearances. Once again an ANCOVA was conducted, with intention as the dependent variable, intention before the intervention as the covariate and importance of a tan to appearance, gender and the condition the participant was in as the independent variables. No significant results were found, with gender not being significantly related to how highly one valued appearances  $F(1, 80) = .037$ , ns; and gender not affecting intentions to wear a sunscreen  $F(1, 80) = .171$ , ns.

### 8.3.6 Hypothesis Six

Testing the theory of terror management, hypothesis six stated that reminding people of their mortality would decrease intentions to use sunscreen when compared to a control group. To test this, a one-way ANCOVA was calculated to examine the effect of the mortality intervention on participants' intentions to use a sunscreen. Using the participant's condition (mortality or control) as the independent variable, intention after the intervention as the dependent variable,

and controlling for intentions before the intervention, the ANCOVA was calculated. Intentions to use a sunscreen before the intervention was significantly related to post-intervention intentions to use a sunscreen  $F(1,101) = 103.679$ ,  $p < .001$ , but the main effect for the intervention was not significant  $F(1, 101) = 0.128$ , ns. As shown in table 8, participants in the mortality condition ( $M = 4.53$ ,  $SD = 1.36$ ) did not differ significantly in intentions to use a sunscreen after the interventions had occurred when compared to the participants in the control group ( $M = 4.35$ ,  $SD = 1.46$ ). In fact, going against the hypothesis, intentions are higher for the mortality group than for the control group (Table 7), however, as non-significant results were obtained these differences cannot be attributed to the intervention.

### 8.3.7 Hypothesis Seven

Following from hypothesis six, hypothesis seven states that not only will reminding people of their mortality decrease intentions to use a sunscreen, but that people who have low self esteem will further decrease such intentions. Furthermore, people who rated a tan as important to appearances should also be more likely to decrease their intentions to use a sunscreen when reminded of their mortality.

To test this the participants were divided into two groups indicating participants with low self-esteem (cut off scores 1-4,  $n = 23$ ), or high self-esteem (cut off scores 5-7,  $n = 81$ ) for both the control and mortality groups. Using intention after the intervention as the dependent variable, self-esteem, and the condition (mortality or control) as the independent variables, and controlling for intentions before the intervention, an ANCOVA was calculated. There were no main effects for condition  $F(1, 53) = .254$ , ns, nor self-esteem  $F(1, 45) = .035$ , ns. As can be seen in table 10, participants in the mortality group with low self-esteem had higher intentions to use sunscreen ( $M = 4.99$ ,  $SD = 1.71$ ) than participants with high self-esteem ( $M = 4.84$ ,  $SD = 2.04$ ). In contrast, participants in the control group with low self-esteem had lower intentions to use a sunscreen ( $M = 4.16$ ,  $SD = 1.65$ ) than participants that indicated they had high self-esteem ( $M = 4.46$ ,  $SD = 2.26$ ). However, the interaction was not significant  $F(1, 99) = .049$ , ns. Thus, it

appears that the level of self-esteem according to the condition had no effect on intentions to use a sunscreen.

**Table 10:**

*Pre and Post Intervention Changes for People with Low and High Self-esteem in the Appearance and Control Condition.*

Variables	Pre-Intervention Intention	Post-Intervention Intention	Difference in Intention
<b>Mortality</b>			
High self-esteem ( $n = 42$ )	4.82	4.85	0.03
Low self-esteem ( $n = 14$ )	4.56	4.98	0.42
<b>Control</b>			
High self-esteem ( $n = 39$ )	4.55	4.46	- 0.09
Low self-esteem ( $n = 9$ )	4.19	4.16	- 0.03
<b>Mortality &amp; Control</b>			
Tan important ( $n = 81$ )	4.69	4.66	- 0.03
Tan not important ( $n = 23$ )	4.42	4.66	0.24

Participants were further divided into two groups depending on how important a tan was to appearances. The two groups represented people who thought a tan was important to appearances (cut off point: 1-4.49;  $n = 57$ ) in both the mortality group and the control group and those people who did not think a tan was important to their appearances (cut off point: 5-7;  $n = 47$ ) in the mortality group and the control group. An ANCOVA was then calculated comparing how important a tan is to participants' appearances and intentions to use sunscreen. For the participants in the mortality condition, those who thought a tan was important to their appearance had higher intentions to use a sunscreen ( $M = 4.98$ ,  $SD = 1.93$ ), than participants who thought a tan was not important to appearances, ( $M = 4.76$ ,  $SD = 1.93$ ). In the control group participants who thought a tan was important to appearances ( $n = 23$ ) also had greater intentions to use sunscreen ( $M = 4.45$ ,  $SD = 2.09$ ) than participants who thought a tan was not important to appearances ( $M = 4.36$ ,  $SD = 2.27$ ). Overall the differences between the two

conditions was not significant,  $F(1, 45) = 6.4, p > .01$ , and the interaction effect between the condition and levels of importance tan to appearance on intentions to use a sunscreen was not significant  $F(1, 99) = 1.45, ns$ . These results indicate that intentions for people to use sunscreen who valued a tan were not affected by the different conditions, any more than for participants who did not value the appearance of a tan.

However, although intentions were not effected by the intervention, there was a significant difference between people who thought a tan was important to appearances compared to those participants who did not think a tan was important to appearances  $F(1, 99) = 4.558, p > .05$ . Specifically people who thought a tan was important to appearances had higher intentions to use sunscreen ( $M = 4.98, SD = 1.93$ ), when compared to participants who did not think a tan was important to appearances ( $M = 4.98, SD = 1.93$ ).

**Table 11:**  
*Comparing Change in Intention for Participants Who Think a Tan is Important for Appearance across Mortality and Control Conditions.*

Variables	Pre-Intervention Intention	Post-Intervention Intention	Differences in Intention
<b>Mortality</b>			
Tan important ( $n = 31$ )	4.71	4.97	0.26
Tan not important ( $n = 25$ )	4.78	4.76	- 0.02
<b>Control</b>			
Tan Important ( $n= 26$ )	4.15	4.45	0.30
Tan not Important ( $n= 22$ )	4.90	4.36	-.054
<b>Mortality &amp; Control</b>			
Tan Important ( $n = 57$ )	4.46	4.74	0.28
Tan not Important ( $n = 47$ )	4.84	4.57	- 0.27

### **8.4 Hypothesis Testing for the UK sample**

Hypothesis testing for the UK data was conducted with the same statistical tests that were used for the hypothesis testing of the NZ data.

#### *8.4.1 Hypotheses One*

Initially the correlations were checked for the variables of the study, and are shown on Table 12. Apart from AR and conscientiousness all variables were significantly related to each other. Furthermore, although not indicted on the table, there were no significant correlations between the study variables and possible confounds such as gender and age.

**Table 12:**

*Pearson's r correlations between the study variables and extraneous variables*

	Intention	Subjective Norm	PBC	Attitude	AR
Subjective Norm	.52**				
PBC	.58**	.40**			
Attitude	.40**	.32**	.36**		
AR	-.59**	.42**	-.27**	-.37**	
Conscientiousness	.22**	.18**	.19**	.14*	-.07

\*\* = Correlation is significant at the 0.01 level (2 tailed)

\* = Correlation is significant at the 0.05 level (2 tailed)

The assumptions of multiple regression were checked and met.

Step One: The constructs of the TPB (PBC, subjective norm, and attitude towards sunscreen) were placed into step one of the hierarchal regression. The variables of TPB together was significant  $F(3, 273) = 75.99, p > .001$ , gaining an adjusted  $R^2$  of .449 Thus, 44.9% of the variations in intentions can be explained by the differences in subjective norm, PBC and attitude to sunscreen.

Individually all the variables were significant. PBC had the greatest effect on intentions to use sunscreen (Beta = .394). The greater participant's perceived behavioural control the greater intentions to use sunscreen. Closely following from PBC, results showed that the higher a participant's subjective norm was,

then the greater their intentions to use sunscreen were, (Beta = .317). Attitude to sunscreen had the least impact on intentions to use sunscreen, (Beta = .156), with results indicating that the more favourable a participant's attitudes were towards sunscreen then the greater the intention to use sunscreen.

#### *8.4.2 Hypothesis Two*

Step Two: Anticipated Regret and conscientiousness were added to the above equation at step two to see if these constructs could further explain sunscreen use, over and above the TPB variables. A significant regression equation was gained  $F(5, 271) = 70.697, p > .001, (\text{adjusted } R^2 = .558)$ . Thus, the variables of conscientiousness and anticipated regret explained a further 10.9% in intentions to use sunscreen. These variables therefore increase the predictive power of the model of TPB from 44.9 % to 55.8% of the variance explained.

