

Running head: FEAR FACTORS – WHAT MAKES US ADOPT A HEALTH MESSAGE?

Fear Factors – Why Do Australians Still Expose Ourselves to the Sun  
and What Makes Us Adopt or Reject a Health Message? –  
A Study into Fear Appeals and an Exploration of Sun Related Health Behaviour

by

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Statement of Originality

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## Abstract

**Scope:** Given Australia's high rate of skin cancer, continued sun exposure, and disturbingly high rate of skin cancer rate in Australia, despite the prevalence of health promotion campaigns, there is a need for further research into the factors affecting behaviour change. Health promotion campaigns have utilised fear in their efforts to affect behaviour change. It is assumed that the presentation of graphic images or frightening messages will allow for greater information processing and information recall which will then lead to behaviour change. To date there has been little research which attempts to not only examine the impact of the emerging dominant type of health campaigns, fear appeals, on health information recall and behaviour change, but to combine this with an attempt to explain the impact and interaction of individual differences and in message acceptance and behaviour change in terms of the Australian cultural context.

**Purpose:** This thesis work was undertaken to determine both the efficacy of fear appeals in relation to both information recall, and affecting behaviour change, and to identify other factors affecting Australians' motivation to make healthier sun behaviour choice. Utilising method triangulation, this research adds to our knowledge of which moderating factors affecting health information recall, and the interaction with attitudes, beliefs and behaviours in relation to sun exposure and skin cancer in Australia.

The research was comprised of three studies; two quantitative and one qualitative. Study 1 was a quantitative pilot study that investigated the level of health knowledge reported by individuals, and predictors of recalled health information following the presentation of a fear appeal. The study investigated the role of anxiety, susceptibility, vulnerability, age, or sex as predictors of recall and whether graphic imagery affected recall, anxiety, perceived susceptibility or perceived vulnerability. The aim of this research was to determine if graphic, mild or no imagery, alter information recall and what other factors predicted this recall. Study 2 extended on the pilot study and investigated general & skin cancer health information recall and predictors of recall, as well as one-month post intervention behaviour change. The additional factor of coping was also added to study 2 to investigate whether defensive coping mechanisms are a factor in behaviour change. Finally, study 3 was a qualitative study to explore discourses about

sun protection and sun cancer beliefs, attitudes and behaviour in the context of the Australian culture, using Interpretative Phenomenological Analysis (IPA) in order to gain a depth of information through a detailed interpretative account of the cases.

**Methodology:** Three studies were carried out – two qualitative and one quantitative. In study 1, 133 participants were asked to report on their own health behaviours and presented with health information, both related and unrelated, to skin cancer. They were then exposed to mild or graphic imagery relating to skin cancer or asked to sit silently for 50 seconds (control group). Participants then completed the Beck Anxiety Inventory and measures of skin cancer perceived vulnerability and susceptibility. Their recall of health information was then tested.

In study 2, 88 participants were asked to report on their own health behaviours and then shown health information related to both skin cancer and general health. They were then exposed to mild or graphic imagery relating to skin cancer or benign imagery (landscapes). Participants then completed the Beck Anxiety Inventory, the Coping Response Inventory and measures of vulnerability and susceptibility. Their health knowledge was then tested and they were invited to participate in a one month follow up test. Sixty-three participants agreed to participate in one month follow up testing and of these, 32 returned the follow up questionnaires. These questionnaires were information about their current health behaviours, the Beck Anxiety Inventory, the Coping Response Inventory and measures of vulnerability and susceptibility.

Study 3 was a qualitative study in which 12 participants who were Australian citizens and over the age of 18, participated in a one-to-one semi-structured interview comprising of questions pertaining to attitudes, beliefs and behaviours about sun and skin care. These interviews were then transcribed and analysed using IPA.

**Results:** It was found in study 1, exposure to no intervention imagery (control condition) had an effect on overall information recall, with those who were exposed to imagery (mild or graphic) recalling less information. However, there was no significant difference in relation to recall of skin cancer information specifically. Information recall was found to be predicted by perceived skin cancer vulnerability and age which both had a negative linear relationship with recall. Skin

cancer information recall was predicted by skin cancer susceptibility (positive relationship) and skin cancer vulnerability (negative relationship). Finally, results showed a difference in anxiety between conditions, with those exposed to graphic imagery reporting significantly higher anxiety than those in the control condition.

In contrast, study 2 found that there was no significant difference between imagery conditions for skin cancer recall and general information recall. General health information recall, was predicted by behaviours - 'Holiday Sunscreen Use' (positive relationship) and 'Cancer Council Visits' (negative relationship). Skin cancer information recall was predicted by age, in a negative linear relationship. Several behaviours were found to have predictive models. Everyday sunscreen use was found to be predicted by perceived skin cancer vulnerability and initial everyday sunscreen usage in a negative linear relationship. Holiday sunscreen usage was predicted by initial holiday sunscreen usage in a linear relationship. Active sunscreen use was predicted by cognitive avoidance in a negative linear relationship.

From the interviews in study 3, seven superordinate themes and 42 subordinate themes were extracted from the interview transcripts using IPA. The superordinate themes revealed that sun exposure attitudes and behaviours were strongly related to positive associations of tanning with the Australian culture. These associations related to perceptions of health, attractiveness and social acceptance.

**Conclusions and Implications:** The results of the current studies show the mixed impact of fear appeals and provide support for the overriding influence of individual and cultural factors on behaviour change. As past research in relation to sun exposure and protection has not investigated a comprehensive range of differing individual and cultural influence factors, the current research also adds to the literature by demonstrating that individuals' behaviour choices are influenced by various normative factors. Fear appeals and health campaigns in general should consider the vital importance of these cultural and individual factors in predicting behaviour change and barriers to change. In the case of fear appeals, behaviour change was not predicted by graphic imagery, or information recall, and was instead predicted predominantly by prior behaviours, calling into question the need for fear at all. Responses to

interviews further added to evidence that individual and other factors (such as culture) come into play when individuals make their health choices.

*Keywords:* Fear Appeals, Sun Exposure, Skin Cancer, Health Knowledge, Anxiety, Coping, Behaviour Change

Fear Factors – What Makes Us Adopt a Health Message?	viii
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## Table of Contents

Statement of Originality	ii
Acknowledgments	iii
Abstract	iv
Table of Contents	viii
List of Tables	xiv
<i>Critical Review of Literature – Fear Appeals and Factors Associated with Sun Exposure Behaviour</i>	1
Skin Cancer and Health Behaviour in Australia	1
Skin Cancer Health Promotion Campaigns	2
Health Promotion Campaigns - Fear Appeals	3
Theoretical Models in Relation to Fear Arousal and Behaviour Change	6
Drive Theory – Fear as Acquired Drive Model	
Parallel Response Model	
Protection Motivation Theory	
Extended Parallel Process Model	
Terror Management Model	
Internal Processes as Mediating Factors in Behaviour Change	13
Health Knowledge and Information Recall	
The Effect of Fear	
Vulnerability and Susceptibility	
Anxiety	
Coping	
Individual Factors as Mediating Factors in Behaviour Change	19
Age	
Sex Differences	
Australian Cultural and Societal Expectations	
Current Studies	23



Fear Factors – What Makes Us Adopt a Health Message?	ix
<i>Study 1: Pilot Study – Fear Appeals and Knowledge Recall</i>	25
Introduction	26
Hypotheses	
Method	28
Design	
Participants	
Materials	
Demographic and Sun Health Behaviour Questionnaire	
Beck Anxiety Inventory	
Health Knowledge Questionnaire	
Skin Cancer Images	
Skin Cancer Vulnerability Questionnaire	
Skin Cancer Susceptibility Questionnaire	
Information Recall Test	
Procedure	
Results	33
Initial Perceived Knowledge	
Impact of Imagery on Information Recall	
Moderating Factors in Predicting Information Recall	
Effect of Imagery on Anxiety, Vulnerability and Susceptibility	
Discussion	37
Implications and Further Research	
Limitations of the Pilot Study	
Summary and Conclusions	
<i>Study 2: Quantitative Study – Fear Appeals and Behaviour Change</i>	45
Introduction	46
Hypotheses	
Method	48
Design	

Fear Factors – What Makes Us Adopt a Health Message?	x
Participants	
Materials	
Demographic and Health Behaviour Questionnaire	
Health Knowledge Questionnaire	
Images	
Beck Anxiety Inventory	
The Vulnerability Questionnaire	
The Susceptibility Questionnaire	
Coping Responses Inventory	
Information Recall Test	
Procedure	
Results	54
Data manipulation – Information Recall	
Initial Perceived Knowledge and Information Recall	
Predictors of Information Recall	
Moderating Factors in Fear Appeals – Anxiety, Vulnerability, and Susceptibility	
Data Manipulations – Behaviour Change	
Overall Predictors of Behaviour Change	
Discussion	61
Graphic Imagery and Information Recall	
Predictors of Information Recall	
Moderating Factors in Information Recall	
Predictors of Behaviour Change	
Implications and Further Research	
Limitations	
Conclusions	
<i>Study 3: Qualitative Study – Skin Cancer and Sun Exposure Beliefs, Attitudes and Behaviours</i>	69
Introduction	70

Fear Factors – What Makes Us Adopt a Health Message?	xi
Australian Cultural Impact	
Age	
Sex Differences and Gender Norms	
Aims	
Method	73
Design	
Participants	
Procedure	
Results	76
Skin Colour	
Australian Culture	
Perceived Knowledge	
Perceived Vulnerability	
Age	
Sex Differences and Gender Norms	
Contradictions and Conflicts	
Discussion	83
Themes	
Skin Colour	
Australian Culture	
Perceived Knowledge and Perceived Vulnerability	
Age	
Sex Differences and Gender Norms	
Contradictions and Conflicts	
Implications	
Limitations	
Conclusions	
<i>General Discussion and Conclusions</i>	93
Introduction to the General Discussion	

Integration of Key Findings

Skin Cancer and Sun Smart Health Knowledge

Fear Appeals and Health Information Recall

Factors Associated with Health Information Recall

The Effects of Fear Appeals on Perceived Vulnerability, Susceptibility, and Anxiety

Individual Differences and Predictors of Behaviour Change

The Role of Australian Cultural Norms on Sun Exposure and Protection

Behaviour

The Effect of Sex and Gender Differences on Sun Behaviour

The Impact of Age

Implications

Strengths and Limitations of the Current Research

Future Research

Summary and Conclusions

*References* 114

*Appendix A: Study 1 Items and Materials* 131

A.1 Information Sheet

A.2 Consent Form

A.3 Demographics and Sun Health Behaviour Questionnaire

A.4 Health Knowledge Questionnaire

A.5 Mild and Graphic Skin Cancer Images (Study 1 & 2)

A.6 Skin Cancer Vulnerability Questionnaire

A.7 Skin Cancer Susceptibility Questionnaire

A.8 Information Recall Test

*Appendix B: Study 2 Items and Materials* 146

B.1 Information Sheet – General Public & Students

B.2 Consent Form – General Public & Students

B.3 Demographics and Health Behaviour Questionnaire

B.4 Health Knowledge Questionnaire

Fear Factors – What Makes Us Adopt a Health Message?

xiii

- B.5 Benign Images
- B.6 Vulnerability Questionnaire
- B.7 Susceptibility Questionnaire
- B.8 Information Recall Test

*Appendix C: Study 3 Items and Materials*

178

- C.1 Information Sheet
- C.2 Consent Form
- C.3 Semi-structured Interview Schedule
- C.4 Superordinate and Subordinate Themes

Fear Factors – What Makes Us Adopt a Health Message?	xiv
--	-----

#### List of Tables

Table 1.1. <i>Participant Group by Sex and Recruitment</i>	29
Table 1.2. <i>Mean and Standard Deviation of Initial Perceived Knowledge Scores</i>	33
Table 1.3. <i>Variables Predicting Overall Health Information Recall</i>	35
Table 1.4 <i>Variables Predicting General Health Information Recall</i>	36
Table 1.5. <i>Variables Predicting Skin Cancer Information Recall</i>	36
Table 2.1. <i>Distribution of Number and Sex of Participants in Each Condition</i>	50
Table 2.2 <i>Variables Predicting General Health Information Recall</i>	56
Table 2.3 <i>Variables Predicting Skin Cancer Information Recall</i>	56
Table 2.4 <i>Variables Predicting Everyday Sunscreen Application Health Behaviour Chang</i>	59
Table 2.5 <i>Variables Predicting Holiday Sunscreen Application Health Behaviour Change</i>	59
Table 2.6 <i>Variables Predicting Active Sun Protection Health Behaviour Change</i>	60
Table 2.7 <i>Coping Variables Predicting Active Sun Protection Health Behaviour Change</i>	60

Fear Factors – Why Do Australians Still Expose Ourselves to the Sun  
and What Makes Us Adopt or Reject a Health Message?

Skin cancer prevention campaigns have been utilised in Australia for over 20 years (Montague, Borland & Sinclair, 2001). However, Australia still has the highest incidence of skin cancer anywhere in the world with at least two in three Australians being diagnosed with skin cancer before the age of 70 (Staples et al., 2006). Studies have shown that health promotion campaigns targeting skin cancer have resulted in a high level of knowledge pertaining to skin cancer, sun exposure and sun protection amongst Australians (Garside, Pearson & Moxham, 2010; Keeney, McKenna, Fleming, & McIlfatrick, 2009; Lupton & Gaffney, 1996; Marks, 1999). Despite this, Australians continue to engage in skin cancer risk behaviours (Garside et al., 2010). Health appeals which include fear raising components, known as fear appeals, have been increasingly used in health promotion in Australia including in sun protection campaigns (Cancer Institute NSW [CINSW], 2010). To date current research into the efficacy of fear appeals observe mixed results suggesting a need for more research (Ruiter, Abraham & Kok, 2001; deHoog, Stroebe & deWitt, 2007; Witte & Allen, 2000).

**Skin Cancer and Health Behaviour in Australia**

Australians are four times more likely to develop a skin cancer than any other form of cancer causing approximately 1600 deaths annually (Australian Institute of Health and Welfare & Australasian Association of Cancer Registries [AIHW & AACR], 2008). Each year more than 380,000 Australians are treated for skin cancer leading to a yearly financial burden of \$300 million on the Australian health system. This cost of treating skin cancer in Australia is significantly higher than any other form of cancer (AIHW & AACR, 2008). The incidence of skin cancer may be reduced by adopting sun protection behaviours that give protection from ultraviolet radiation (Armstrong, 2004). Sun exposure has been shown to be the cause of approximately 99% of non-melanoma skin cancers and 95% of melanoma cases in Australia (Armstrong, 2004). Sun protection behaviours include wearing hats, wearing long sleeves, staying out of the sun when the sun's rays are hottest, and regular application of sunscreen

(Dobbinson, Hill & White 2002). In addition, skin checking behaviour is important for the early detection of skin cancer. Studies have shown that 70% of skin cancers are first detected by the individual, their family or during a regular GP visit (McCarthy, 2004) and earlier detection of skin cancers leads to better treatment outcomes (Cancer Council Australia [CCA], 2007). Health behaviours, therefore, have an important role in decreasing cancer incidence, morbidity and mortality given the preventable nature of many cancers, including skin cancer (Amin, Kucuk, Khuri, & Shin, 2009). However, a significant proportion of Australians, despite having good awareness of skin cancer risks, still do not practice protective sun behaviour (CINSW, 2010; Lowe et al., 2000).

### **Skin Cancer Health Promotion Campaigns**

Advertising as a health promotion strategy has become a major tool utilised by governments, charities and private organisations as a means of increasing public health knowledge and changing health behaviour (Abroms & Maibach, 2008). These health promotion and advertising campaigns have one or more objectives as a base (Bettinghaus, 1986). These objectives are to inform the public about a particular health issue in order to; (1) Avoid an unhealthy behaviour before it is adopted, such as anti-drug campaign aimed at teens regarding not taking that first offer of drugs, (2) Maintain healthy behaviours such as continuing to engage in exercise, (3) Increase healthy behaviour, for example advertising aimed at getting adults to increase their fibre intake, (4) Change a health related behaviour, such as, quit smoking campaigns or sun smart campaigns, (5) Adopt new health behaviour, for example campaigns promoting skin checking, breast checking and mammograms.

Skin cancer health promotion campaigns in Australia began on a wide scale in the early 1980's with the 'Slip, Slop, Slap' campaign, which encouraged sun protection in the form of 'slipping on a shirt', 'slopping on sunscreen' and 'slapping on a hat' (Marks, 1992). Other campaigns have been launched in subsequent years and leading to an increase in the general public's knowledge of skin cancer risks (Garvin & Eyles, 2001; Smith, Ferguson, McKenzie, Bauman, & Vita, 2002). Overall, knowledge of skin cancer risk has increased which has lead to



societal changes being enacted, such as Australian primary school's 'no hat, no play' policy, and an increase in sun protective behaviours, as shown in self reports. However, it is difficult to measure actual extent behaviour change in each area of sun protection (e.g. wearing hats, sunscreen, staying out of the sun, and wearing protective clothing) on an individual level in the community (Anti-Cancer Council of Victoria [ACCV], 1996; Borland, 1992).

### **Health Promotion Campaigns - Fear Appeals**

Health promotion behaviour change campaigns generally aim to decrease the rate of self-damaging behaviour and increase protective behaviour, such as sun protection (e.g. sunscreen use). Unfortunately, the presentation of health information alone is insufficient to influence individual behaviour change (Leventhal & Niles, 1964). In an attempt to influence the adoption of these healthier lifestyle choices, a particular form of advertising, known as fear appeals, have been used extensively since the 1950's (Witte & Allen, 2000). The use of fear appeals is grounded in the belief that negative emotional arousal is necessary for individual behaviour change to occur (Atherly & Clarke, 1995; Cohen, 1957). One example of a fear appeal is the "Dark Side of Tanning" campaign, where adolescents and young people are targeted with graphic images of melanoma shown spreading throughout the body while being informed by voiceover that this is a possible outcome of deliberate tanning (CINSW, 2010).

Fear appeals in health are persuasive media communications designed to raise fear in the individual. Fear as it relates to fear appeals, is defined as a negative emotional state that is accompanied by a high level of arousal that is perceived to be both significant and personally relevant to the individual (Witte, 1998). This is most commonly achieved by presenting the individual with graphic content which is presented as either vivid descriptions of poor health outcomes often using language which refers directly to the individual (e.g., "when you burn in the sun"), or disturbing images (e.g., video images of advanced skin cancer), all relating to the negative outcomes which can occur if the individual does not comply with the message (Ruiter et al., 2001). This is the first component of a fear appeal, known as a 'severe threat' component. Often this component will alert individuals to information about their own

susceptibility to that outcome. Secondly, the 'safety action' component may be presented. This is in the form of information regarding the recommended individual response to the health threat and an attempt to activate within the individual a sense of self-efficacy. In practice, fear appeals may neglect to supply a recommended behaviour change if the healthier behaviour option is obvious, such as in road safety messages (Ruiter et al., 2001). Following the presentation of a fear appeal, the individual is expected to have increased motivation to initiate self-protective behaviours (Dillard & Anderson, 2004; Witte & Allen, 2000). This motivation and subsequent change in behaviour is proposed to be as a result of a change in the individual's perceptions of the severity of a health issue and an increase in feelings of their own perceived vulnerability and susceptibility to that issue (Maddux & Rogers, 1983; Witte, 1992).

The health promotion objectives in fear appeals can be divided into two types, disease detection behaviours and health promotion behaviours (Millar & Millar, 2000). Disease detection behaviours are a way of identifying or confirming an already existing health problem (Millar & Millar, 2000). For example, a skin cancer mole check only allows the person to possibly detect an abnormal mole and does not prevent or change the condition. Conversely, health promotion behaviours provide the individual with the opportunity to increase good health, prevent ill health or return to better health (Millar & Millar, 2000). For example, using sun protection such as a hat and sunscreen may prevent skin cancer, or ceasing smoking will reduce the risk of lung cancer. Researchers have found that when designing health campaigns, it is important to determine whether the behaviour required is a disease detection behaviour, such as a breast or skin checks, or a disease prevention behaviour, such as using sunscreen, or quitting smoking (Salovey, Schneider & Apanovitch, 2002). Research has shown that loss-framed messages that emphasises the risk of not changing, will be more persuasive for detection behaviours, whereas gain-framed messages that emphasises the benefits of changing, will be more persuasive for prevention behaviours (Toll et al., 2007; Rothman & Salovey, 1997). A loss-framed message presents negative outcomes, or the lack of positive outcomes associated with not adopting the behaviour advocated in the health campaign, while a gain-framed message presents positives outcomes, or the absence of negative outcomes

related to following the advice presented (Broemer, 2002). In the case of skin cancer health promotion an example of a gain-framed message would be, 'Using sunscreen will decrease your risk of skin cancer', while a loss-framed message would be 'Not using sunscreen increases your risk of skin cancer'.

Meta-analyses of fear appeal literature show that fear arousal has not been consistently found to be a predictor of the effectiveness or ineffectiveness of health promotion campaigns (Witte & Allen, 2000; Ruiter et al., 2001; deHoog et al., 2007). Analyses have shown that in some studies, fear has been found to be an effective motivator for behaviour change (e.g. Cameron, Newstead, Diamantopoulou, & Oxley, 2003; LaTour, Snipes, & Bliss, 1996; Tay, 2002; Ulleberg & Vaa, 2009), while others have found that it is not (eg, Janis & Feshbach, 1953; Pechmann & Shih, 1999; Zimmerman, 1997). This means that it has not been clearly established as to whether the use of fear as a component of a health promotion campaign assists in eliciting behaviour change or whether another factor is of greater importance in the success of a campaign (Fisher & Fisher, 1992). It may also be that another unknown variable may moderate the effect that fear has on behaviour change, such as prior knowledge or self efficacy for example. Despite a long history of sun protection and cancer prevention campaigns including fear-based campaigns in Australia, skin cancer diagnoses still account for over 80% of all cancers diagnosed (AIHW & AACR, 2007). Moreover, individuals continue to engage in potentially damaging behaviours and decline to engage in health protective behaviours (Gascoigne, 2001). In the case of sun exposure, researchers have found that Australians still do not always engage in sun protective behaviours while engaged in outdoor activities (Foot, Giris, Boyle & Sanson-Fisher, 1993). In study of Newcastle NSW beachgoers, only 45% of those sampled used a high SPF sunscreen and in fact 16% admitted to not using any sun protection (Foot et al., 1993). Gascoigne (2001) proposed that in fact the presentation of fear appeals may have the unintended effect of normalising and thus encouraging these unhealthy behaviours.

Fear appeal research stems from two differing bases (Witte & Morrison, 2000). The first proposes to explain the various internal processes that may occur for the individual that moderate and influence their uptake of positive health behaviours using health models (e.g. Hovland, Janis & Kelley, 1953; Leventhal, 1970, Rogers, 1975; Stephenson & Witte, 2001). In contrast the second, attempts to identify individual differences that affect positive responses to fear appeal campaigns which is then used to group individuals for specifically targeted campaigns (Witte & Morrison, 2000). However, no model accounts for a complete picture of how fear appeals affect behaviour change, and no clear picture of how individual differences predict responses to fear appeals has yet been shown (Witte & Morrison, 2000). Given mixed results for fear arousal as a predictor of behavioural change, and the ongoing negative sun health behaviours Australians engage in, this suggests that our research into the effectiveness of fear appeals needs to examine both the internal processes proposed in the established theoretical models and the individual differences. This is in order to gain a complete picture of the barriers and motivations to change behaviour following the presentation of a fear appeal.

### **Theoretical Models in Relation to Fear Arousal and Behaviour Change**

There have been many models that have attempted to explain the function of fear appeals in arousing behaviour change. These include Drive Theory (Hovland et al., 1953), Parallel Response Model (Leventhal, 1970), Protection Motivation Theory (Rogers, 1975), Extended Parallel Process Model (Stephenson & Witte, 2001; Witte, 1992) and Terror Management Theory (TMT) (Greenberg, Solomon & Pyszczynski, 1997).

#### **Drive Theory (Hovland et al., 1953).**

Initial research into fear appeals began in the 1950's and were guided by drive theory (Hovland et al., 1953; deHoog et al., 2007). Drive theory asserts that fear arousal is evoked and this arousal acts as a drive to motivate action in the individual (Witte & Allen, 2000). It suggests that the greater this drive, the more motivating it becomes. Thus exposure to threatening health behaviour consequences motivates the individual to reduce the threat by changing their

behaviour accordingly to a more protective action. In addition, the response in reducing this fear arousal then acts as a reinforcer for the changed behaviour. However, it is suggested that the level of fear arousal can produce both positive, persuasive effects (i.e., behaviour change) and negative, avoidance effects in a curvilinear type relationship. An individual's response is influenced by whether engaging in the protective action reduces the level of aroused fear or not (deHoog et al., 2007). This relationship results in an inverted u-shaped relationship between fear and behaviour change, which posits that a moderate amount of fear arousal should produce the greatest behaviour change (Hovland et al., 1953; Janis & Terwilliger, 1962). Low levels of fear fail to motivate action, and high levels of fear which are not alleviated by the suggested protective action lead to avoidance. The drive model was largely rejected in the 1970's due to a lack of evidence in support of the inverted u-shaped model, with studies showing that fear can be positively associated with both message rejection and message acceptance (Beck & Frankel, 1981; Giesen & Hendrick, 1974; Sutton, 1982; Tay & Watson, 2002; Witte & Allen, 2000). Furthermore, the theory does not account for the complex nature of decision making and individual differences (La Tour & Zahra, 1989). Nor does the theory does not offer an adequate explanation of how fear appeals motivate behaviour change, and researchers have since proposed alternate theories.

**Parallel Response Model (Leventhal, 1970).**

Leventhal (1970) proposed that individual responses to fear appeals fall into two categories – danger control and fear control. Danger control processes involve an individual's attempts to control the danger or perceived threat while fear control processes involve the individual's attempts to control the internal fear generated by the danger or threat. It is proposed that when individuals are in danger control, they typically reflect on the fear appeal presented and attempt to generate ways to reduce the threat. It is theorised that they will consider the recommended positive behaviour changes and adopt them in order to control the perceived threat. In contrast, when individuals are in fear control they do not contemplate the fear appeal presented or the threat. The focus in this case is on their feeling of fear, with the

result being a defensive or avoidant response or denial of the threat (Witte & Allen, 2000).

However, this model fails to specify the conditions under which individuals enact one process or the other, whether individuals can move from one process to the other, and under what conditions (Witte & Allen, 2000). Thus a major criticism of this model is that the lack of specificity as to the conditions under which each control process is initiated, meaning that it is difficult to make predictions about which stimuli should best provoke positive behaviour change.