PBC and subjective norm maintained their significant relationships to intentions to using sunscreen, however attitude was reduced to non significant when anticipated regret and conscientiousness were added to the equation. Anticipated regret had the greatest impact on explaining intentions to use sunscreen at step two of the equation (Beta = -.375). The negative relationship indicated that the more regret a participant anticipates from not using sunscreen, then the greater the intentions to use sunscreen are. Conscientiousness had a small significant impact on intentions to use sunscreen (Beta = .083). Results showed that participants who scored both highly or moderately on the conscientiousness measures had higher intentions to use sunscreen.

**Table 13:**

*Multiple regression analysis of the effects of age, gender, TPB constructs (subjective norm, attitude to sunscreen, Perceived Behavioural control) and the variables of anticipated regret and conscientiousness on intentions to use sunscreen (n=277).*

	Step 1 $\beta$	Step 2 $\beta$
Subjective Norm	.317***	.189***
Perceived Behavioural Control	.394***	.352***
Attitude to Sunscreen	.156**	.063
Anticipated regret		-.375***
Conscientiousness		.083 *
<b>R<sup>2</sup></b>	.455	.566
<b>Adjusted R<sup>2</sup></b>	.449***	.558***
<b>R<sup>2</sup> change</b>		.109***

\* $p < .05$ \*\* $p < .01$ \*\*\* $p < .001$ 

#### 8.4.3 Hypothesis Three

The ANCOVA used to test hypothesis three found that pre-intervention intentions to use a sunscreen was significantly related to post-intervention intentions to use a sunscreen  $F(1,184) = 431.895$ ,  $p < .001$ , and that the main effect for the intervention was not significant  $F(1, 184) = 0.060$ , ns. Therefore, intentions of participants in the mortality condition ( $M = 5.28$ ,  $SD = 2.04$ ) did not differ significantly in intentions to use a sunscreen compared to the control group ( $M = 5.51$ ,  $SD = 1.95$ ). In fact the control group had higher intentions to use a sunscreen than the mortality intervention (Table 14).

**Table 14:**

*Pre and Post Intervention Means for Intentions to Use Sunscreen Between the Three Conditions.*

	Mortality Intervention ( <i>n</i> = 91)	Appearance Intervention ( <i>n</i> = 96)	Control Intervention ( <i>n</i> = 90)
Pre Intervention Intention	4.93	5.24	5.22
Post Intervention Intention	5.28	5.34	5.51
Change in Intention	0.35	0.10	0.33

#### 8.4.4 Hypothesis Four

A one-way ANCOVA was calculated to examine the effect of the appearance intervention on participants' intentions to use a sunscreen. Results from this found that the main effect for the intervention was not significant  $F(1, 186) = 1.136$ , ns. Intentions for participants in the appearance condition ( $M = 5.34$ ,  $SD = 2.00$ ) did not differ significantly in intentions to use a sunscreen after the interventions had occurred when compared to the control group ( $M = 5.51$ ,  $SD = 1.95$ ). In fact intentions to use a sunscreen were lower for the appearance group, than the control group.

#### 8.4.5 Hypothesis Five

People in the appearance condition, who thought a tan was important to their appearances, (cut off scores 1- 4.49,  $n=65$ ), had lower intentions to wear a sunscreen ( $M = 5.22$ ,  $SD = 2.09$ ), when compared to the intentions of those who did not think a tan was important to their appearance (cut off scores 4.50 - 7,  $n=50$ ) ( $M = 5.61$ ,  $SD = 1.783$ ). However, participants in the control condition who reported a tan as important to their appearances reported higher intentions to wear a sunscreen ( $M = 5.50$ ,  $SD = 1.95$ ), than for those participants who indicated a tan was not important to their appearance ( $M = 5.53$ ,  $SD = 2.04$ ). An ANCOVA found that the difference between the two conditions was not significant  $F(1, 181)$

=.155, ns. Thus, hypothesis five is not supported. However, similarly to the NZ data, it was found that the difference for participants who reported a tan as being important to appearances did significantly differ from the participants who did not think a tan was important to appearances regardless of the intervention  $F(1, 181) = 6.105$ . As indicated by table 15 participants who reported a tan as being more important to appearances had higher intentions to use sunscreen than participants who did not think a tan was important to appearances.

**Table 15:**

*Comparing in Pre and Post Interventions to use Sunscreen for the Appearance and Control Interventions.*

Variables	Pre-Intervention Intentions	Post-Intervention Intentions	Difference in Intention
<b>Appearance</b>			
Tan Important ( $n=65$ )	5.11	5.22	.11
Tan not Important ( $n=31$ )	5.51	5.61	.10
<b>Control</b>			
Tan Important ( $n=59$ )	4.94	5.5	.11
Tan not Important ( $n=31$ )	5.75	5.53	-.22
<b>Appearance &amp; Control</b>			
Tan Important ( $n=124$ )	5.03	5.35	.32
Tan not Important ( $n=62$ )	5.63	5.57	-.06

The effects of the appearance intervention on gender was also examined to see if there was a difference between females and males who thought a tan was important to their appearance. The ANCOVA found no significant results. With gender not being significantly related to how highly one valued appearance  $F(1,88) = 3.314$ , ns, and gender not affecting intentions to wear a sunscreen  $F(1, 88) = 1.437$ , ns.

#### 8.4.6 Hypothesis Six

To test TMT, a one-way ANCOVA was calculated to examine the effect of the mortality intervention on participant's intentions to use a sunscreen. Pre-intervention intentions to use a sunscreen was significantly related to post intentions to use a sunscreen  $F(1,184) = 431.895$ ,  $p < .001$ , but that the main effect for the intervention was not significant  $F(1, 184) = 0.060$ , ns, with the condition not affecting intentions to use a sunscreen. Although, the intentions to use sunscreen are slightly higher for the participants in the mortality group ( $M = 5.28$ ,  $SD = 2.03$ ) when compared to the control group ( $M = 5.51$ ,  $SD = 1.95$ ), as non-significant results were obtained these differences cannot be attributed to the intervention, therefore the null hypothesis is supported.

#### 8.4.7 Hypothesis Seven

To test hypothesis seven a between subjects ANCOVA was conducted comparing intentions to wear a sunscreen after the intervention and levels of self-esteem. There were no main effects for conditions  $F(1, 88) = .135$ , ns, nor self-esteem  $F(1, 87) = .1875$ , ns. As can be seen from table 16, participants in the mortality condition with low self-esteem had higher intentions to wear a sunscreen ( $M = 5.07$ ,  $SD = 2.21$ ) than participants with high self esteem ( $M = 5.32$ ,  $SD = 2.06$ ), furthermore participants in the control group with low self-esteem had only slightly higher intentions to use a sunscreen ( $M = 5.28$ ,  $SD = 2.12$ ) than participants that had high self esteem ( $M = 5.63$ ,  $SD = 1.85$ ). The interaction was also not significant  $F(1, 176) = .430$ , ns. Thus, it appears the level of self-esteem according to the condition had no effect on intentions to use a sunscreen.

**Table 16:**

*Pre and Post Intervention Changes for People with Low and High Self-esteem in the Appearance and Control Condition.*

Variables	Pre-Intervention Intention	Post-Intervention Intention	Difference in Intention
<b>Mortality</b>			
High self-esteem ( $n = 67$ )	4.98	5.32	0.34
Low self-esteem ( $n = 24$ )	4.8	5.07	0.27
<b>Control</b>			
High self-esteem ( $n = 59$ )	5.22	5.63	0.41
Low self-esteem ( $n = 31$ )	5.2	5.28	0.08
<b>Mortality &amp; Control</b>			
High self-esteem ( $n = 126$ )	5.09	5.47	0.38
Low self-esteem ( $n = 55$ )	5.03	5.19	0.16

Participants were further divided into two groups depending on how important a tan was to appearances. The two groups represented people who thought a tan was important to appearances (cut off point 1-4.49,  $n=105$ ), and those people who did not think a tan was important to their appearances (cut off point 4.5-7;  $n=66$ ). Results found that participants in the mortality condition, who thought a tan was important to their appearances, had lower intentions ( $M = 5.10$ ,  $SD = 2.136$ ), than participants who thought a tan was not important to their appearances ( $M= 5.50$ ,  $SD=1.89$ ). In the control group participants who thought a tan was important to their appearances also had lower intentions to use sunscreen ( $M=5.50$ ,  $SD =1.955$ ) than participants who thought a tan was not important to their appearances ( $M= 5.53$ ,  $SD =2.044$ ). Results from the ANCOVA found the differences between the two conditions not to be significant  $F(1, 176) = .266$ , ns. The interaction effect between the condition and levels of importance of a tan to appearance on intentions to use a sunscreen was not significant  $F (1, 176) = 1.211$ , ns. This indicates that intentions to use a sunscreen for people who reported a tan as being important to appearances were not affected by the different conditions, any more than for participants who did not value the appearance of a tan.

However, how important a tan is to appearances significantly affected intentions to use sunscreen  $F(1, 176) = 10.236$ . Mean differences revealed that intentions were lower for participants who reported a tan as being important to appearances compared to participants who did not think a tan was important to appearances (Table 17).

**Table 17:**  
*Comparing Change in Intention for Participants Who Think a Tan is Important for Appearance across Mortality and Control Conditions.*

Variables	Pre-Intervention Intention	Post-Intervention Intention	Differences in Intention
<b>Mortality</b>			
Tan important ( $n = 56$ )	4.61	5.10	0.49
Tan not important ( $n = 35$ )	5.44	5.50	0.06
<b>Control</b>			
Tan Important ( $n= 59$ )	4.94	5.50	0.56
Tan not Important ( $n= 31$ )	5.75	5.53	-0.22
<b>Mortality &amp; Control</b>			
Tan Important ( $n = 105$ )	4.78	5.30	0.52
Tan not Important ( $n = 66$ )	5.59	5.52	-0.07



## Chapter Nine

### Discussion

The main purpose of this study was to examine various constructs that affect sunscreen use and to evaluate interventions aimed at increasing intentions to use sunscreen. This chapter consists of the discussion with regard to the results as they relate to each of the hypotheses, followed by issues concerning the implications of the findings for sunscreen use. Limitations of the present study and recommendations for further research are discussed and future implications are also addressed. Although, not all of the hypotheses were supported, the interesting results could be valuable in aiding sunscreen campaigns.

#### **9.1 Summary of the results**

##### *9.1.1 Theory of Planned Behaviour, Anticipated Regret and Conscientiousness*

It was hypothesised that the constructs of the Theory of Planned Behaviour (TPB), specifically attitudes to sunscreen, subjective norm and perceived behavioural control, would be significant predictors of intentions to use sunscreen. The results of the present study supported this hypothesis. It was shown that the variables, subjective norm, attitude and perceived behavioural control were all significant in predicting intentions to use a sunscreen for both UK and NZ beachgoers. Specifically, the results demonstrated that this theory explained 53.1 per cent of intentions to use a sunscreen for the NZ participants, and 44.9 per cent of the variance in intentions to use sunscreen for the UK participants. From this it can be determined that the constructs of TPB influence a large proportion of the participants' intentions to use sunscreen.

The present study's findings were in line with previous research. Armitage & Conner (2001) in a meta-analysis study found that on average, 39 per cent of the variance in intentions could be explained by the TPB. Hillhouse et al (1997) used the TPB variables in a study and found that attitudes, subjective norms, and PBC accounted for 37 per cent of the variance in intentions to use sunscreen. The present study not only offers general support for the Theory of Planned

Behaviour, but also provides support for the constructs of TPB being used to explain sunscreen intentions.

Perceived behavioural control appeared to have the greatest impact on predicting intentions to use sunscreen in both the NZ and UK samples. Four separate items measured Perceived behavioural control, asking participants how much control they had over using a sunscreen at the beach that day. The present study showed that the greater a participant's PBC was, then the greater the participant's intention use sunscreen. Such results are supportive of previous research that asserts the greater a person's perceived behavioural control is, the more likely it will be that the enactment of the behaviour in question will occur (Armitage & Connor, 2001). These results can also be related back to findings by Godkin and Kok (1996), where perceived behavioural control added a mean 13 per cent of the explained variance in intention, over and above attitude and subjective norm. It is also consistent in findings by Armitage and Connor (2001) who found perceived behavioural control explained a further 6 per cent of the variance in intention.

TPB proposes that strong intentions will be formulated when individuals have both favourable attitudes and subjective norms regarding the target behaviour (Abraham, 1999). In the present study subjective norm was measured by asking participants if people they cared about thought they should use sunscreen. Results demonstrated that if participants believed that people who cared about them thought they should use sunscreen, the greater their intentions to use sunscreen were. Although these findings are supportive of previous studies (eg: Hillhouse, Adler, Drinnon & Turrisi 1997), such findings contradict research results by Armitage and Connor (2001), who found that subjective norm was the weakest predictor of the TPB variables in explaining intention. Armitage and Connor (2001) suggested that the weak power of subjective norm in predicting intention is explained by most studies as being a result of only using a single item to measure it, which results in a low reliability of the measure. However, in the present study, subjective norm is only measured using a single item, and this does not appear to have impaired the performance of the variable.

The present study also demonstrated that attitudes to sunscreen is correlated with sunscreen intentions (.47), determining that the more positive attitude participants had towards sunscreen, then the greater their intentions were to use it. However, attitudes to sunscreen became insignificant when the variables AR and conscientiousness were added to step two of the equation.

Although the variables of TPB explained a large proportion of the variance in intentions to use sunscreen, there is still a considerable proportion that is not explained in terms of this theory. Thus, the present study further looked at additional constructs to see if these would further explain sunscreen use. Hypothesis two stated that anticipated regret and conscientiousness would further increase the predictive power of sunscreen intentions, after the constructs of TPB had been accounted for. The results of the present study offered support for this hypothesis, as both anticipated regret and conscientiousness were found to significantly explain sunscreen intentions after the constructs of TPB had been accounted for in the UK sample. Specifically, the results showed that together, anticipated regret and conscientiousness explained a further 14.6 per cent of intentions to use sunscreen for the New Zealand participants, and a further 10.9 per cent in intentions to use sunscreen use for the UK participants. Therefore, the combined effect of anticipated regret and conscientiousness, when added to the model, increased the predictive power of the intentions from 53.1 per cent to 68.9 per cent and from 44.9 per cent to 55.8 per cent in the NZ and UK samples respectively.

Anticipated regret proved to have the greatest impact on explaining intentions to use sunscreen and was very strongly correlated with intentions to use sunscreen (-.7; -.59) in both the NZ and UK samples respectively. The present study showed that if a participant reported they would later regret not using a sunscreen, the greater their intentions were to use a sunscreen on the beach that day. Such results add further support to previous findings. Armitage and Connor (2001) reported that anticipated regret increased variance in intentions to 65 per cent from the 39 per cent achieved when looking only at the constructs of the Theory of Planned Behaviour. Furthermore, anticipated regret has been used to explain a wide array of health behaviours including reckless driving (Parker et al., 1995), eating a healthy

diet (Richard et al, 1996), using drugs and drinking alcohol (Richard et al, 1996), exercising (Abraham & Sheeran, in press) and engaging in safe sex practices (Richard et al, 1998). Together with previous research, the current findings suggest that anticipated effective reactions are an important predictor of intentions. Not only is the present study in line with previous research, but it can be further concluded that AR is a significant predictor of sunscreen use.

The present study demonstrated that conscientiousness was a reliable predictor of intentions to use sunscreen. Results found that the more conscientious a person rated himself or herself, the greater their intentions to use sunscreen were. Limited studies have looked at using conscientiousness to explain sunscreen use, but the present study offers support for Castle et al (1999), which reported that subjects who gained high scores on conscientiousness were found to engage in better sun protective behaviours. Therefore, the present study adds to growing evidence of the significance of the dimension of conscientiousness for health, suggesting that more conscientious individuals will engage in better health protective behaviours.

When anticipated regret and conscientiousness were entered into the model, PBC and subjective norm maintained their significant relationship, but it reduced the predictive power of attitude to sunscreen to non-significance. Anticipated regret is shown to be significantly correlated with attitude to sunscreen in both samples, indicating that the greater a participant reported they would later regret not using a sunscreen, then the more positive attitude they had towards sunscreen. As conscientiousness is only correlated with attitudes in the UK population, it appears that anticipated regret is explaining most of the variance in intentions to use sunscreen that is also explained by attitude. However, the relationship between intentions to use sunscreen and attitude, conscientiousness and anticipated regret would need to be further examined to assess which constructs are the more important explanatory variables.

Overall, results thus far have provided evidence explaining the variance in intentions to use sunscreen. The variables of TPB, and the constructs of anticipated regret and conscientiousness, were all shown to significantly explain the variations in sunscreen use. The identification of these constructs have

distinguished cognitions between those people who are likely, or unlikely, to engage in recommended health behaviours. These variables could therefore be identified as targets for interventions to improve sunscreen use in people who are on the beach. Specifically as anticipated regret and perceived behavioural control had the greatest impact on the variance of people's intentions, future interventions could aim to target these variables when trying to improve sunscreen use.