### **Protection Motivation Theory (PMT; Rogers, 1975).**

In 1975 Rogers proposed a theory that expanded on the Parallel Response Model's danger control process. The protection motivation theory specifies the cognitive appraisal processes that moderate the individuals' response. Rogers suggested that there are four components of a fear appeal that motivate the individual to implement the suggested protective action. These are the perceived severity of the threat, the likelihood of the threat occurring, the likelihood that a change in behaviour would decrease or halt the threat, and the individual's self-efficacy. Therefore, it is theorised that the individual not only appraises the presented threat but also their own coping. In appraising the threat (for example, sunbaking as a cause of skin cancer), the individual assesses their vulnerability and susceptibility to that threat and contrasts this with the relative rewards associated with the current unhealthy behaviour. In assessing their coping, the individual appraises the response efficacy (i.e. the effectiveness of the recommended response), self-efficacy (i.e. the individuals perceived ability to perform the response) and costs (e.g. time to perform, expense of action, difficulty of action) associated with engaging in the positive health behaviour. Behaviour change is proposed to be most likely when the threat is perceived as serious and coping is perceived to be effective. Therefore according to this model a successful fear appeal campaign requires the individual to perceive that they are highly susceptible and vulnerable to the threat, that the threat is serious, that the recommended behaviour change is appropriate to decrease the threat and that they have the self-efficacy to initiate the necessary changes (deHoog et al., 2007). This also shows one strength of the model, in that it provides a possible explanation to why individuals who have low

self efficacy may not initiate change. It proposes that when individuals are threatened but have no effective way to protect themselves, then intention to change behavior is low. Thus the individual will utilise denial, avoidance, or wishful thinking in response to the threat. (Roser & Thompson, 1995). Two meta-analyses of studies into PMT help to support this, as they found that self-efficacy was the most consistent and strongest predictor of intention to change or actual change. In addition, it was found that there was support for each of the main variables - severity of the threat, the likelihood of the threat occurring, the likelihood that a change in behaviour would decrease or halt the threat, and the individual's self-efficacy – as predictors of intentions to change behaviour or actual change (Floyd, Pretence-Dunn & Rogers, 2000; Milne, Sheeran & Orbell, 2000). The supporting results of these two meta-analyses are strengthened by the fact that they found the same results despite using different study inclusion criteria and effect size measures. Floyd et al., (2000) analysed 65 studies while Milne et al., (2000) studied 27. Of these studies there were only 12 studies in common. This suggests strong support for the predictive nature of the four main variables proposed by PMT in fear appeals. A weakness of this model however, is that it does not provide an explanation as to how and why fear appeal messages can be unsuccessful (Witte & Allen, 2000). In addition, the PMT model ignores all emotional response to fear, and addresses only the responses which arise from cognitive appraisals of the threat (Tanner, Hunt, & Eppright, 1991).

#### **Extended Parallel Process Model (EPPM; Witte, 1992).**

The main concepts from the Fear-as-Acquired Drive Model, Parallel Response Model and PMT were integrated to form the Extended Parallel Process Model (Stephenson & Witte, 2001; Witte, 1992). This model attempts to explain when and why fear appeals work, in addition to their failure (Witte, 2000). In this model, the assumption is that a fear appeal is moderated by either a threat appraisal or a coping appraisal. In the threat appraisal process, the threat is appraised on the basis of perceived severity and personal susceptibility and vulnerability. The more the individual believes they are vulnerable to a serious threat, the more motivated they will be to engage in the coping appraisal process. In the coping appraisal process, an evaluation of

the fear appeal and the recommended behaviour change is invoked. The model suggests that if a threat is perceived as irrelevant or insignificant then there is little motivation to process the message further. Conversely, when the threat is perceived or believed to be serious and relevant, individuals become afraid and are motivated to act in order to reduce their fear. The nature of this action is determined by the coping appraisal.

EPPM also proposes that fear provoking campaigns can lead to the individual engaging in danger control processes, leading to engagement in more positive health actions. Alternately it can provoke a fear controlling process leading to avoidant behaviour. The predicting factor in which process will be invoked is theorised to be the perceived efficacy of the recommended action which determines whether individuals, who believe that they are vulnerable to a serious risk, will engage in danger control or fear control (Witte, 1992). Therefore, individuals will mainly engage in danger control when they perceive the recommended action as effective in reducing the threat, and they will mainly engage in fear control when they perceive the recommended action as ineffective, or when they feel unable to perform the recommended action. In that case, defense motivation is aroused. Therefore the EPPM posits that perceived threat determines the degree of the response to a fear appeal campaign while perceived efficacy determines the direction of the response (Witte, 1992). Research has shown that this model has validity in some health contexts such as STD's and condom usage (Witte, 1994; Witte, Berkowitz, Cameron & McKeon, 1995) and the model has been used in analyzing areas such as message processing (Stephenson & Witte, 1996). However, the results of two meta-analyses of fear appeal studies have found that it is unclear as to whether a specific fear reaction is a necessary element required in order for danger control processes to occur (Floyd et al., 2000; Witte & Allen, 2000). Floyd and colleagues (2000) found that perceived self-efficacy and to a slightly lesser extent, response efficacy, are the best predictors of an individual's likelihood of engaging in danger control processes and behaviour change or intent to change. However, they found that this was regardless of the level of fear. A meta-analysis by Witte and Allen (2000) also showed that fear control processes may occur regardless of level of efficacy if the threat is high. Another criticism of the model is that it does not offer a clear method for



delineating between differing groups of recipients in order to target fear appeal messages.

Therefore further research is required in this area, and specifically research is needed in areas such as sun exposure and skin cancer in order to examine the validity of the model in these areas.

### **Terror Management Theory (TMT).**

Some research suggests further moderating factors that affect the efficacy of fear appeals (Jessop, Albery, Rutter & Garrod, 2008). Jessop et al., (2008) found that campaigns focusing on health risks related to mortality can backfire by increasing undesirable behaviour. It asserts that prior models and research have failed to account for the fact that individuals do not always act rationally, nor consider what is in their best interest in terms of health behaviour. This research was based on Terror Management Theory (TMT; Greenberg et al., 1997) which states that human behaviour is mostly motivated by the fear of mortality and details the conditions under which mortality fear based campaigns are likely to fail or produce undesirable responses.

TMT asserts that an individual maintains cultural worldviews which become threatened when individuals are reminded of their mortality. The overall terror of mortality creates subconscious anxiety in people which they then aim to make sense of. The result of this terror on a societal scale results in the development of cultural and belief systems to try and explain the significance of life, admirable attributes, and desirable qualities for individuals, as well as the contrasting perceived negative attributes to be defended against. On an individual level, the adherence to the dominant cultural worldview can be defined as self-esteem, with individuals measuring their self worth on achieving cultural expectations. In terms of sun exposure, this would relate to the Australian cultural norm of being tanned. These cultural views, when challenged, will result in the individual engaging in strategies such as denial or distancing. After a delay or distraction, when the thoughts of mortality are still present but not in conscious awareness, the individual engages in distal defences (Jessop & Wade, 2008). These may include cognitive or behavioural efforts to defend their worldviews or attempt to boost their self-

esteem (e.g. engaging in the culturally normative behaviour – i.e. tanning). Therefore the individual's need to maintain self-esteem and their cultural normative worldview outweighs the health risks associated with the negative health behaviour being engaged in. This suggests that cultural beliefs may be an important factor to be considered when investigating the effectiveness of health campaigns.

A criticism of this theory is in regards to difficulties in assessing whether the effects observed in TMT research are driven by what death represents (e.g., meaninglessness [Heine, Proulx, & Vohs, 2006]; or uncertainty [McGregor, Zanna, Holmes & Spencer, 2001]) and not death itself. If, as postulated by TMT, people are motivated to avoid death, then the theory does not adequately explain why individuals engage in risk taking behaviours which invite death (such as sky diving for example). Thus leading to a major criticism of all current fear appeal theories – that despite the attempts to provide a theoretical framework for behaviour of individuals when exposed to fear appeals, none of the current models have been able to completely explain the inconsistent results found in practical fear appeal studies. Also the notion of fear, in fear appeals, is shown to be perceived differently between models. For example, in PMT fear is proposed to influence perceptions of severity of threat only (Rogers, 1975) while in contrast EEPM suggests that fear is a far more important factor which is vital for the deeper processing and recall of a health message (Witte, 1992). Witte and Allen (2000) found that there was a small correlation between fear and changes in attitudes and behaviour. As fear represents only one type of emotional response, which may or may not be evoked in response to a threat (Dillard et al., 1996), this suggests that in research to date, there may have been an over-emphasis on level of fear which in turn has resulted in other possibly important factors not being fully investigated. For example, the qualitative nature of the fear message may be an important dimension in fear appeal effectiveness or ineffectiveness (Hunt & Shehryar, 2011). Thus as no model fully explains behaviour change or lack thereof, further post fear appeal research is needed.

### **Internal Processes as Mediating Factors in Behaviour Change**

#### **Health Knowledge and Information Recall.**

Health information and knowledge has been asserted to be a background factor that influences a person's attitude toward related behaviour (Ajzen, 1991). Therefore knowledge may be an important factor in fear appeals in achieving behaviour change. In fear appeal research, it is assumed that when individuals are presented with health information they retain that information. However, if this is not the case and information is poorly retained then individuals may be less likely to engage in the suggested behaviour change. Keller and Block (1996) suggest that when presented with information which the individual perceives as being highly graphic and fear evoking, they defend against the message by avoidance, therefore protecting themselves against the threatening content but also from the information presented. Therefore, individuals are less able to recall any information presented, diminishing one intended effect of the fear appeal, increased public awareness of a health issue (Keller, 1999; Cho, 1999). However, one weakness in these fear appeal studies investigating information recall is that the individual is aware that they are supposed to be taking in the health information, thus possibly affecting the results by making the individual more likely to specifically attempt to remember presented information despite any fear arousal.

Indirect or incidental learning is another way in which fear appeal campaigns have attempted to assist the individual in accepting health information for behavioural change. Incidental learning is one form of indirect learning where an individual learns information as a product of another activity and not via the intent to learn (Marsick & Watkins, 2001). In indirect learning, information is presented in a situated, social and contextual natural way of learning (Rogers, 1997). In the context of fear appeals research, it has been suggested that this will result in unconscious positive behaviour change (Morrison, 2005; Rogers, 1997). Incidental learning, while unconscious may be later intentionally examined, explored and recommendations followed or rejected (Marsick & Watkins, 2001). Scant research to date has examined incidental learning in a fear appeal context. Knowledge (which comes from learning)

is also often suggested to be a factor influencing an individual's attitude toward a particular behaviour (Ajzen, 1991). It is further suggested that knowledge acts as a mediating factor which influences those attitudes and beliefs, allowing for a change in behaviour. Despite this important factor, knowledge retention or information recall in relation to fear appeals has not been widely studied.

### **The Effect of Fear**

Research into fear appeals has shown mixed results as to the effectiveness of fear as a way of increasing health protective behaviours. For example, some studies into fear appeals and breast cancer screening, found a positive relationship between fear-related variables, such as anxiety and susceptibility, and increased rates of screening behaviour (Stefanek & Wilcox, 1991), some studies show no relationship (Fuller, McDermott, Roetzheim & Marty, 1992), while some studies are suggestive of a curvilinear relationship, with very low fear failing to motivate change due to lack of arousal while very high fear invokes avoidant behaviour (Kash, Holland, Halper & Miller, 1992). From this it can be argued that the strength of the fear invoked may be important in success of fear appeals.

Using the framework of the fear appeal models, research has been carried out investigating the necessary strength of the fear appeal to provoke positive behaviour change (Keller & Block, 1996; Witte & Allen, 2000). Weak fear appeals may be less effective because the threat is not perceived as severe enough to motivate a change in behaviour, or the perceived response efficacy is not convincing enough. Strong fear appeals may well lead to adaptive health behaviour change, but can also give rise to defensive avoidance or perceived manipulation whereby the individual feels that the appeal is manipulative and unrealistic (Keller & Block, 1996). Nevertheless, several studies show that strong fear appeals can lead to behavioural change (Cameron et al., 2003; Tay, 2002; Ulleberg & Vaa, 2009). Overall, it has been concluded that moderate fear appeals are the most effective in generating a desired behavioural effect and that there is a curvilinear relation between the strength of the fear appeal and the behavioural response (Das, 2001; Ruiter, 2000; Witte & Allen, 2000).

In their meta-analysis, Witte and Allen (2000) investigated the influence of fear level, and the mediating effects of perceived fear, perceived response efficacy, and perceived self-efficacy on attitudes, intentions, and behaviour. They found medium to strong effects of manipulation of fear level on perceptions of fear, level of fear severity, response efficacy, and self-efficacy. They also found small significant effects of perceived fear, perceived severity, perceived response efficacy, on behaviour. This suggests that higher perceptions of fear, severity, response efficacy, and self-efficacy all resulted in more behaviour change. In addition they also investigated fear control responses and found that higher fear messages and lower efficacy levels resulted in more fear control responses. In addition, they found a negative relation between fear control responses and persuasion. Several previous studies have also found these results in relation to fear control and persuasion and found fear appeals are more effective when people report higher levels of self-efficacy (Blumberg, 2000; Donovan, 1991). This suggests that those individuals who feel that they can cope with a health threat will respond more positively to suggestions for change.

### **Vulnerability and Susceptibility.**

Fear appeal literature has also found that vulnerability and susceptibility may be factors which have an influence on behaviour change. Witte and Allen (2000) investigated the influence of fear level, and the mediating effect of perceived vulnerability on attitudes, intentions, and behaviour. They found medium to strong effect of manipulation of fear level on perception of vulnerability and also small significant effect of perceived vulnerability on behaviour. This suggests that higher perception of vulnerability result in more behaviour change. In contrast to this, it has been suggested that those who are most likely to listen to strong fear appeals are often those who feel less susceptible to the threat (Keller, 1999). Strong fear appeals are found to be received more positively by individuals who already engage in the suggested/positive health behaviour while in contrast those individuals who were engaging in the negative health behaviour were more affected by mild fear appeals (Keller, 1999). Those individuals with higher

levels of perceived susceptibility may therefore react with more defensive responses especially when presented with a strong fear appeal (Donovan, 1991).

In investigating the role of vulnerability and susceptibility in engaging in health behaviour change, it has been found that individuals need to perceive the threat as relevant to themselves and must also feel vulnerable to the negative health effects (Brinol & Petty, 2006; Lewis, Watson, White & Tay, 2007). When individuals perceive health threat messages as being more relevant to others than themselves, known as the third person effect, they are less likely to perceive it to be as high threat to their wellbeing and thus have a low response to the message (Lewis, Watson & Tay, 2007). In relation to skin cancer, it has been found that people tend to perceive their own susceptibility and their risk of skin cancer as low despite engaging in tanning or other exposure behaviour (Garside et al., 2010).