### *9.1.2 Mortality Based Intervention*

Hypothesis three asserted that making participants aware of the negative effects of sun exposure on one's health, and stressing that people frequently die as a result of these health concerns would increase people's intentions to use sunscreen when compared to a control group, who were not exposed to this information. The results from the present study did not offer support for this hypothesis. However, results demonstrated that the cancer-based intervention had the predicted effect on participant's emotional state. Both the NZ and UK samples reported having more negative feelings than the control group after reading text and viewing the pictures of malignant melanoma, feedback included feeling sad, concerned, tense, frightened risky and troubled. Although the intervention seemed to have an emotional effect on participants, it did not significantly increase intentions to use sunscreen, as no differences between the mortality intervention group and the control group were determined.

These results raise doubts about current interventions popularly promoted by sunscreen campaigners, which aim to increase sunscreen use by convincing people that exposure to the sun will increase the likelihood of skin cancer. It is interesting to note that the interventions do in fact seem effective as negative emotional responses were gained from participants. So although the mortality intervention works to create the desired response in participants, the intervention does not work to increase the participants' intentions. If such information does not actually increase intentions to use sunscreen, campaigners will have to re-strategise campaigning techniques as such interventions are designed, not just to spark a negative emotional response, but also increase intentions. It could be that participants have been exposed to this material frequently in the past and although initially the information may have had an impact, after the information has

increased individual awareness, mortality-based data may lose its effectiveness. However, such explanations are only speculative and further research is needed to verify them.

Prior research had suggested that education about skin cancer is an effective intervention in ceasing sun bathing (eg: Kiesling & Friedman, 1987); however, the present study does not offer support for these previous studies. The limitations within the present study (which are discussed further in the chapter) could offer an explanation for why prior findings are not supported. Thus, further research is needed to address this issue, taking into account the various limitations associated with this study.

### *9.1.3 Appearance Based Interventions*

As people actively strive to seek a tan in a perceived effort to be more attractive and fit in with what the majority deem a desirable image, looking at interventions that use an appearance-based intervention approach, may be more effective in increasing people's intentions to use sunscreen. Thus, hypothesis four predicted that stressing the negative effects of the sun on one's appearance would be effective in promoting increased intentions to use sunscreen. Results from the present study did not achieve a significant difference between the group who were shown the disfiguring effects of sunshine and the control group.

These results do not support previous research, as Novick (1997), found that viewing pictures of aged skin resulted in short-term increase in sunscreen use, and Mahler et al (1997), discovered that an appearance-based intervention led to greater intentions to use sunscreen when compared to a control group. Thus the present study weakens support for appearance-based interventions, as the present study showed that informing participants about the negative effects of sun exposure on appearances did not significantly raise intentions to use sunscreen.

Hypothesis five predicted that intentions to use sunscreen would be greater for participants who rated a tan as important to appearances after being exposed to the appearance based intervention. Given the degree to which tanning is motivated by

concerns of appearance, it was reasoned that people who think a tan is important to their outward look would be more persuaded by information regarding the detrimental effects of tanning on appearances. The results found that people who thought that a tan was important to appearances increased intentions to use sunscreen after appearance intervention, whereas participants who didn't think a tan was important to appearances decreased intentions. However, the exact same pattern occurred for participants in the control group, thus these differences were not attributed to the intervention, and therefore the hypothesis was not supported. Similar results were obtained for both the NZ and UK samples. The present study indicates that an appearance-based intervention is no more effective in increasing sunscreen intentions for people who think a tan is important to appearances than those people who do not think a tan is important to appearances.

Although no significant differences were obtained between the appearance and control conditions, it is interesting to note that the overall difference in intentions between the appearances measures was significant. That is, in the NZ sample people who thought a tan was important to appearances had significantly higher intentions to use sunscreen when compared to the participants who did not think a tan was important to appearances, however, the intervention did not have a different effect between these groups with intentions to use sunscreen. Such results are counter intuitive in the fact that people who thought a tan was important to appearances had greater intentions to use a sunscreen, thus slowing down their potential to tan. It could be justified that such people who think a tan is important to appearances may be concerned with outward appearances generally, and may therefore use a sunscreen to prevent other negative effects of sun exposure on appearances. Another explanation for this pattern could be that although such people are interested in tanning they may want to spend more time in the sun and use sunscreen to prevent them from burning. Burke (1999) highlighted that researchers have identified that using sunscreens encourage people to stay out in the sun for longer periods of time. Such information could have valuable implications for sunscreen campaigners, helping identify which people are more likely and unlikely to use sunscreen. However, opposite results were obtained for the UK sample. People who thought a tan was important to appearances had significantly lower intentions to use sunscreen when compared to

the participants who did not think a tan was important to appearances. It is unclear at this stage why there is a regional difference. It could be that as the NZ sun is harsher, with a shorter burn time, sunscreen is essential for serious sunbathers within NZ, but this may not be the case in the UK where the sun has a longer burn time.

#### *9.2.4 Terror Management Theory*

Another theory that has been used to explain other health behaviours is the theory of terror management (TMT). The present study aimed to see if this theory could help explain sunscreen use, or lack of it. TMT states that when a person is reminded of their mortality they will try to increase their self-esteem, in order to buffer the anxiety that is created from being reminded of one's potential death. As being tanned is clearly perceived as a desirable social norm (Koblenzer, 1998; Arthey & Clarke, 1999; Kiesling & Friedman, 1987), and contributes to positive image of an individual (Broadstock et al, 1992; Leary & Jones, 1993; Kiesling & Friedman, 1987), sunbathing can be a relatively simple way of increasing one's self-esteem (Goldenberg et al, 2000). Since using suntan lotion slows down the process of tanning, people should be less inclined to use it when trying to tan. It was therefore hypothesised that reminding people of their mortality would decrease intentions to use sunscreen when compared to a control group, as people in the mortality intervention would attempt to buffer the anxiety associated with being reminded of their mortality, by trying to increase their self esteem. Trying to get a tan, and conforming to the social norms of attractiveness could do this. It was further hypothesised, that participants with low self-esteem would also decrease intentions compared to people with high self esteem, as such individuals would need to increase their self esteem more so than individuals with high self esteem. Finally it was also hypothesised participants who deemed a tan as important to their appearances, would further decrease intentions to use a sunscreen when compared to participants who did not think a tan was important to appearances. Participants who did not think a tan was important to appearances would not be trying to increase their self-esteem by trying to gain a tan.

While no other published studies have looked at TMT explaining sunscreen use, the present study does not support using it. Results showed that the cancer-based

intervention had the predicted effect on participants' emotional state, as both the NZ and UK sample reported having more negative feelings than the control group after reading text and viewing the pictures of malignant melanoma. However, the intentions for these participants to use sunscreen increased, not decreased, as TMT would predict. However, these differences were not significant. Additionally, intentions for people who rated themselves as having low self-esteem did not significantly increase intentions to use sunscreen when compared to participants who reported having high self-esteem after being exposed to the mortality intervention. However, there were a significantly larger number of participants who reported having high self-esteem compared to the number of participants who reported having low self-esteem. This could therefore help to explain why insignificant results were obtained. Such a big difference of participant numbers between the two groups may mean the ANOVAS were not as reliable. More equal groups of high and low self-esteem would be needed to test this hypothesis. Finally, intentions for participants who thought a tan was important to appearances did not have significantly differ to participants who did not think a tan was important to appearances. However, although the interventions had no effect on participants, regardless of how important a tan was rated as being to appearances, a significant difference was found the two levels of appearance. Thus, overall people who thought a tan was important to appearances had significantly higher intentions to use sunscreen than participants who did not think a tan was important to appearances. This finding is interesting in identifying people who are more or less likely to use sunscreen on the basis of attitudes to tanning and appearance, but does not show any support for the present hypothesis, as the mortality intervention did not significantly change intentions. The current study seems to contradict both the anxiety buffer and mortality salience hypotheses of TMT, and it is reasonable to conclude that sunbathing behaviour cannot be explained in terms of this theory.

However, since these measures were based on self-reports with no actual behavioural measures to verify them, no conclusions can be reached about the true extent of these intentions. Thus, before we can disqualify TMT completely from explaining sunscreen use, further studies would need to look at actual behaviours. Furthermore, self-esteem was only measured looking at one question, which

directly asked “I have high self esteem –agree/disagree”. Due to social desirability, people may indicate that they have high self-esteem, as it is not desirable to have low self-esteem. In the current study large numbers of participants in each condition indicated they had high self-esteem, and a significantly lower number of participants indicated they had low self-esteem supporting this assumption. Such a difference between the numbers of participants would also mean that the statistical analysis was not as accurate. Thus, future questions looking at self-esteem should use more indirect questions to prevent this occurring and attempt to control for social desirability. Furthermore, having more questions for this measure would increase reliability, ensuring that questions are in fact measuring self-esteem. In saying this however, the population of people sought in the present study, were beach goers, and therefore, often found sunbathing. High self-esteem could be a characteristic of such people’s behaviour, as people with low self-esteem may not have the confidence to sunbath on a public beach. However, such ideas are only speculative, and more research is needed to investigate this line of thought.

### **9.3 New Zealand and British Comparisons**

Differences between the two samples found that overall intentions were higher for the United Kingdom sample when compared to the New Zealand sample. This is most probably due to the time of year the questionnaires were conducted being late summer in New Zealand, and in the peak summer months for the United Kingdom sample. Whilst the researchers were conducting the research, many of the New Zealand participants stated verbally that they would use sunscreen during the hotter summer months, but didn’t at this time of year, as they were less likely to get burnt. Therefore, as the questionnaires were asking about intentions on that particular day, intentions may have been lower for the New Zealand sample, than if the research was conducted in the peak of summer. However, future research could look at intentions in a New Zealand population, conducting similar research in the months of December – February. This would see if intentions are greater for New Zealanders in the peak of summer, or if New Zealanders as a whole have

lower intentions to use sunscreen, which would raise further concerns for New Zealand sunscreen campaigners.

Opposite results were obtained between the NZ and UK samples for intentions to use a sunscreen between the people who thought a tan was important to appearances and people who did not. As already mentioned, it is unknown why these regional differences were obtained, however future research could address this. It may be that different approaches are needed for the different countries, due to the differences in sun intensity.

However, by in large the results between the UK and NZ samples were similar for both populations. Similar differences and changes in intentions were obtained from both samples. This therefore, adds support for the results of this study, as they were obtained from two separate and independent samples on either side of the world. As two populations were used, the generalisability of the results is increased.

#### **9.4 Limitations of the Study**

The fact that many of the differences obtained in the present study were not significant could be a result of various limitations within this study. These should therefore be carefully considered before similar studies are embarked on.

From the results, it was noted that changes in intentions to use sunscreen were observed, not only for the two experimental interventions, but also in the control group. This suggests that perhaps the control group was not really neutral as far as the interventions are concerned. Since the questionnaire contained numerous statements referring to sunscreen use and sunbathing behaviour, this in itself might have served as a form of intervention. Therefore, all participants would have been exposed to a partially identical intervention. If the intentions of the participants in the control group were affected by this unaccounted for intervention, then this could also explain why there are no significant differences between the groups. Furthermore, as mortality interventions have been apart of sunscreen and skin cancer campaigns for a number of years, it may have been hard to find a control group not aware of the information that the mortality group

was being exposed to. As a result the researchers are prevented from finding out if the interventions would have otherwise had a unique influence on intentions to use sunscreen. To fully understand the impact of the interventions on future intentions to use sunscreen, there must be a more strict control condition to which these interventions could be compared.

Due to practical complications, the time of year that the study was conducted in New Zealand meant that it was in the later months of summer. While the weather on the beach was still hot enough for sunbathing, many of the respondents commented that the sun was no longer strong enough to burn their skin and accordingly had not applied sunscreen. As a result of this, the participant's intentions to use sunscreen may have been lower than what it would have been in the summer months. A replication of this study, in the peak summer months, would help to see if this factor did contribute as a significant limitation to the present study. However, in saying this the UK data was conducted in the peak summer months, weakening this limitation slightly. Nevertheless, as the sun in the UK has a longer burn time and is not as harsh as the New Zealand sun, people may generally use sunscreen less, when compared to New Zealanders.

The population sought in the present study was solely beach-goers, thus the results are limited in how far they can be generalised, limited to only beachgoers. Often beachgoers are people who actively seek a tan; intentions to wear sunscreen amongst such a population may be lower than people who are not at the beach. Interventions may work differently amongst different population groups and be more effective for those who are more sun conscious.

Various methodological limitations also arose from the present study, which should be considered if future researchers intend to replicate this study. Firstly, self-report measures were used, and as noted by several authors, such measures are often susceptible to bias. More socially desirable answers may have resulted because of this, as evident in questions like 'I have high self esteem' (discussed in the TMT section of this chapter), and may have applied to the conscientiousness questions also, with people rating themselves more favourably.

The measure of behavioural intention was used as the first outcome in the Theory of Planned Behaviour, thus actual behaviours are unknown in the present study. Since 47 per cent of those who form intentions fail to act upon them (Sheeran, 2002), measuring actual behaviour would have provided a more accurate picture of sunscreen use. In future questionnaires pertaining to sunscreen use should implement specific questions about intentions as well as behaviour. However, in saying this, because behavioural intentions are important prerequisites to action (Sheeran, 2002), the higher the intention, the higher the possibility that the action will be carried out.

Limitations specific to the questionnaire used in this study include the length of it. Researchers found that participants became restless towards the end of the questionnaire, indicating that it may have been in fact too long. During the statistical analysis it was noted that many of the missing answers fell towards the end of the questionnaire, supporting this assumption. This in turn may have affected results, especially the post-intervention items, which were vital in hypotheses three to seven. Reverse scoring was used to ensure the participants were reading the questions and answering them correctly. However, it was noted that those questions lowered the reliability (measured by Cronbach's alpha), thus, it appears that the reverse scoring either confused participants, or the participants were in fact not answering the questions correctly, which may have affected the results. The fact that many of the answers on the questionnaire were measured on a Likert Scale may have also affected results on the questionnaire. Participants tended to respond towards the middle of the Likert Scale not giving a strong positive or negative answer to many of the questions. Not only did this make it more difficult to divide the responses into definite groups for analysis, but meant that no clear-cut answers were obtained from participants. Future studies should instead have definite answers, rather than participants answering on a continuum, where they are more likely to answer in the middle.

### **9.5 Implications for future research**

Based on these shortcomings and the study results, recommendations for future research can be made. Future designs should ensure that the control condition contains no elements of possible interventions, which may later confound the findings. Conducting studies that look at sunscreen use and/or intentions should be done in the peak summer months of December - February when sunscreen use should be at its maximum usage. Furthermore, behavioural measures should be used when possible.

Despite the study's limitations, some conclusions about sunscreen use can be made as a result from the present study. TPB influenced a large proportion of the participants' intentions to use sunscreen. Limited studies have looked at using the theory of planned behaviour to help explain sunscreen use, thus the present study adds support for this. Overall TPB explained nearly half of the variation in intentions to use sunscreen, with anticipated regret and conscientiousness significantly explained sunscreen use over and above this model. Sunscreen campaigners should therefore look closely at these constructs in future efforts to increase sunscreen use. Out of all the constructs looked at, PBC and anticipated regret were the most significant at explaining sunscreen use. Considering the very high correlations between anticipated regret and PBC, it follows that prospective campaigners attempting to increase sunscreen use would benefit from including these concepts in future interventions.

Results that looked at the mortality and appearance interventions did not find significant results, with neither intervention increasing sunscreen use. Future studies could look closely at this to see if the limitations of the present study affected these results or if in fact the interventions do not work to increase sunscreen use. If the latter is the case, then health campaigners will have to seriously re-consider their tactics for increasing sunscreen use, as such results would mean that the current mortality interventions implemented are not effective.

Finally, researchers observed when conducting the data collection, that immediately after the questionnaires a number of respondents were seen to be

applying sunscreen. Whether it was a result of the questionnaire on its own acting as an intervention is only speculative, but suggests that raising awareness and providing information in the behavioural setting could be an effective intervention. Future designs of sunscreen promotional campaigns might focus on using interventions in the actual settings where the target population is likely to be intending to use sunscreen. Prominently displayed billboards or distribution of leaflets on the beach, are examples of how this could be done.

## **9.6 Conclusion**

In summary, the results of the present study support the theory of planned behaviour being usefully applied to predict intentions to use sunscreen amongst beachgoers. The results suggest raising an individual's perceived behavioural control, subjective norms and attitudes towards sunscreen could be positive ways to increase sunscreen use. Furthermore, these results extended to the concepts of conscientiousness and anticipated regret. Specifically, the greater regret a person anticipates from not wearing sunscreen, and the more conscientious a person is then the more likely it is that they will use sunscreen. These results do not only add support for the efficacy of the theory of planned behaviour, but have identified what variables can help increase sunscreen use. Sunscreen campaigners when developing interventions should therefore take on board this information. As PBC and AR were shown to have the greatest impact on explaining intentions, targeting a person's perceived behavioural control and anticipated regret, for example, could be two effective ways to helping to increase sunscreen use.