Research outcomes on studies of vulnerability and susceptibility have been mixed. High levels of perceived susceptibility have been found to increase the take up rate of recommendations made by fear appeals (Keller, 1999). While Randolph and Viswanath (2004), suggest that both perceived vulnerability and susceptibility influence behaviour change in the individual. In contrast with this, some studies have found that they are not a factor in behavioural change or intention to change (Block & Keller, 1995; Tanner et al., 1991). The results must be interpreted with caution however, as it is suggested that a lack of manipulation of the severity of the negative health outcomes may have resulted in a low fear response, therefore not impacting on perceptions of vulnerability or susceptibility (deHoog et al., 2005). Further study is needed to determine the role of both vulnerability and susceptibility in information recall, message acceptance and behaviour change.

A further issue arises with the terms vulnerability and susceptibility not being clearly defined in the literature and being used interchangeably at times. Therefore in the present research vulnerability will be defined as an individual's perception of the personal threat to their health that sun exposure behaviours pose, while susceptibility will be defined as an individual's perception of the skin cancer health threat as they see it in comparison or relation to others.

**Anxiety.**

Anxiety may also play a role in the effectiveness of a fear appeal (Boster & Mongeau, 1984). Specifically, there are two types of anxiety of concern: trait anxiety and state anxiety. Trait anxiety can be considered a personality trait or an enduring personality characteristic. Conversely, state anxiety refers to a specific and localized tension generated by a set of circumstances. Boster and Mongeau (1984) research suggest that high fear messages are unlikely to be any more or less persuasive for highly anxious individuals than those who are not anxious (i.e. trait anxiety). However, these highly anxious people may avoid messages that increase their anxiety. Conversely, less anxious individuals are likely to respond more favourably to high fear messages.

For some individuals the message contained within the fear appeal may increase state anxiety and reinforce the idea that they are at risk and that they may already have a threat to their health. Brinol and Petty (1996) found that individuals who, when exposed to a fear appeal, felt a sense of anxiety and helplessness were more likely to reject a health behaviour change message. They found that this was due to fears these people had that they have already been exposed to the risks as a result of prior unhealthy behaviour. This suggested that fear appeals raise state anxiety in those individuals who were already at risk but resulted in a rejection or avoidance on the health change.

This rejection of health messages with increased anxiety, may be of concern in particular, with those fear appeal campaigns which aim to increase disease detection behaviours, as they are a means of identifying or confirming health problems but by themselves do not provide any plan of action to deal with health threats. Thus individuals who are presented with a fear appeal may feel that they have already been put at risk and therefore if they perform detection behaviours there is the possibility that they may discover a disease. These threats to perceptions about health are related to the generation of strong anxiety and fear responses (e.g., Leventhal & Cameron, 1987; Tesser & Shaffer, 1990). The anxiety and fear associated with the detection behaviour and the absence of a way of reducing current risk, as well as no

plan of action for dealing with increased anxiety may motivate the individual to avoid these behaviours.

### **Coping.**

An individual's coping responses may affect their ability to retain health information and enact behaviour change when presented with this information in a fear appeal (Witte, 1992).

Coping is the cognitive and behavioural responses of an individual to stress. It is operationalised in various ways in an effort to manage and overcome demands or events that pose a challenge or threat, and may result in harm, loss, or be of benefit to an individual (Lazarus, 1991). Thus coping has the function of both regulating stressful emotions and modification of the conditions that lead to the stress response (Lazarus & Folkman, 1984). Various coping constructs have been proposed and researched in relation to individual cognition and behaviour (Roth & Cohen, 1986). Approach-avoidance coping is one of these constructs. Approach coping refers to an individual's tendency to manage a stressor by information seeking or monitoring the stressor. In contrast, avoidance coping refers to a tendency to repress, ignore or attempt to divert attention from the stressor. It is suggested that the efficacy of these constructs is related to the perceived controllability and duration of stress (Roth & Cohen, 1986). This means that for acute stress that cannot be controlled avoidance coping is more beneficial, whereas for enduring, controllable stress, such as that related to chronic disease or health behaviour change, approach coping has more benefit (Roth & Cohen, 1986). Thus when an individual is presented with a fear appeal they may respond in an avoidant manner which can involve defensiveness, which results in justifying behaviour or the ignoring the message (Tanner et al., 1991). In contrast an individual may respond with an approach style whereby they accept the information and message of the appeal and adopt the recommended behaviours. It should also be noted that these approach and avoidant coping styles also map somewhat onto the danger and fear control processes described in EEPM when applied to fear appeal responses. This can be explained as individuals fearing a threat and perceiving a behaviour change which can lower the threat danger, meaning that processes are



engaged and they are motivated to act. In terms of coping, this can be seen as approach coping. In contrast, when the threat is high but perceived efficacy is low, fear control processes are initiated and maladaptive or avoidant coping mechanisms are the result.

Individuals differ in how they extrapolate coping resources from their self and the environment (Moos, Brennan, Fondacaro & Moos, 1990). Approach coping is associated with message acceptance and thus should be associated with deeper information processing and greater knowledge retention (Witte, 1992). In contrast, avoidant coping has been found to be associated with rejection of fear eliciting health behaviour messages (Goldstein, 1959) and may be associated with poor information retention.

### **Individual Factors as Mediating Factors in Behaviour Change.**

Health promotion messages have at times been criticised for presenting risk behaviours and alternate actions without an attempt to understand or address the underlying meanings associated with those behaviours (Crossley, 2000). For example, previously health campaigns frequently focus on skin cancer risk as the tool to promote sun protection behaviour (Cho & Salmon, 2007; Stephenson & Witte, 1998). However, Tay, Ozanne and Santiono (2000) argue that health behaviour change largely depends upon personal and situational moderating factors, which alter an individual's response to a health campaign message. Personal factors can be socio-demographic and cultural, or can also relate to personality characteristics, individual differences and more temporary phenomena such as mood (Quinn, Meenaghan & Brannick, 1992). Situational factors are the environment in which the individual is exposed to the behaviour change message or fear appeal, for instance the media context in which the appeal is shown – whether textual, audio or graphic (Janssens & DePelsmacker, 2005). Despite research that suggests the significance of the type of environment in influencing health behaviour, few studies have included this factor. The effect of fear appeal environment is also asserted as a vital influence on behaviour change according to the theory of planned behaviour (Ajzen, 1991; [TBP]). Theory of Planned Behaviour incorporates a multifaceted approach to behaviour change. In this theory it is asserted that behavioural intentions are reasoned and

rational. However, the intent to perform a health behaviour depends on the individual's assessment of behavioural, normative, and control beliefs and evaluative aspects associated with them. Behavioural beliefs are those beliefs that an individual holds about a particular behaviour, for example sun protection. The associated evaluative aspect is the individual's perceived outcome of the behaviour - positive or negative. This produces a favourable or unfavourable attitude towards the behaviour. Thus, an individual's weigh up the personally perceived advantages and disadvantages of performing a particular behaviour. Normative beliefs are the beliefs that an individual may hold about the level of social support they would receive for performing a behaviour, for example peer support to avoid getting sunburnt. The associated evaluative aspect is the amount of importance the individual places on this support resulting in subjective norms. Finally, control beliefs refer to an individual's beliefs with regards to factors they feel may impede or facilitate performing a particular behaviour. The associated evaluative aspect is perceived the power of these control factors to affect behavioural performance if they were to occur or be present (Ajzen, 1991). In combination, the attitude towards the behaviour, subjective norms, and perceived behavioural control lead to the formation of a behavioural intention (Ajzen, 2002). The TPB has been applied to many health areas including sun protection. In a study of tanning intentions, Hillhouse, Adler, Drinnon and Turrisi, (1997) found some support for the TPB as an appropriate model to explain sun exposure behaviour. They found that attitudes were strongly associated with exposure behaviour (such as tanning, using a tanning salon or not using sunscreen) however subjective norms were not as strongly associated with that behaviour. In addition, perceived behavioural control was moderately associated with attitudes, norms and intention to sun bake. Therefore this suggests that in order to effectively study sun protection and skin cancer health behaviours overall, individual differences and environmental differences must be taken into account.

**Age.**

In investigating individual differences in relation to fear appeal effectiveness it has been found that several individual differences appear to have an effect on behaviour change. In

several different areas of health behaviour, it has been found that age is a factor in the uptake of health behaviour change (e.g., Benet, Pitts & LaTour, 1993; Brinol & Petty, 2006; Leary & Jones 1993). For example, it was observed that for young women, , although they reported knowing the risks of sun exposure and having been exposed to graphic skin cancer appeals, they continued to engage in the risky health behaviour, such as tanning (Leary & Jones, 1993). In contrast to this, some research has shown younger people are less likely to reject the fear appeals information and messages than older people (Brinol & Petty, 2006). Adolescents have been shown to be more reluctant to use sun protection and also found to describe more negative sun protection attitudes compared with children (Dobbinson, Hayman, Livingston & White, 2007; Stanton, Janda, Baade & Anderson, 2004). In addition, adolescents spend more time outdoors in the sun, and use less sun protection than other age groups (Hill & Boulter, 2002).

### **Sex Differences**

Sex differences may also play a role in fear appraisal and behaviour change with knowledge, attitudes and behaviours differing between males and females (Leary & Jones, 1993; Lupton & Gaffney, 1996). Men in Australia have more than two times the risk of developing skin cancer than women (Buettner & Raasch, 2001; Staples et al., 2006). As both sexes experience the same level of Australian environmental sun, gender differences in both sun exposure and sun protection practices may be a factor. Research has shown that although men tend to spend more time in the sun at work and during recreational activities (unintentional/incidental exposure), men mainly use limited sun protection in the form of clothing or hats (Godar, Wengraitis, Shreffler & Sliney, 2001; Jackson & Aiken, 2000; Lupton & Gaffney, 1996; Mahler, Kulik, Gibbons, Gerrard & Harrell, 2003; Wichstrom, 1994). In contrast, females overall show greater knowledge of skin cancer risks, perceive higher levels of susceptibility and use more sunscreen and shade protection behaviour (Arthey & Clarke, 1995; Cody & Lee, 1990; Leary & Jones, 1993; Lupton & Gaffney, 1996). However, despite women's higher knowledge and generally greater use of sun protection, the perceived attractiveness of tanning

has segregated a subset of women, who are higher consumers of mass media, into a group who are less likely to use sun protection in favour of deliberate tanning (Arthey & Clarke, 1995; Beasley & Kittel, 1997; Cafri, Thompson, & Jacobsen, 2006; Mahler, Beckerley, & Vogel, 2010; Prentice-Dunn, Jones & Floyd, 1997). It has also been shown that women are more likely to deliberately tan (Jackson & Aiken, 2000; Leary & Jones, 1993; Lupton & Gaffney, 1996). While the sex differences in sun health behaviour have been fairly well researched and established there is a need for greater information about what factors contribute to these sex differences. This is important as these factors could assist in developing more targeted and effective health promotion campaigns.

### **Australian Cultural and Societal Expectations**

There are many studies into negative health behaviour engagement that attempt to explain why the behaviour continues despite knowledge, fear appeals, and high perceived risk (e.g. Arthey & Clarke, 1995; Lamanna, 2004; Leary & Jones, 1993; Miller, Ashton, McHoskey & Gimbel, 1990; Murray & Turner, 2004). However, health campaigns often ignore the social and cultural contexts involved in health behaviour choices (Crossley, 2000). In Australia particularly, tanning has become one of the symbols of “Australianness”, with images of the ‘bronzed Aussie’ (Lupton & Gaffney, 1996). Jackson and Aiken (2000) showed that intentions to tan were associated with perceived societal norms. In relation to sun exposure behaviours and skin cancer risk, it has been found that attitudes towards healthiness, perceived activeness and perceived increased attractiveness are associated with tanning behaviour (Beasley & Kittel, 1993; Broadstock, Borland, & Gason, 1992; Lamanna, 2004; Leary, Saltzman & Georgeson, 1997). This association negates the impact of their knowledge and perceived risk of skin cancer (Lamanna, 2004). In contrast with other research showing favourable attitudes towards tanning in relation to perceived attractiveness, activeness and healthiness (Beasley & Kittel, 1993; Lamanna, 2004; Leary et al., 1997; Miller et al., 1990), researchers found that both extremes of tanness and paleness were considered fashionable (Jackson & Aiken, 2000). This suggests that there may be multiple perspectives influencing tanning behaviour. Indeed, the limitation is

that these studies, while showing patterns of attitude and behaviour, do not assist researchers in understanding why these perceptions exist as they do not examine the underlying socio-cultural differences inherent in moderating these risky health behaviours. This is primarily due to the studies being quantitative in nature (e.g. Lamanna, 2004; Leary & Jones, 1993; Miller et al., 1990). Study 3 in the current research which is qualitative in nature aims to address this limitation.

### **Current Studies**

Given the continued sun exposure and disturbingly high of skin cancer rate in Australia, despite the prevalence of health promotion campaigns, there is a need for further research into the factors affecting behaviour change. To date there has been no research which attempts to not only examine the impact of the emerging dominant type of health campaigns, fear appeals, on health information recall and behaviour change, but to combine this with an attempt to explain the impact and interaction of individual differences and in message acceptance and behaviour change in terms of the Australian cultural context. This thesis work was undertaken to determine the efficacy of fear appeals, in relation to both raising fear and affecting behaviour change, and to identify other factors affecting Australians' motivation to make healthier sun behaviour choice. This will add to our knowledge of which moderating factors affecting health information recall, and the interaction with attitudes, beliefs and behaviours in relation to sun exposure and skin cancer in Australia.