The present study did not find significant results for the use of mortality and appearance-based interventions. Such results raise doubts about current interventions popularly promoted by sunscreen campaigners, which aim to convince people that exposure to the sun will increase the likelihood of skin cancer. If such information does not actually increase intentions to use sunscreen, campaigners will have to re strategize their campaigning techniques as such interventions are designed, not just to spark a negative emotional response, but also increase intentions. It is hoped future research, controlling for the limitations within this study, will gain more favourable results for using these interventions.

Terror Management Theory was also looked at to see if this theory would explain why mortality interventions are, at times, ineffective. Although this study was the first to look at sunscreen intentions being explained by TMT, present results indicate that the theory of terror management was not significant at explaining sunscreen intentions.

Overall the present study has gained useful information explaining sunscreen use. It has opened the doors for a wide area of research, which would be invaluable for developing effective sunscreen interventions and increasing people's sunscreen behaviours. By developing more effective interventions and increasing sunscreen usage, will help to decrease the number of incidences of melanoma and other skin cancers, and decrease the death rates associated with this.

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## Appendix A: Participant Information Sheet

(on massey letter head)

### Sunscreen Use Among New Zealand Beach Goers

#### Information sheet

Our names are Tessa Neil and Katharine Mills, and although you may only meet one of us on the beach, we are postgraduate students at Massey University, currently researching the area of sunscreen use among beach goers. Our supervisor is Christine Stephens, a lecturer in the School of Psychology at Massey University, whose contact details are below.

You are asked to complete a short questionnaire, read a short extract, view two pictures and answer a few easy questions on this. This should take you no more than ten minutes.

The information obtained from your questionnaire will be used for the completion of our thesis projects, publications in academic journals, and possibly used to help advance sunscreen interventions. If you are interested in these results, we will send you a summary if you complete the request form included with the questionnaire. This request form will be stored separately from the questionnaire as soon as we receive it and the record will be destroyed once we have sent you the information. These sheets will be kept in locked filing cabinet, until the research has concluded.

Your name and contact details do not appear on any part of the questionnaire, so confidentiality and anonymity are guaranteed. The questionnaires will only be viewed by the researchers. At the conclusion of the study all questionnaires will be destroyed.

You have the right to decline to participate in this research, the right to refuse to answer any question in the questionnaire, and are able to withdraw from the study while completing the questionnaire. You have the right to ask any questions about the study at any time during participation and are assured confidentiality and anonymity.

**If you would like any further information or have any questions about the study please do not hesitate to contact Christine Stephens at the address above or phone us at [REDACTED]**

Yours sincerely

Dr Christine Stephens

Tessa Neil

Katharine Mills



## Appendix B: Feedback Request Form

### Feedback request form

Please send me a summary of the results at the conclusion of the sunscreen use study:

Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_



# A warning sign

## Solar Keratoses (Sunspots)

- Not a skin cancer but a warning that you are prone to skin cancer.
- Characterised by red, flattish scaling areas which may sting if scratched.
- Sunspots appear on sun-exposed skin in the over 40 age group.



Cancer Society

For further information contact Your local Cancer Society

1995

# Take time to spot the difference



Most of us have spots on our skin. That is quite normal. However be on the lookout for any new or unusual freckle, mole, sunspot or unhealing sore on your skin. Or a spot that looks different from other spots around it. Or a spot that has changed colour, shape or size in the last few months.

### It only takes a minute to check

Consult your doctor if you have any of these signs. Thousands of New Zealanders require treatment for some form of skin cancer each year.

# Types of skin cancer\*

Skin cancer is:

- rarely painful
- not usually ugly
- flat if it is early melanoma

## Melanoma

- The most dangerous skin cancer. If untreated, cancer cells spread to other parts of the body. If treated early, 95% are cured.
- Appears as a new spot, unusual freckle or mole that changes colour, size or shape. Usually has an irregular or smudgy outline and more than one colour.
- Grows over weeks to months, anywhere on the body.



\* Your skin spots may vary from the examples shown.



## Basal Cell Carcinoma

- The most common, least dangerous.
- Red, pale or pearly in colour and scaling on occasions.
- As it grows it may become ulcerated - like an unhealing sore - or one that heals then breaks down again.
- Growing slowly, it appears on the head, neck and upper trunk.

## Squamous Cell Carcinoma

- Not as dangerous as melanoma but may spread to other parts of the body if not treated.
- A thickened red, scaly spot. Later it may bleed easily or ulcerate.
- Appears on sites most often exposed to the sun.
- Grows over some months.



**Early detection of skin cancer leads to a cure in 99% of cases.**



## Appendix D: Pre Intervention Questionnaire

### On the beach.....

Please answer the following questions honestly. Remember this is not a test of any sort - it is just about what you think and do.

What is your age? (put one number in each box)

Are you (tick one)      Male                       Female

What is your nationality? \_\_\_\_\_

Using a sunscreen on the beach today would be:(circle one number per line)

- |                |   |   |   |   |   |   |   |            |
|----------------|---|---|---|---|---|---|---|------------|
| a) Bad         | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Good       |
| b) Harmful     | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Beneficial |
| c) Unpleasant  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Pleasant   |
| d) Unenjoyable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Enjoyable  |
| e) Risky       | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Safe       |
| f) Reassuring  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Troubling  |

Do you think people of your age and sex think they should use sunscreen when on the beach? (circle a number to show how much you agree or disagree with this statement)

definitely do      1   2   3   4   5   6   7      definitely do not

I intend to use sunscreen on the beach today.

strongly disagree   1   2   3   4   5   6   7      strongly agree

For me to use sunscreen when on the beach today would be:

difficult			intermediate			easy
1	2	3	4	5	6	7

I have high self-esteem.

not very true of me   1   2   3   4   5   6   7      very true of me

People who are important to me think I should use sunscreen when on the beach today.

Unlikely 1 2 3 4 5 6 7 likely

Sun tanned people do not look more attractive.

strongly disagree 1 2 3 4 5 6 7 strongly agree

How much control do you have over whether you use sunscreen when on the beach today?

no control                      intermediate                      complete control  
1      2      3      4      5      6      7

I look slimmer when I have a tan.

strongly disagree 1 2 3 4 5 6 7 strongly agree

I will try to re-apply my sunscreen often enough to ensure adequate protection on the beach today.

likely 1 2 3 4 5 6 7 unlikely

Most people on the beach today will be using use sunscreen.

strongly disagree 1 2 3 4 5 6 7 strongly agree

Having a tan helps me feel better about myself.

strongly disagree 1 2 3 4 5 6 7 strongly agree

Had you thought about the following before coming to the beach today?

(tick one box in each row)

	had not occurred to me	had not thought about it	had occurred to me	had an idea about how to do this	had a clear plan how to do this
taking sunscreen to the beach					
putting sunscreen on regularly on the beach					

For me to use sunscreen often enough to ensure adequate protection today would be:

difficult                      intermediate                      easy  
 1      2      3      4      5      6      7

I intend to re-apply my sunscreen often enough to ensure adequate protection on the beach today.

strongly disagree    1   2   3   4   5   6   7    strongly agree

Having a sun tan makes people look healthier.

strongly disagree    1   2   3   4   5   6   7    strongly agree

I am more attractive when I have a tan?

strongly disagree    1   2   3   4   5   6   7    strongly agree

I plan to use sunscreen on the beach today.

strongly disagree    1   2   3   4   5   6   7    strongly agree

In the past, how often did you use sunscreen when on a beach?

never	almost never	a few times	sometimes	several times	quite often	all the time

How would you feel later if you did not use sunscreen on the beach today?

(circle a number in each row)

a) worried	1	2	3	4	5	6	7	not worried
b) regret	1	2	3	4	5	6	7	no regret
c) tense	1	2	3	4	5	6	7	relaxed
d) upset	1	2	3	4	5	6	7	no upset



## Appendix E: Interventions

### The Mortality Intervention

Do you think you know enough about malignant melanoma?  
Please read the following passage and try to answer some simple  
questions afterwards...

#### THE FACTS ABOUT MALIGNANT MELANOMA

Malignant melanoma is the most lethal variety of skin cancer. Melanoma is characterized by the uncontrolled growth of pigment-producing tanning cells. Melanomas may suddenly appear without warning, but can also develop from or near a mole. They are found most frequently on the upper backs of men and women or on the legs of women, but can occur anywhere on the body.