This research is unique in that it utilises method triangulation in order to explain more fully the complex relationships involved in health message acceptance or rejection, health behaviour and change. The research is comprised of three studies; two quantitative and one qualitative. Study 1 was a quantitative pilot study that investigated the level of health knowledge reported by individuals, and predictors of recalled health information following the presentation of a fear appeal. The study investigated the role of anxiety, susceptibility, vulnerability, age, and sex as predictors of recall and whether graphic imagery affected recall, anxiety, perceived susceptibility or perceived vulnerability. Participants were asked about their

health behaviour and, utilising the incidental learning paradigm, were asked various questions about whether they had prior knowledge of the information provided to them on skin cancer and general health. Following this there was a fear appeal intervention comprising of graphic or mild imagery in the experimental groups, or being asked to sit for a short period in the control group. Measures were recorded for anxiety, susceptibility and vulnerability. Participants were asked to recall information they were given earlier. The aim of this research was to determine whether graphic, mild or no imagery alter information recall and other factors that may predict this recall. Continuing from study 1, study 2 quantitatively investigated general and skin cancer health information recall, predictors of recall, and one-month post intervention behaviour change. The additional factor of coping was added to study 2 to investigate whether defensive coping mechanisms are a factor for those participants who do not change their behaviour as postulated by Protection Motivation Theory. Given the fact that much of the skin cancer development is associated with excessive sun exposure and is largely preventable, it is important to investigate mediating factors that may affect sun protection message uptake in the context of fear appeals. Finally, study 3 was a qualitative study to explore discourses about sun protection and sun cancer beliefs, attitudes and behaviour in the context of the Australian culture. This study was undertaken to more fully understand the individual factors in Australian society affecting sun protection behaviour change. This study further sought to determine why individuals continue to engage in unsafe sun behaviour or why they choose sun smart behaviours. Overall, the approach adopted in the current research will allow for a wide range of information to be gathered which will assist in guiding the future direction of more targeted health promotion campaigns and more appropriate formulation of strategies to encourage sun protective behaviours.

### **Study 1**

#### **Impact of Fear Appeals on Skin Cancer Knowledge Recall**

In fear appeals, it is proposed that when individuals are presented with information perceived as graphic and fear provoking, they engage defensive mechanisms to defend against threat perception. However, fear appeal campaigns have been suggested to also impede intake of the information being presented (Keller & Block, 1996). Early fear appeal research has backed this assertion, finding that higher fear arousal correlates with lower levels of information recall (Janis & Terwilliger, 1962). A possible limitation of previous studies was that the conditions of testing meant that the individual was aware that they were being asked to take in health information. In reality health information interactions are presented to the individual through various formats at various times, whether they are consciously aware of it or not (Marsick & Watkins, 2001). This is termed incidental learning where an individual learns information as a product of another activity and not via the intent to learn (Marsick & Watkins, 2001). Currently limited research has been undertaken to examine incidental learning in a fear appeals context. Therefore, this quantitative study investigated health information recall was measured within an incidental learning paradigm. A number of contributing factors that affect information recall have been addressed in this study. These include: prior knowledge, anxiety, perceived vulnerability, perceived susceptibility, and demographic differences.

Previous studies have shown that anxiety can impede information recall by avoidance of the message (Boster & Mongeau, 1984). It is suggested that high fear messages are unlikely to be any more or less persuasive for highly anxious individuals. However, these highly anxious people may avoid messages that increase their anxiety. Conversely, less anxious individuals are likely to respond more favourably to high fear messages.

Susceptibility and vulnerability may be important factors in fear appeal efficacy. It been shown that individual's need to feel that they may be susceptible to the health threat and vulnerable to the negative health effects for a fear appeal to have an impact on knowledge and behaviour change (Brinol & Petty, 2006; Lewis, Watson, White et al., 2007). If individuals perceive health threat messages as being more relevant to others than themselves, known as the third person effect, they are less likely to perceive it to be as higher threat to their own



wellbeing and in turn have a lower response to the message (Lewis, Watson, & Tay, 2007).

Vulnerability is an individual's perception of the personal threat to their health that sun exposure behaviours pose. Susceptibility is an individual's perception of the skin cancer health threat as they see it in comparison to others. Therefore the study investigated these factors in relation to fear appeals and information recall.

In Australia there can be difficulty with attempting to present new information to be learnt about sun exposure, sun protection and skin cancer due to the Australian public being exposed to over 20 years of sun protection awareness campaigns, therefore other information of a general health nature will also be presented during the fear appeal to assert whether learning overall is impeded by fear arousal (Keeney et al., 2009; Marks, 1999; Montague et al., 2001).

Research into fear appeals has shown mixed results as to the effectiveness of fear as a way of increasing health protective behaviours. Some studies found a positive relationship between fear-related variables, such as anxiety and susceptibility, and increased rates of health behaviour (Stefanek & Wilcox, 1991), some studies show no relationship (Fuller et al., 1992), while some studies are suggestive of a curvilinear relationship, with very low fear failing to motivate change due to lack of arousal while very high fear invokes avoidant behaviour (Kash et al., 1992). This suggests that the strength of fear evoked may be important in the success of fear appeals. From this perspective, study 1 should investigate the impedance to knowledge recall with both graphic and milder fear appeals as well as a control of no intervention in order to ascertain whether the graphic nature of fear appeals are a factor.

In summary, study 1 is used to look at initial impact of fear appeals on information recall. In addition, the impact of fear appeals on anxiety, perceived vulnerability and perceived susceptibility will be examined. It will compare mild fear appeals and graphic fear appeals in terms of information recall, anxiety, perceived vulnerability and perceived susceptibility. This study will provide a means of identifying possible methodological flaws and to look at initial trends in results.

## **Hypotheses**

For study 1, 4 hypotheses were developed:

Hypothesis 1: Those participants who are presented with graphic fear appeal images will recall less overall health information than those in the control group.

Hypothesis 2: Those participants who are presented with graphic fear appeal images will recall less skin cancer information than those presented with mild appeal images or the control group respectively.

Hypothesis 3: Lower health information recall will be predicted by higher anxiety, skin cancer vulnerability and skin cancer susceptibility

Hypothesis 4: Participants exposed to graphic images will report higher levels of anxiety, vulnerability and susceptibility than those in the mild and control groups respectively.

## **Method**

### **Design**

Study 1 explored perceived initial knowledge, information recall, and whether exposure to graphic imagery has an impact on information recall. The study was a quantitative between subjects factorial design with two treatment groups (mild intervention – mild images of skin cancer presented, graphic intervention – graphic images of skin cancer presented) and one control group (no images presented). Dependent variables were anxiety, vulnerability, susceptibility, perceived initial and post-intervention information recall. Independent variables were sex, age, sunscreen use (general and holidays), hours spent in the sun (general and holidays), and intervention condition (mild, graphic, control).

## Participants

Power analysis revealed that 120 participants were required for a large effect size. Participants were required to be Australian citizens, and over 18 years of age. Participants were first and third year psychology students recruited via online advertising at the University of Newcastle and recruitment meetings. Members of the general public were recruited at a Central Coast Beach via external advertising posters placed in public places as well as via snowballing. Details of participant group are shown in Table 1. A total of 133 participants were recruited whose ages ranged from 18-88 years old ( $M = 39.34$ ,  $SD = 16.68$ ).

Table 1.1. *Participant Group by Sex and Recruitment*

	Male	Female	Total
Student	15	38	53 (39.85%)
General Public	31	49	80 (60.15%)
Total	46 (34.59%)	87 (65.41%)	133 (100%)

## Materials

In order to assess initial knowledge, information recall, impact of graphic imagery on information recall and individual differences affecting recall, a battery of questionnaires were used, as was an intervention in the form of the presentation of skin cancer imagery. The questionnaires were Demographics and Sun Health Behaviour Questionnaire, a Skin Cancer Health Knowledge Questionnaire (HKQ), the Beck Anxiety Inventory (BAI), a Skin Cancer Vulnerability Questionnaire (SCVQ), a Skin Cancer Susceptibility questionnaire (SCSQ), and an Information Recall Test (IRT).

**Demographics and Sun Health Behaviour Questionnaire (Appendix A).** The demographics and health behaviour questionnaire was a purposely designed measure which asked participants to give their year of birth, sex, hours of weekly, weekend, work and holiday sun exposure patterns, which sun protective behaviours they utilised and how often they utilised

them – i.e. sunscreen, hats/clothing to cover exposed skin, visits to GP for skin checks, visits to Cancer Clinic for skin checks.

**The Beck Anxiety Inventory (BAI; Beck Epstein, Brown & Steer, 1988).** The BAI is a 21 item scale which presents the common symptoms of anxiety using a 4-point Likert scale to determine how often the participant had experienced each symptom in the last month. For the BAI, 1 denoted that the participant had not experienced the symptom at all through to 4 which indicated that the participant had experienced the symptom frequently. The scale has a high internal consistency (0.92; Beck, Epstein, Brown & Steer, 1998). Test-retest reliability over one week is  $r(81)=0.75$  (Beck, Epstein, Brown & Steer, 1998).

**The Health Knowledge Questionnaire (HKQ; Appendix A).** The HKQ is a purpose designed measure of health knowledge. Its purpose was to surreptitiously present participant's information regarding sun cancer and general health. The HKQ consisted of 12 questions (6 skin cancer related and 6 general health), derived from Australian Government health priorities and Dermatology Insights (Haggerty, 2000). Cronbach's alpha showed that the questionnaire had reasonable reliability ( $r=0.61$ ). The information was presented in the form of a 'did you know...' statement, which required a 'yes' or 'no' circled response as to whether they had prior knowledge of the information given for each question. Scores ranged from 0-12 (0=all no responses, 12=all yes responses).

**Skin Cancer Images (Appendix A).** Participants in the experimental conditions were presented with skin cancer images, either mild or graphic, via PowerPoint presentations containing 10 images with a 5 second screening for each image. These images were presented on a laptop computer. In order to assess the graphic rating of each of the skin cancer images the research team collected images available in the public domain via a search of Google images. These images were colour photographs depicting the various types of skin cancer and differing stages of progression. The researchers each rated whether they considered the images to be 'mild' or 'graphic'. Only those images where all assessors agreed on their

category were used. The control group were shown no images and asked to sit in the laboratory for 50 seconds instead.

**The Skin Cancer Vulnerability Questionnaire (SCVQ; Appendix A).** This questionnaire was designed for this study to measure the participant's perceived vulnerability to sun related health issues. Participants were asked to rate on a 4-point Likert scale (ranging from 1-4: 1 not important at all, to 4 very important) what importance they placed on each of 8 sun care related behaviours eg "staying out of the sun between 10am and 4pm". Scores ranged between 8-32. Cronbach's alpha showed that the questionnaire had excellent reliability ( $r=0.82$ ).

**The Skin Cancer Susceptibility Questionnaire (SCSQ; Appendix A).** The SCSQ was designed to measure the participant's perceived susceptibility to sun related health issues. The participants were asked how often they performed sun related behaviours in comparison to their friends utilising the same 8 statements about sun behaviour that were presented in the VQ. Again the responses were on 4-point Likert scale (ranging from 1-4: 1 not important at all, to 4 very important). Scores therefore ranged between 8-32. Cronbach's alpha showed that the questionnaire had excellent reliability ( $r=0.84$ ).

**Information Recall Test (IRT; Appendix A).** The IRT used questions that asked the participant to recall information presented in the Skin Cancer Health Knowledge Questionnaire. This questionnaire asked multiple choice questions whose answers were supplied in the HKQ and was designed to assess the amount of information from HKQ one recalled post intervention. It consisted of 10 multiple-choice questions and two recall questions. Each multiple-choice question was scored with a 1 and each recall question was scored 0-4 (0=no information recalled, 4=all four correct responses recorded). Scores ranged between 0 and 18.

## **Procedure**

Following ethics approval from the University of Newcastle, participants were recruited for this study. Undergraduate student participants were recruited via advertising on the online

recruitment system at the university and by means of a recruitment meeting attended by interested third year psychology students. First year psychology students received course credit for their participation. General public participants were recruited via information posters placed at the clubhouse of the Central Coast beach surf club and via word snowballing. Interested people were able to contact the researchers to arrange a suitable testing time, with the study run in an audio visual laboratory equipped for video projection.

Student and general public interested individuals were allocated a suitable time and were asked to attend the laboratory. Each participant was allocated sequentially to one of conditions (control, mild, graphic) according to what time they arrived at the venue.

Each participant was given a booklet with all of the measures for the study and was asked to work on it. The measures were the Demographic and Sun Health Behaviour Questionnaire, followed by the HKQ. Following this a slide show was shown dependent on which condition the participant had been assigned. The slide presentations were 10 mild images of skin cancer in the mild condition, or 10 graphic images of skin cancer in the graphic condition. For the control condition no images were shown. Each of the images in the slide presentation were shown for 5 seconds each and the slides were screened on a 1.5m projector screen. The participants in the control condition were asked to sit silently for 50 seconds. Immediately following this participants were asked to fill out the BAI, SCSQ, SCVQ, and the HKT.

After testing was complete, participants in the intervention groups were informed of services that they could access (Lifeline, University counselling service) should they be concerned by any of the images or information presented.

## Results

### Initial Perceived Knowledge

Firstly Initial Perceived Knowledge was analysed to determine whether participants were reporting a high level of health knowledge prior to the presentation of a fear appeal. Initial perceived knowledge was measured using the number of 'yes' responses to the Health Knowledge Questionnaire (HKQ). It was found that the mean score on the HKQ was 7.50 ( $SD = 2.27$ ; out of 12). Overall participants reported a moderate amount of health behaviour knowledge prior to participating in the study. Using paired sample t-tests, the perceived knowledge for specific information types, either skin cancer or general health was determined. A significant difference between perceived skin cancer ( $M = 3.94$ ,  $SD = 1.22$ ) and general health knowledge ( $M = 3.56$ ,  $SD = 1.51$ );  $t(130) = 2.726$ ,  $p < .01$  was observed. These data show that the participants in this study reported a significantly higher level of skin cancer prior knowledge than prior general health knowledge. By directly comparing the initial perceived general health and skin cancer knowledge between test conditions, that is control, mild, and graphic groups via one-way ANOVA, no significant difference in 'yes' responses to skin cancer questions ( $F(2, 127) = 1.971$ ,  $p = .27$ ), nor general health questions ( $F(2, 129) = 2.874$ ,  $p = .29$ ) was observed. This shows that the initial perceived general health or skin cancer knowledge was equal for each test conditions and did not directly influence results in this study. Table 1.2 shows the mean and standard deviation of the initial perceived knowledge scores.

Table 1.2. *Mean and Standard Deviation of Initial Perceived Knowledge Scores*

Group	Skin Cancer	General Health
	Mean (SD)	
Control	3.82 (1.34)	3.28 (1.56)
Mild	4.19 (1.14)	3.77 (1.62)
Graphic	3.80 (1.17)	3.65 (1.36)
Overall	3.94 (1.22)	3.56 (1.51)

### **Impact of Imagery on Information Recall**

Post-intervention information recall was measured using the Information Recall Test. Using a one-way ANOVA, it was found that there was a significant difference between intervention condition and overall information recall,  $F(2, 132) = 6.52, p < .01$ . Tukey's post-hoc tests indicated that the mean score for the control condition ( $M = 11.8, SD = .218$ ) was significantly different than the graphic imagery condition ( $M = 10.33, SD = .167; p < 0.01$ ), and the mild imagery condition ( $M = 10.55, SD = .206; p < 0.05$ ). This shows that those participants in the control condition retained more information than those in the graphic and mild groups respectively.

A 2 x 3 ANOVA was performed to investigate recall of general knowledge and skin cancer related health questions in relation to condition. A significant difference was found between the conditions for the general health questions,  $F(2, 130) = 7.30, p < .001$ . This shows that while there was a difference in scores for general health questions between conditions, there was no significant difference between scores for skin cancer related questions between conditions. Tukey's post-hoc tests showed a significant difference between the control ( $M = 6.17, SD = 2.31$ ) and mild ( $M = 5.16, SD = 1.68$ ) intervention conditions ( $p < .05$ ) and control and graphic ( $M = 4.70, SD = 1.44$ ) conditions ( $p < .001$ ) for the general health questions. This suggests that those in the control condition recalled more general health information than those in the mild condition. It also shows that those in the control condition recalled more general health information than those in the graphic condition. However, it does not show a significant difference between groups in relation to skin cancer recall.

### **Moderating Factors in Predicting Information Recall**

In order to determine those variables that predict overall health information, general health and skin cancer health information recall a series of 3 blocked stepwise multiple linear regressions were performed. The predictors used in each of these analyses were identical. Predictors were organised into 3 blocks. Block 1 contained Anxiety (BAI), Skin Cancer



Perceived Vulnerability, and Skin Cancer Perceived Susceptibility. Block 2 contained behaviour variables including normal hours in the sun, holiday hours in the sun, normal sunscreen use and holiday sunscreen use. Block 3 contained the demographic variables sex and age.

Overall health information recall was investigated using a blocked stepwise multiple linear regression analysis. The dependent variable for this analysis was overall health information recall. A significant model emerged which explained 9.7% of the variance in overall health information recall ( $F(1, 131) = 8.128, p < .001$ ). Skin cancer vulnerability explained 2.3% of the variance in overall health information recall, and Age explained a further 7.4% of the variance (see Table 1.3). This result shows that Anxiety, Skin Cancer Perceived Susceptibility, sun behaviours and sex do not predict general information recall. A one-way ANOVA was performed to further investigate the influence of age on health information. The pre-intervention health knowledge test was used to evaluate whether there was an age difference in initial perceived health knowledge. No significant difference was found.

Table 1.3. *Variables Predicting Overall Health Information Recall*

Variable	Adj $R^2$	B	SE B	$\beta$
Perceived skin cancer vulnerability	0.023	-.067	.033	-.173*
Age	0.074	-.039	.011	-.296**

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

General health information recall was investigated using a blocked stepwise multiple linear regression analysis. The dependent variable for this analysis was general health information recall. A significant model emerged which explained 7.1% of the variance in general health information recall ( $F(1, 131) = 11.104, p < .001$ ). Age explained 7.1% of the variance in general health information recall (see Table 1.4). This result shows that Anxiety, Skin Cancer Perceived Susceptibility, Skin Cancer Perceived Vulnerability, sun behaviours and sex do not predict general information recall. A one-way ANOVA was performed to further investigate the influence of age on general health information. The pre-intervention health knowledge test was

used to evaluate whether there was an age difference in initial perceived general health knowledge. No significant difference was found.

Table 1.4 Variables Predicting General Health Information Recall

Variable	Adj R <sup>2</sup>	B	SE B	β
Age	0.071	-.033	.010	-.280*

\* $p < .001$

Skin cancer information recall was investigated using a blocked stepwise multiple linear regression analysis. The dependent variable for this analysis was skin cancer information recall. A significant model emerged which explained 5.8% of the variance in skin cancer information recall ( $F(2, 131) = 5.064, p < .01$ ). Skin cancer perceived susceptibility explained 2.4% of the variance in skin cancer information recall and skin cancer perceived vulnerability explained a further 3.4% (see Table 1.5). This result shows that Anxiety, sun behaviours, age and sex do not predict skin cancer information recall.

Table 1.5. Variables Predicting Skin Cancer Information Recall

Variable	Adj R <sup>2</sup>	B	SE B	β
Skin Cancer Perceived	0.024	.038	.013	.268*
Susceptibility				
Skin cancer Perceived	0.034	-.029	.012	-.223**
Vulnerability				

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

### Effect of Imagery on Anxiety, Vulnerability and Susceptibility

The question of whether the individuals' anxiety, perceived vulnerability and perceived susceptibility is impacted upon after exposure to fear appeal imagery was examined. It was found that the vast majority of participants ( $N = 127$ ) had BAI scores suggesting very low levels of anxiety (between 0-21 [ $M = 6.60, SD = 5.72$ ]), seven participants scored within the moderate anxiety range (22-35 [ $M = 28.57, SD = 5.71$ ]) and two participants scored in the high anxiety

range (36+ [ $M = 39.00$ ,  $SD = 2.83$ ]). This shows that most participants did not experience particularly high levels of anxiety. The mean scores on the skin cancer perceived vulnerability ( $M = 22.89$ ,  $SD = 5.64$ ) and skin cancer perceived susceptibility ( $M = 21.05$ ,  $SD = 5.15$ ) scores were found to show moderate levels. To investigate whether there was a difference in anxiety, perceived skin cancer vulnerability, and perceived skin cancer susceptibility, between conditions a one-way ANOVA was performed. It was found that there was a significant difference in anxiety between conditions  $F(2, 132) = 3.90$ ,  $p < .05$ . Tukey's post-hoc tests indicate that the mean score for the graphic imagery condition ( $M = 10.67$ ,  $SD = 10.25$ ) was significantly different than the mean score in control condition ( $M = 5.80$ ,  $SD = 4.85$ ;  $p < .05$ ). However, the mild imagery condition ( $M = 8.43$ ,  $SD = 8.82$ ) did not differ significantly from the graphic imagery and control conditions. No significant difference was found for perceived skin cancer vulnerability, and perceived skin cancer susceptibility.

## Discussion

This pilot study explored the impact of imagery, like those shown in fear appeals, on health knowledge recall as well as the effect of imagery on individual's anxiety, perceived vulnerability and perceived susceptibility. The main hypothesis was partially supported with results showing that exposure to no intervention imagery (control condition) has an effect on overall information recall. Specifically, results suggest that when individuals are not exposed to imagery after presentation of health information, they recall that information more than if they are exposed to either graphic or mild imagery. Those in the graphic and mild imagery conditions were not shown to have significantly differing levels of recall however. This suggests that health images, regardless of strength of the image, may impact on the ability of the individual to take in overall health information presented and recall it. The results also show the same effect for general health information recall. They show that those in the control condition retained more information than those in the mild and graphic conditions but once again with no significant difference between mild and graphic. This may offer some initial support to the results of prior research which suggest that fear appeals overall can have the opposite of the

intended effect however it does not support the theory that it is only highly graphic fear appeals which are problematic (Cho, 1999; Keller & Block, 1996). The results of this study also appear to be in conflict with other research which has found that mild fear appeals are the most persuasive (Janis & Feshbach, 1954; Witte & Allen, 2000). Instead the current research, showing that the control condition participants recalled higher amounts of information yet both the mild and graphic conditions lower recall was not significantly different, suggests that showing any health imagery related to the health issue in focus will impede information recall. One explanation for this is that the presentation of images (mild and graphic) acted as a distraction from health information learning. This is supported by previous research (McDonald, Wiczorek & Walker, 2004), which found that distraction during information presentation in a health campaign has an impact on recall, resulting in a decrease in learning or processing and therefore possibly impacting on the efficacy of the campaign. However, this explanation would be further strengthened with the use of a manipulation check to ascertain what information was being learned as opposed to already known. Although there was a significant difference in overall information recall between conditions with control condition showing higher recall, there was no significant difference in relation to skin cancer information. Thus Hypothesis 2 was not supported. Prior studies show that this can be explained by the fact that there is a high saturation of skin cancer information already in the Australian community and a high knowledge of risks (Garvin & Eyles, 2001; Smith, Ferguson et al., 2002). In the current study, the lack of significant difference between conditions pre and post intervention in regards to skin cancer information; the fact that the average level of reported skin cancer knowledge was already moderate; and the contrast with the significant difference in post intervention general knowledge recall between conditions; combined, suggest that many participants simply may not have gained any additional skin cancer information. The general health information may have, in contrast, been less well known prior, and thus may be a better indicator of the impact of fear appeals on information retention in this instance. Alternatively it may be that this indicates that individuals who already feel they have a high level of knowledge in an area tend to ignore additional attempts at introducing new information in that area. This will be explored further in study 2.

It was found that overall health information recall was predicted by perceived skin cancer vulnerability and age which both had a negative linear relationship with recall. It suggests participants who felt less vulnerable recalled more information and younger participants were able to recall more overall health information than older participants. As there was no age difference found between participants in reported prior health knowledge, this suggests that health information intake and recall is being processed differently in older people than younger people. This can be explained by prior research suggesting that older people are more likely to reject fear appeals information and overall messages to a belief that the damage has already occurred or it is too late to make effective changes (Brinol & Petty, 2006). Alternatively, it could be a difference in age-related processing of information. However, as vulnerability also predicts overall recall, this suggests that perhaps older people may also feel more personally likely to be affected by poor health outcomes further rejecting the information presented. The vulnerability result contradicts prior research which suggests that higher vulnerability is related to increased acceptance of fear appeal messages (deHoog et al., 2005). In teasing out the types of information being recalled, it was found that general health information recall was predicted only by age - once again showing that it was younger participants that recalled more general health information than older participants. This suggests that older participants are less likely to retain health information and may feel more vulnerable to poor health outcomes.

Skin cancer information recall was predicted by skin cancer susceptibility and skin cancer vulnerability. However it was found that skin cancer susceptibility had a positive linear relationship with recall, suggesting that higher feelings of susceptibility to skin cancer are associated with higher recall, yet a negative linear relationship with vulnerability. This suggests that people who feel more personally vulnerable to a health risk are likely to reject more of the skin cancer information intake, in contrast with prior research suggesting the inverse (deHoog et al., 2005). In contrast, those who felt that they were susceptible to skin cancer showed increased recall. This can be explained as vulnerability looks at personal perceived risk, while susceptibility looks at the individual's perception of risk to a health issue in relation to others and

may be affected by coping styles, which affect how people take in and process information from fear appeals (Roth & Cohen, 1986). It can be theorised that those who feel more personally at risk (vulnerable) to a health issue employ avoidant coping strategies in order to reduce the perceived risk and decrease their negative emotions. Avoidant coping has been found to be associated with rejection of fear eliciting health behaviour messages (Goldstein, 1959). While those who may not feel at a high overall personal risk but when they compare their risk to others they consider it higher (susceptible) may utilise approach coping strategies, which are associated with message acceptance and thus associated with deeper information processing and greater information retention (Witte, 1992).

The difference in predictors between types of information recall can be explained by prior studies showing a high saturation of skin cancer information already in the Australian community (Garvin & Eyles, 2001; Smith, Ferguson et al., 2002). Information processing will therefore only be affected for those who feel particularly vulnerable or susceptible to skin cancer in particular. In contrast a more general information processing and recall is affected more by age related factors as with increased age comes decreased recall of health information.

Participants were not shown to have higher levels of perceived skin cancer vulnerability or susceptibility in the graphic conditions, or mild conditions compared to control as was proposed in Hypothesis 4. There was no difference between groups. Research has shown that there is an association with level of fear and level of perceived vulnerability in relation to fear appeals (deHoog et al., 2005). The fact that vulnerability and susceptibility were not significantly different suggests that the images themselves did not evoke a sense of fear and therefore personal threat in the participants. The results also contradict other research findings (Witte & Allen, 2000). Witte and Allen (2000) found that graphic fear appeals that are associated with moderate fear arousal also show moderate perceived susceptibility. In addition, as perceived skin cancer vulnerability is a negative predictor of both overall health knowledge recall and skin cancer knowledge recall, but yet not significantly different between conditions,

this suggests that it is not the imagery which is arousing perceptions of vulnerability and susceptibility but instead is related to some other factor. This will be further explored in study 2.

However, results showed a difference in anxiety between conditions. These results suggest that exposure to graphic imagery has an effect on anxiety. Specifically, results suggest that when individuals are exposed to graphic skin cancer imagery, their anxiety is higher. It should be noted that the 'no imagery' control condition does not have this effect and more mild imagery does not significantly increase anxiety. This supports other research which suggests that there is a relationship between increased anxiety and graphic imagery (Boster & Mongeau, 1984). This increased anxiety in the face of apparent ineffectiveness of graphic imagery to evoke a sense of personal vulnerability or susceptibility, suggests that while the fear appeal was successful in provoking anxiety, it did not create a sense of personal connection with that threat image. In addition, the increased anxiety associated with graphic imagery when combined with the results showing that overall information recall was impacted on by imagery condition (control condition showed higher recall than both mild and graphic conditions with both mild and graphic imagery conditions not significantly different in recall), suggest that although anxiety was aroused in the graphic condition, both the mild and graphic conditions showed lower recall than control. Therefore it is suggested that not only do fear appeals interfere with information recall, graphic appeals may also provoke unnecessary anxiety. However, this is in conflict with research suggesting that anxiety has an important role in fear appeals (Boster & Mongeau, 1984).