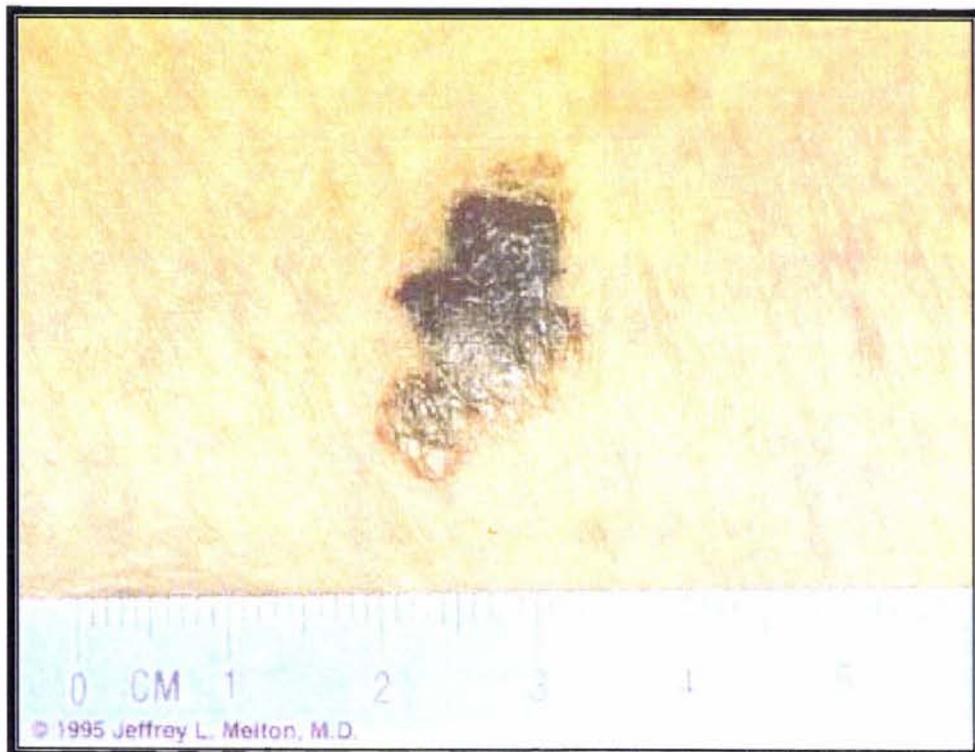
More than 80 percent of skin cancer deaths are from melanoma. Advanced melanoma spreads to internal organs and may result in death. One person each hour dies from melanoma.

In the United States 7,800 people (5,000 men and 2,800 women) were expected to die from the disease in 2001. About 1,500 people die from melanomas in Britain every year. In 1995, the deaths of 697 men and 698 women in England and Wales were attributed to malignant melanoma.

Increase in the disease can be attributed to increased exposure to ultraviolet radiation (UVR) from the sun, mainly through sunbathing. Intermittent sun exposure and sunburn were associated with increased risk of melanoma. There's strong evidence that melanomas occur on sun-damaged skin and that people are particularly at risk when they have sudden, short bursts of sunlight on holidays in places where the sun is very strong.

However, it has been indicated that 80% of skin cancers can be avoided. Behaviours that are thought to reduce the risk of skin cancer include limiting sun exposure (by avoiding mid-day sun and wearing protective clothing) and wearing a sunscreen lotion with an SPF (sun protection factor) of 15 or higher.

Please turn over to look at some pictures...



One kind of malignant melanoma of the back



One kind of malignant melanoma of the trunk

Please answer the following questions by circling one of the options:

1. Malignant melanoma is:
  - a) Harmless form of skin cancer
  - b) Most lethal variety of skin cancer
  - c) Type of headache
  
1. Melanomas can occur:
  - a) Anywhere on the body
  - b) Only on the face
  - c) Only on the back
  
1. How many skin cancer deaths are contributed to melanoma?
  - a) Less than 10%
  - b) Less than 50%
  - c) More than 80%
  
1. In Britain, what is the estimated number of people dying from melanoma every year?
  - a) About 7800
  - b) About 500
  - c) About 1500
  
1. Increase in the incidence of melanomas is due to:
  - a) Unhealthy diet
  - b) Increased exposure to ultraviolet radiation
  - c) Swimming in the sea



## The Appearance Intervention

Do you think you know enough about photoaging?

Please read the following passage and try to answer some simple questions afterwards...

### THE EFFECTS OF PHOTOAGING

Would you be surprised to learn that 90 percent of the wrinkling, sagging, sough patches, skin discoloration, or sallowness that you see when you look in the mirror is not caused by aging? It's true. It's not aging that does most of the damage to our skin as we get older - it's exposure to the sun's ultraviolet rays.

Photoaging is the premature aging of the skin caused by frequent unprotected exposure to sunlight. No one is immune from its effects. Beginning in early adulthood, many will suffer the ravaging consequences of excessive exposure to the sun's rays. A sunburn is nothing more than an acute photodamage.

Overwhelming evidence indicates that sun exposure and other sources of UV radiation (UVR) play the major role in causing the undesirable skin changes of fine and coarse wrinkles, roughness, laxity, mottled pigmentation, actinic lentigines, actinic keratoses, leathery texture/coarseness, scaling/xerosis, sallowness, and telangiectasia.

Photoaging is seen most frequently and severely on parts of the body that are constantly exposed to the sun such as the: face, ears, sides of the neck, the backs of hands and forearms and occasionally a bald head.

Photoaged or photodamaged skin is what is usually referred to as "old skin." It can be dry, rough, leathery, yellow, deeply wrinkled and mottled. In addition, it may have numerous age or liver spots (flat, brownish skin discolorations) and irregular pigmentation.

Please turn over to look at some pictures



Normal skin



Photoaged skin

Please answer the following questions by circling one of the options:

1. What causes photodamage?
  - a) Dropping water on pictures
  - b) Swimming in the sea
  - c) Exposure to sun's UV rays
  
2. 90 percent of the wrinkling, sagging and skin discoloration is due to:
  - a) Old age
  - b) Frequent unprotected sun exposure
  - c) Sleeping too long
  
3. Acute photodamage presents itself in the form of:
  - a) Sunburn
  - b) Temporary blindness
  - c) Torn photograph
  
4. Photoaging is most frequently seen on:
  - a) Face
  - b) Feet
  - c) Old postcards
  
5. Photodamaged skin is usually referred to as:
  - a) Sensitive skin
  - b) Old skin
  - c) Bruised skin



### The Control Condition for The NZ sample

Do you think you know enough about Mauao?

Please read the following passage and try to answer some simple questions afterwards...

#### THE STORY OF MAUAO

Mauao is the name of the distinctive mountain at the end of Mount Maunganui beach. It is actually the tip of an enormous volcanic rim that includes the thermal area of Rotorua. Close examination reveals lines volcanic ash from ancient eruptions that have formed over the volcanic rock at Mauao's core.

According to Maori legend, Mauao was once a nameless mountain and stood in the ranges behind Tauranga next to Mount Otanewainuku. The nameless one longed for his sweetheart, Puwhenua, who was unfortunately spoken for by the chief Otanewainuku. Distraught, for he could not have her, he decided to finish himself in the ocean with the help of the patupaiarehe (land fairies). When they had almost reached the sea scarcely before sunrise, the fairies, fearing the light, abandoned him and retreated to the mountains. The nameless mountain was left "caught by the light - Mauao", to stand alone for evermore.

In later years, magnificent Maori canoes landed on Mauao's shores and many forceful battles were fought. Mauao remains a guardian to the tribes and sub-tribes of Ngaiterangi and Ngati Ranginui.