### **Implications and Further Research**

The results from this study showed that individuals exposed to health information but no imagery (mild or graphic), in a health campaign recalled higher amounts of information than those who were exposed to imagery, suggesting that showing any health imagery related to the health issue in focus will impede overall information recall. If information intake is found to be related to behaviour change (as will be examined in study 2) then the results of this study support previous research suggesting that fear may actually be an unnecessary component of

effective health campaigns (Ruiter, 2003). Indeed, health promotion campaigns may be found to be as effective if they simply present appropriate health information minus the fear component. Additionally, as age was found to be a significant predictor of information recall, this may need to be taken into account when designing health campaigns in order to ensure that the message will be processed or accepted, and the behaviours enacted by the targeted age group.

Furthermore these results in regards to skin cancer information recall support previous research which suggests that most adults in Australia have good knowledge levels regarding sun risks and protection behaviours (Smith, Ferguson et al., 2002). This has significant implications for arguments against the need to use fear appeals in areas where information saturation is already high, as it has been shown that this knowledge is generally not influenced by any new health promotion campaigns. However, it has been found that sun protection behaviour between health campaigns tends to decrease to levels recorded prior to the campaign (Smith, Ferguson et al., 2002). This suggests that instead of providing new information and inducing fear of consequences to create behaviour change in already established health areas, individuals may simply need to process consistent prompts or reminders over time about risks and sun protection to maintain behaviour change.

One of the aims of fear appeals is to raise perceived susceptibility and vulnerability in individuals (Brinol & Petty, 2006), however the results of this study suggest that the presentation of graphic imagery in particular is not contributing to this aim. This could be due to the fact that fear appeal images have been over represented in media health campaigns for many years and individuals may become desensitised to graphic health imagery negating its ability to elicit an emotional response and personal connection to risk. This calls into question the efficacy of future fear campaigns.

Finally, despite apparent moderate levels of skin cancer knowledge, research has shown that this does not necessarily translate into a change in behaviour (Arthey & Clarke,



1995). Therefore behaviour change needs to be investigated (study 2), to determine whether this knowledge translates to behaviour.

### **Limitations of Study 1**

This study is limited by several factors including the fact that it does not explore specific target groups who may be at risk of various health issues, nor does it examine any possible behaviour change as a result of the fear appeal. In addition, not showing images to the control group adds an additional possible moderating factor of distraction (McDonald et al., 2004). It may be that the image presentations (mild and graphic) acted as a distraction from retention of information which was not present for the control group. This will be addressed in the following study (study 2) by adding benign imagery to the control condition. This will allow for the confounding factor of distraction as a reason for lowered recall to be eliminated and ensure the results from the intervention are as a result of image strength/type presented in a fear appeal.

While it was found that age was a factor in information recall, the study failed to investigate at risk groups who may also show differing responses to fear appeals. Future research may add high and low risk groups to see whether high risk predicts higher recall or behaviour change.

This study is also limited in its use of a small number of questions presented regarding skin cancer and health issues. As it appears that skin cancer knowledge may already be at saturation point in the community, in order to better show the impact of fear appeals the contrasting 'general health information' questions may need to be increased to better show the differences in recall between groups. In addition to this, while skin cancer perceived vulnerability and susceptibility were examined following presentation of general health and skin cancer information and intervention, general health perceived vulnerability and susceptibility were not measured. This would allow us to examine whether the presentation of fear appeals also raises overall perceived vulnerability and susceptibility.

## Summary and Conclusions

Despite the lack of difference in skin cancer recall in study 1, further study into fear appeals related to skin cancer (study 2), is needed to find whether there are changes in behaviour post-intervention in a longitudinal study. If it is found that fear appeals hinder behaviour change despite no significant difference in skin cancer information recalled, then this renders fear appeals ineffective and suggests that other factors are more significant in improving health behaviour change outcomes.

It was also found in study 1, that not only do fear appeals interfere with information recall, graphic appeals may also provoke unnecessary anxiety, possibly causing the individual to engage in avoidant coping strategies to lower risk perception. Study 2 therefore needs to further research anxiety in fear appeals in relation to behaviour change in order to gain more insight into its role. In addition, coping should be explored to clarify its role, as well as the apparently associated factors in information recall of vulnerability and susceptibility.

Overall, the results may suggest that fear appeals impact upon the recall of health information, resulting in decreased recall, whether the presentation is of mild or graphic health imagery. The fact that imagery appears to inhibit incidental learning and therefore subsequent recall, suggests that fear appeals are ineffective tools for health information dissemination. In addition, campaigners must be aware of the age of their target audience in order to ensure the efficacy of any campaign as the present study has indicated that this factor is significant. As information recall has been impacted upon negatively by the imagery presentation in this study, should information recall then be found to be an important factor in behaviour change (to be explored in study 2), this calls into question the basis of fear appeals themselves.

**Study 2 –**

**The Effect of Fear Appeals on Knowledge and Behaviour Change**

Study 1 provides some preliminary evidence for the ineffectiveness of fear appeals. Study 1 suggested that people already have moderate knowledge of skin cancer and overall general health knowledge. This backs prior research which suggests that Australian people generally have good skin cancer knowledge in addition to a positive attitude to sun protective behaviour (Smith, Ferguson et al., 2002). However this does not always translate to a change to beginning the healthier behaviour (Arthey & Clarke, 1995). Therefore study 2 will incorporate a longitudinal design to investigate not only skin cancer knowledge recall but also one month post intervention behaviour change. In terms of knowledge recall, due to the a possible saturation effect posed by skin cancer information, as shown in study 1, further general health questions will be added to the initial and post intervention questionnaires. Also, benign images will be added to the control group testing in place of allowing them to sit for a period of time, thus overcoming any confounding effects of distraction that may have influenced prior results. Vulnerability and susceptibility measures will also be extended to measure both skin cancer and general health vulnerability and susceptibility in order to see whether individuals have an overall increase vulnerability and susceptibility when exposed to a fear appeal or whether any increase relates specifically to skin cancer.

In its design, study 2 has addressed the limitations of the first study. This is done by adding a focus on different groups who may be more or less at risk of skin cancer and therefore groups for whom sun protective behaviours may have more or less behavioural relevance. In study 2, work place (indoors/outdoors) was added as a factor. This was chosen given that a large portion of an average adult's week is spent at work and the higher risk of skin cancer that outdoor workers face (Diepgen & Mahler, 2002). In addition, as prior sun behaviours may have an impact on knowledge recall and the effectiveness of fear appeals, further information will be gathered and examined regarding sun behaviour. This will be compared with the same behaviours in the one month follow up in order to examine behaviour change. The behaviours relate to the major sun protective and checking behaviours such as sun screen use, other active sun protection measures such as hat wearing, skin checking, as well as Cancer Council interaction.

For some individuals, the message contained within the fear appeal may increase anxiety and reinforce that they are at risk and that they may already have a threat to their health (Brinol & Petty, 1996). Therefore those participants who are not engaging in sun protective behaviours may reject a health behaviour change message due to fears that they have already been exposed to the risks. The addition of further sun protective behaviour variables may therefore help to further explain anxiety results such as those found in study 1.

Some research suggests that both perceived vulnerability and susceptibility influence behaviour change in the individual (Randolph & Viswanath, 2004), study 1 showed that the variables related to perceived vulnerability and susceptibility may play a role in knowledge recall and therefore behaviour change, although in study 1 the results were somewhat contradictory. Several studies have found that fear appeals are more effective when people feel that they can cope with a health threat (Blumberg, 2000; Donovan, 1991). They suggest that in this case those individuals will respond more positively to suggestions for change. Coping is therefore seen as an important aspect of health behaviour change. Approach coping is associated with message acceptance and therefore deeper information processing and greater knowledge retention (Witte, 1992). In contrast, avoidant coping may be associated with rejection of fear arousing health behaviour messages and is associated with poor information retention (Roth & Cohen, 1986). The Extended Parallel Process Model postulates that there is an association with coping and vulnerability (Witte, 1992). It is suggested that individuals who believe that they are vulnerable to a specific risk will engage in the coping appraisal process. In the case of fear appeals this can lead to the individual engaging in fear controlling processes which result in avoidant coping behaviour or danger control processes leading to approach coping behaviours. As such coping appears to be a factor which should be included in study 2.

In summary, from the results of study 1, it was felt that further concepts needed to be explored in relation to fear appeals and their effect on knowledge recall. Once again the concept of recall being disrupted by the intrusion of graphic imagery needs to be studied in relation to fear campaigns. This study aims to investigate whether the knowledge recall results

found in study 1 will be replicated, with participants exposed to the most graphic imagery retaining least information, than those exposed to mild imagery or control group participants who are exposed to benign imagery. In addition the study aims to investigate the effects of exposure to the imagery on anxiety. Thirdly the study aims to investigate which demographic factors predict behaviour change. And finally, the study aims to investigate whether participants who are more at risk of adverse health effects (i.e. those who work outdoors) respond more strongly to fear appeals than those who do not have those risks.

### **Hypotheses**

For study 2, 5 hypotheses were derived:

Hypothesis 1: Individuals who are exposed to graphic imagery will retain less skin cancer and general health information than those exposed to mild or benign imagery

Hypothesis 2: Lower general information recall will be predicted by older age

Hypothesis 3: Individuals exposed to the graphic imagery condition will report higher levels of anxiety, perceived susceptibility and perceived vulnerability

Hypothesis 4: Behaviour change will be predicted by imagery condition, outdoor working, higher anxiety, higher skin cancer perceived susceptibility, higher skin cancer perceived vulnerability and approach coping

## **Method**

### **Design**

This study explored whether exposure to graphic imagery has any impact on knowledge retention. It also explored whether exposure to knowledge retention is predicted by levels of anxiety, perceived susceptibility, perceived vulnerability or coping style. Finally, the factors which may predict behaviour change over time were examined. The longitudinal study was a

quantitative mixed factorial design with two groups (mild intervention – mild images presented, graphic intervention – graphic images presented) and one control group (benign images presented). Dependent variables were anxiety, vulnerability, susceptibility, coping, baseline and post-intervention knowledge. Independent variables were sex, age, sun protection behaviour, skin checking behaviour, and intervention condition (mild, graphic, control). Active sun protective behaviour, sunscreen usage (daily and holiday), skin checking behaviour, other protective behaviours, coping, vulnerability, susceptibility, and anxiety were measured at Time 1 (initial testing) and Time 2 (one month follow up testing). To overcome any confounding effects of distraction that may have influenced study 1 results, the control group was exposed to benign images for the duration of the intervention process.

### **Participants**

In total 88 individuals were recruited to the study. The participants were randomly allocated to one of three imagery group conditions (control, mild, graphic). Participants were recruited from the general public and from the undergraduate psychology program at the University of Newcastle. Undergraduate psychology participants received partial course credit for participation, but no other participants received any incentives to participate. Of those initial 88 participants, 63 agreed to participate in one month follow up testing, of these 32 returned the follow up questionnaire. Details of participant group are shown in Table 2.1.

Table 2.1. *Distribution of number and sex of participants in each condition*

		Recruitment Place		Condition		
		Student	General Public	Control	Mild	Graphic
N		48	40	30	30	28
Initial Testing	Male	10	16	5	11	10
	Female	38	24	25	19	18
N		25	7	10	11	11
Follow-up Testing	Male	4	2	2	4	1
	Female	21	5	8	7	10

## Materials

In order to assess perceived initial knowledge, information recall, impact of imagery on information recall, and individual differences affecting recall, questionnaires were used, as was an intervention in the form of the presentation of skin cancer imagery or benign images. The questionnaires were Demographics and Health Behaviour Information, a Health Knowledge questionnaire (HKQ), the Beck Anxiety Inventory (BAI), a Vulnerability Questionnaire (VQ), a Susceptibility Questionnaire (SQ), the Coping Responses Inventory (CRI), and a Information Recall Test (IRT). In order to test behaviour change variables one month follow up testing was performed. One month follow-up testing was in the form of a booklet containing the Demographics and Health Behaviour Information Questionnaire, the BAI, VQ, SQ, and the CRI.

**Demographics and Health Behaviour Questionnaire (Appendix B).** The demographics and health behaviour questionnaire was a purposely designed measure which asked participants to give their year of birth, sex, as well as answering various questions to obtain information on sunscreen application during usual activity (everyday usage), sunscreen application on



holidays, active sun protective behaviour (for example, wearing protective clothing), and skin checking behaviour (for example, checking skin for changes). These variables were used as measures of behaviour change. The behaviour change variables were measured pre-intervention (Time 1) and at one month follow up (Time 2). The difference in scores between Time 2 and Time 1 was used to create the final behaviour change variables. The questionnaire also contained questions on breast checking and smoking behaviour as part of a larger study which is beyond the scope of this thesis.

**Health Knowledge Questionnaire (HKQ; Appendix B).** The HKQ is a purpose designed measure of health information. Its purpose was to present participant's information regarding sun cancer, smoking behaviour, breast health and general health in a way that would not alert them to the fact that they were actually being asked to retain this information for later recall. The HKQ consisted of 24 questions (6 skin cancer related, 18 general health), derived from Australian Government health priorities and Dermatology Insights (Haggerty, 2000), and the Cancer Council Public Information Sheets ([www.cancer.org.au](http://www.cancer.org.au)). Cronbach's alpha showed that the questionnaire had reasonable reliability ( $r=0.61$ ). The information was presented in the form of a 'did you know' statement, which required a 'yes' or 'no' circled response as to whether they had prior knowledge of the information given for each question. Scores ranged from 0- 24 (0=all no responses, 24 =all yes responses).