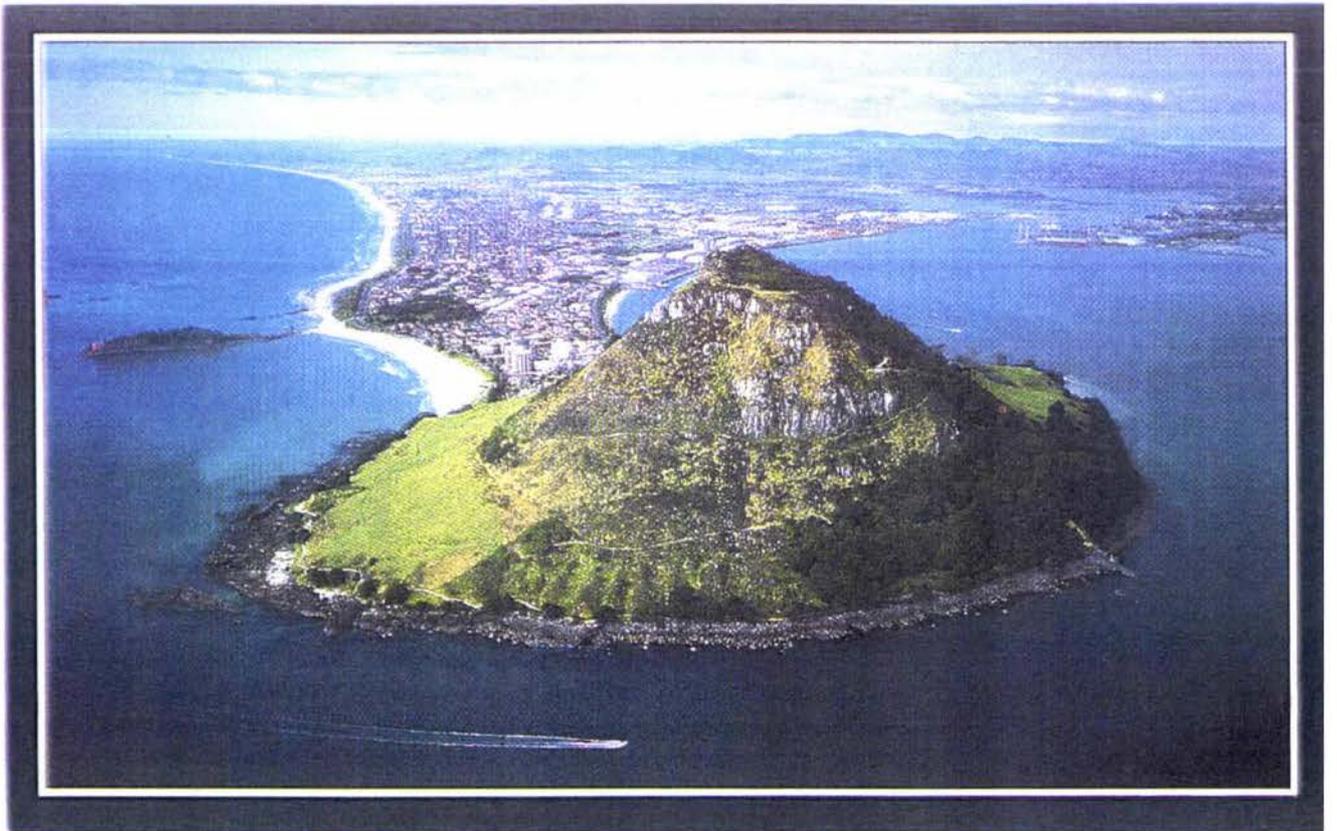
Early European settlers built a stone jetty and stone steps leading up the slopes, which can still be seen today. There is also a statue of Tangaroa, a Maori warrior, commemorating the establishment of the Port of Tauranga in 1873.

Today, an estimated 150,000 people use Mauao each year for walking or running the 3.5km base track, or for climbing one of the several hiking tracks to the summit. Various sporting competitions are held on its slopes and it is also a sight for hang-glider launches.

Please turn over to look at some pictures...



**Views of Mauao**



Please answer the following questions by circling one of the options:

1. Mauo is volcanic rock:
  - a) On the tip of a volcanic rim
  - b) At the centre of a ring of volcanoes
  - c) Under the ocean
  
2. The word 'Mauo' means:
  - a) 'Friend of the fairies'
  - b) 'Nameless mountain'
  - c) 'Caught by the light'
  
3. The Port of Tauranga was established in:
  - a) 1840
  - b) 1873
  - c) 1900
  
4. Mauo is a popular site for:
  - a) Bungee jumping
  - b) Helicopter rides
  - c) Hang glider launches
  
5. The track around the base of Mauo is:
  - a) 305 km
  - b) 2.9 km
  - c) 3.9 km



### The Control Condition for the UK sample

Do you think you know enough about the West Pier?  
Please read the following passage and try to answer some simple  
questions afterwards...

#### THE BRIGHTON WEST PIER STORY

Brighton's West Pier is a magnificent and unique English seaside promenade and pleasure pier built over 130 years ago. Although closed since 1975 and suffering decay, miraculously the West Pier still survives - fundamentally unchanged since 1916 - as a magical and enduring part of seaside England and a key feature of the Brighton seafront.

West Pier was a place for the Victorian middle classes to socialise and exhibit their wealth - to walk, see and be seen, consume the health-giving properties of sea air and take in panoramic views of the land.

The pier was closed to members of the public on 30<sup>th</sup> September 1975, after nearly 109 years. More recently a number of sections of the pier have actually fallen into the sea.

This decaying relic stands as a symbol of Brighton's decadent past, in striking contrast to the kitsch modern version that mirrors it a few hundred meters east. This alone merits its place as a prime sight of Brighton, but there is more...

At dusk it host a spectacular ritual. Literally hundreds of resident birds spend the sunset hour conducting a display of formation flight of collective consciousness, creating a king of wonderful sight that is both inspiring and relaxing.

Brighton West Pier Trust has owned the pier since 1978 and has secured lottery funding to aid a two-phase restoration of the pier. The aim is for the restoration to be completed during 2005. Then the West Pier will once again represent the pinnacle of pier architecture and the most original of piers in the country.

Please turn over to look at some pictures...



Please answer the following questions by circling one of the options:

1. West Pier was build:
  - a) Over 130 years ago
  - b) Over 50 years ago
  - c) Over 300 years ago
  
2. West Pier was permanently closed to public in:
  - a) 1991
  - b) 1920
  - c) 1975
  
3. At sunset, West Pier becomes a site for:
  - a) Display of fireworks
  - b) Display of resident birds
  - c) Pop band concerts
  
4. In its heyday, West Pier was mainly visited by:
  - a) Local fishermen
  - b) Brighton's working classes
  - c) Victorian middle classes
  
5. The restoration of West Pier is planned to be completed in:
  - a) 2005
  - b) 2002
  - c) 2025



## Appendix F: Post Intervention Questionnaire

How did the pictures make you feel?

a) sad	1	2	3	4	5	6	7	happy
b) concerned	1	2	3	4	5	6	7	not concerned
c) relaxed	1	2	3	4	5	6	7	tense
d) frightened	1	2	3	4	5	6	7	not frightened
e) safe	1	2	3	4	5	6	7	risky
f) reassured	1	2	3	4	5	6	7	troubled

Please answer the next questions by ticking a box for each statement which best represents the extent of your agreement or disagreement with the statement. (*Tick one box in each case*)

DISAGREE STRONGLY	DISAGREE A LITTLE	NEITHER AGREE OR DISAGREE	AGREE A LITTLE	AGREE STRONGLY
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**I see myself as someone who...**

1) does a thorough job	<input type="checkbox"/>				
2) can be somewhat careless	<input type="checkbox"/>				
3) is a reliable worker	<input type="checkbox"/>				
4) tends to be disorganised	<input type="checkbox"/>				
5) tends to be lazy	<input type="checkbox"/>				
6) perseveres until the task is finished	<input type="checkbox"/>				
7) does things efficiently	<input type="checkbox"/>				
8) makes plans and follows through with them	<input type="checkbox"/>				
9) is easily distracted	<input type="checkbox"/>				

### Just a few more questions.....

I intend to use sunscreen on the beach today.

(circle a number to show how much you agree or disagree with this statement)

strongly disagree    1   2   3   4   5   6   7    strongly agree

I intend to re-apply my sunscreen often enough to ensure adequate protection on the beach today.

strongly disagree    1   2   3   4   5   6   7    strongly agree

I will try to re-apply my sunscreen often enough to ensure adequate protection on the beach today.

likely    1   2   3   4   5   6   7    unlikely

I plan to use sunscreen on the beach today.

strongly disagree    1   2   3   4   5   6   7    strongly agree

How would you feel later if you did not use sunscreen on the beach today?  
(circle a number in each row)

a) worried	1	2	3	4	5	6	7	not worried
b) regret	1	2	3	4	5	6	7	no regret
c) tense	1	2	3	4	5	6	7	relaxed
d) upset	1	2	3	4	5	6	7	no upset

What is your natural hair colour? (tick one box)

black     brown     light brown     blond or fair     red

How easily does your skin get sunburnt? (that is, reddening of the skin from being in the sun that is still there the next day).

Easily 1    2    3    4    5    6    7    not at all easily

**THANK YOU**  
**for your time!**

The researcher will collect your completed questionnaire.