**Images.** Participants were presented with sun cancer images, either mild or graphic (Appendix A), via PowerPoint presentations containing 10 images with a 5 second screening time for each image. These images were colour photographs depicting the various types of skin cancer in differing stages of progression, presented on a laptop computer. The images were freely available in the public domain and were rated by each of the researchers in the research team as to whether they considered the images to be 'mild' or 'graphic'. Only those images where all assessors agreed on their category were used. The control group were shown 10 images of benign scenery shown for 5 seconds each these were sourced from freely available images found on the internet (Appendix B).

**The Beck Anxiety Inventory (BAI; Beck et al., 1988).** The BAI is a 21 item scale which presents the common symptoms of anxiety using a 4-point Likert scale (0-3; 0 = not at all, to 3 = bothers me a lot) to determine how often the participant had experienced each symptom in the last month. The scale has a high internal consistency (0.92; Beck et al., 1998). Test-retest reliability over one week is  $r(81)=0.75$  (Beck et al., 1998).

**The Vulnerability Questionnaire (VQ; Appendix B).** This measure was designed for this study to measure the participant's perceived vulnerability to skin cancer and general health issues. Participants were asked to rate on a 4-point Likert scale (ranging from 1-4: 1 not important at all, to 4 very important) what importance they placed on each of 23 health related behaviours eg "staying out of the sun between 10am and 4pm". Scores ranged between 23 and 92. Cronbach's alpha showed that the questionnaire had excellent reliability ( $r=0.82$ ).

**The Susceptibility Questionnaire (SQ; Appendix B).** The SQ was designed to measure the participant's perceived susceptibility to skin cancer and general health issues. The participants were asked how often they performed sun related health behaviours in comparison to their friends utilising the same 23 statements about sun exposure/skin cancer and general health related behaviour that were presented in the VQ. Again the responses were on 4-point Likert scale (ranging from 1-4: 1 not important at all, to 4 very important). Scores therefore ranged between 23-92. Cronbach's alpha showed that the questionnaire had excellent reliability ( $r=0.84$ ).

**Coping Responses Inventory (CRI; Moos, 1990).** The CRI is a 48 item questionnaire based on 8 subscales of cognitive and behavioural coping, each of which is measured by six items. The subscales are derived from the two basic coping styles – Approach and Avoidant. Approach Coping is comprised of two cognitive coping subscales (Logical Analysis, Positive Reappraisal) and two behavioural coping subscales (Seeking Guidance and Support, Problem Solving). Avoidance Coping is comprised of two cognitive coping subscales (Cognitive Avoidance, Acceptance or Resignation) and two behavioural coping subscales (Seeking Alternative Rewards, Emotional Discharge). The CRI asks participant to think of how they have responded

to difficult situations in their life and answer the questions relating to strategies they used to cope with the situations.

The CRI uses a 4-point Likert scale to measure how often the coping strategy is used with a scale ranging from 0 (no, does not use that strategy) to 3 (Yes, Fairly often, the strategy is used). The internal consistency (Cronbach's alpha) of the measure is reasonable, although the avoidant coping variable is less internally consistent than the approach coping variables (approach coping  $\alpha = .7$  and avoidant coping  $\alpha = .41$ ).

**Information Recall Test (IRT; Appendix B).** The IRT was a purposely designed measure which used questions that asked the participant to recall information presented in the Health Information Questionnaire (HKQ). This questionnaire asked 20 multiple choice questions and 4 free recall questions with 4 responses required for each, whose answers were supplied in the HKQ and was designed to assess the amount of information from HKQ one recalled post intervention. Each multiple-choice question was scored with a 1 and each recall question was scored 0-4 (0=no information recalled, 4=all four correct responses recorded). Scores for the multiple choice questions ranged between 0 and 20, for the free recall questions they ranged between 0 and 16 and for the total questionnaire scores therefore ranged between 0 and 36.

## **Procedure**

Following ethics approval from the University of Newcastle participants were recruited for this study. Undergraduate student participants were recruited via advertising on the online recruitment system at the university. General public participants were recruited via external advertising posters placed in public places as well as via snowballing. Interested people were able to contact the researchers to arrange a suitable testing time, with the study run in an audio visual laboratory equipped for video projection.

Student and general public interested individuals were allocated a suitable time and in groups of one to five were asked to attend the laboratory. Each group of participants were randomly allocated to one conditions (control, mild, graphic).

Each participant was given a booklet with all of measures for the study and was asked to work on it. The measures were the Demographic and Health Behaviour Questionnaire, followed by the HKQ. Following this a slide show was shown. The slide presentations were ten benign images of scenery for the 'control' condition; ten mild images of skin cancer in the 'mild' condition; or ten graphic images of skin cancer in the 'graphic' condition. Each of the images in the slide presentation were shown for 5 seconds each and the slides were screened on a 1.5m projector screen. Immediately following this participants were asked to fill out the BAI, SQ, VQ, CRI, and the IRT was given. After testing was complete, participants in the intervention groups were informed of services that they could access (Lifeline, University counselling service) should they be concerned by any of the images presented.

One month after the participants had been tested, those who agreed to participate in the follow-up were sent a booklet which contained the demographics and health behaviour questionnaire, the BAI, SQ, VQ, and CRI which they were asked to complete and return to researchers via an included reply paid envelope.

## **Results**

### **Data manipulation – Information Recall**

Information recall is investigated in order to explore whether there are any differences in recall across imagery conditions. As the skin cancer information recall and general information recall variables were created from a different number of questions (6 skin cancer related, 18 general health related), the raw scores were converted to percentage scores to allow for meaningful comparisons.

### **Initial Perceived Knowledge and Information Recall**

A one way ANOVA was performed to ascertain whether there was a difference between imagery conditions in reported initial skin cancer knowledge and general knowledge. It was found that there was no significant difference between conditions on initial reported skin cancer

( $F(2, 84) = 0.213$ ;  $p = .809$ ) or initial general health knowledge ( $F(2, 84) = 0.063$ ;  $p = .939$ ).

Therefore, prior to intervention, there was no significant difference in reported skin cancer or general knowledge between groups.

To investigate whether there was a difference in post intervention skin cancer information and general information recall scores between groups, a one way ANOVA was performed. It was found that there no significant difference in skin cancer information recall between conditions ( $F(2, 84) = 2.562$ ;  $p = .087$ ) or general information recall ( $F(2, 84) = 1.54$ ;  $p = .221$ ). This indicates that there was no significant difference between imagery conditions in skin cancer or general information recall.

### **Predictors of Information Recall**

In order to investigate which variables may have an impact on the recall of general health information a blocked stepwise multiple linear regression was utilised. The dependent variable for this analysis was general information recall. Predictors were organised into 4 blocks. Block 1 contained Anxiety (BAI Time 1), General Health Perceived Vulnerability (Time 1), and General Health Perceived Susceptibility (Time 1). Block 2 contained Cognitive Approach Coping Style (Time 1), Cognitive Avoidance Coping Style, Behavioural Approach Coping Style (Time 1), and Behavioural Avoidance Coping Style. Block 3 contained sun protection measure variables (everyday sunscreen use, holiday sunscreen use, active sun protection use, Cancer Council visits, personal skin checks, GP skin checks – reported at Time 1, and Indoor/Outdoor Work) and Block 4 contained age and sex. A significant model emerged which explained 14% of the variance in general health information recall ( $F(1, 86) = 8.085$ ,  $p < .001$ ). Holiday sunscreen use explained 8.5% of the variance in general health information recall and Cancer Council visits explained a further 5.5% (see Table 2.2). Cancer Council visits registered a negative beta value suggesting that those who visit the Cancer Council clinic tended to have poorer health knowledge. This result shows that Anxiety, General Health Perceived Susceptibility, General Health Perceived Vulnerability, Coping Style, Condition, other sun

protection behaviours and indoor/outdoor working context do not predict general information recall.

Table 2.2 *Variables Predicting General Health Information Recall*

Variable	Adj R <sup>2</sup>	B	SE B	β
Holiday sunscreen use	0.085	0.302	.100	.299*
Cancer Council Visits	0.055	-1.341	.524	-.255**

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

Skin cancer information recall was also investigated using a blocked stepwise multiple linear regression analysis. The dependent variable for this analysis was skin cancer information recall. Predictors were organised into 4 blocks. Block 1 contained Anxiety (BAI Time 1), Skin Cancer Perceived Vulnerability (Time 1), and Skin Cancer Perceived Susceptibility (Time 1). Block 2 contained Cognitive Approach Coping Style (Time 1), Cognitive Avoidance Coping Style, Behavioural Approach Coping Style (Time 1), and Behavioural Avoidance Coping Style. Block 3 contained sun protection measure variables (everyday sunscreen use, holiday sunscreen use, active sun protection use, Cancer Council visits, personal skin checks, GP skin checks – reported at Time 1, and Indoor/Outdoor Work) and Block 4 contained age and sex. A significant model emerged which explained 9.9% of the variance in skin cancer information recall ( $F(1, 86) = 10.53, p < .01$ ). Age explained 9.9% of the variance in skin cancer information recall (see Table 2.3). Age registered a negative beta value suggesting that those who are older tended to have poorer health knowledge. This result shows Anxiety, Skin Cancer Perceived Vulnerability, Skin Cancer Perceived Susceptibility, Coping Style, Condition, sun protection measures, indoor/outdoor working context, age, and sex do not predict skin cancer information recall.

Table 2.3 *Variables Predicting Skin Cancer Information Recall*

Variable	Adj R <sup>2</sup>	B	SE B	β
Age	0.099	-.013	.004	-.330*

\* $p < .01$

**Moderating Factors in Fear Appeals – Anxiety, Vulnerability, and Susceptibility**

The impact of fear appeal imagery on anxiety, perceived vulnerability and perceived susceptibility was examined. It was found that the majority of participants had BAI scores suggesting very low levels of anxiety (between 0-21 [ $M = 9.13$ ,  $SD = 5.50$ ]), eight participants scored within the moderate anxiety range (22-35 [ $M = 29.75$ ,  $SD = 4.17$ ]) and one participant scored in the high anxiety range (36+). This shows that most participants did not experience particularly high levels of anxiety in the past month. The mean scores on the general health perceived vulnerability ( $M = 46.07$ ,  $SD = 8.31$ ) and general health perceived susceptibility ( $M = 38.13$ ,  $SD = 8.23$ ) questionnaires were moderate which suggests that participants perceived a moderate amount of general health vulnerability and susceptibility. Skin cancer perceived vulnerability ( $M = 25.76$ ,  $SD = 4.60$ ) and skin cancer perceived susceptibility ( $M = 19.38$ ,  $SD = 5.62$ ) scores were also found to show moderate levels. A one-way ANOVA was performed to investigate whether there was a difference in Anxiety (BAI Time 1), General Health Perceived Susceptibility (Time 1), Skin Cancer Perceived Susceptibility (Time 1), General Health Perceived Vulnerability (Time 1) and Skin Cancer Vulnerability (Time 1) between imagery conditions (control, mild, and graphic). There was no significant difference between imagery conditions for Anxiety, General Health Perceived Vulnerability, General Health Perceived Susceptibility, Skin Cancer Perceived Vulnerability or Skin Cancer Perceived Susceptibility (all  $F < 1$ ).

**Data Manipulations – Behaviour Change**

Behaviour change is investigated in order to explore which variables predict this change and whether there is a difference in behaviour change between conditions (control, mild or graphic). The behaviour change variables were created from a different number of health behaviour questions (everyday sunscreen usage, holiday sunscreen usage, hat wearing, wearing long sleeves, staying out of the sun during peak sun times, visiting the cancer council, GP skin checks, self skin checks), correlations were utilised, and those variables which were highly correlated were grouped. This led to four variables – Everyday sunscreen usage, Holiday

sunscreen usage, Active Sun Protection, and Checking Behaviour. The difference was found between Time 1 and Time 2, to create each of the final behaviour change variables and allow for meaningful results.

### **Overall Predictors of Behaviour Change**

In order to ascertain which variables predict behaviour change, a series of 5 blocked stepwise multiple linear regressions were performed on various health behaviours (everyday sunscreen usage, holiday sunscreen usage, active sun behaviour, and skin checking behaviour) relevant to skin cancer. The predictors used in each of these analyses were identical. Predictors were organised into 6 blocks. Block 1 contained Skin Cancer Information Recall and General Health Information Recall. Block 2 contained Anxiety (BAI at Time 2). Block 3 contained General Health Perceived Susceptibility (Time 2), and Skin Cancer Perceived Susceptibility (Time 2). Block 4 contained General Health Perceived Vulnerability (Time 2), Skin Cancer Perceived Vulnerability (Time 2). Block 5 contained Approach Coping Style (CRI Approach (Time 1 and 2)), Avoidant Coping Style (CRI Avoidant (Time 1 and 2)) and Block 6 contained condition, the indoor/outdoor worker variable, age, sex and initial behaviour.

Everyday sunscreen usage behaviour change was investigated using a blocked stepwise multiple linear regression analysis. The dependent variable for this analysis was everyday sunscreen usage. A significant model emerged which explained 44.5% of the variance in everyday sunscreen usage ( $F(2, 29) = 13.416, p < .001$ ). Perceived Skin Cancer Vulnerability explained 13.3% of the variance in everyday sunscreen usage, and initial sunscreen usage explained a further 31.2% (see Table 2.4). Perceived Skin Cancer Vulnerability and initial sunscreen usage both registered a negative beta value suggesting that those who perceived higher skin cancer vulnerability and those who have higher initial daily sunscreen usage tended to change their everyday sunscreen usage behaviour less.



Table 2.4 *Variables Predicting Everyday Sunscreen Application Health Behaviour Change*

Variable	Adj R <sup>2</sup>	B	SE B	β
General Health	0.133	-.030	.033	-.132*
Perceived Vulnerability				
Initial everyday sunscreen use	0.312	-.605	.143	-.626**

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

Holiday sunscreen usage behaviour change was investigated using a blocked stepwise multiple linear regression analysis. The dependent variable for this analysis was holiday sunscreen usage. A significant model emerged which explained 10.8% of the variance in active sun protection behaviour  $F(1, 30) = 4.755$ ,  $p < .05$ . The variable in this model which predicted holiday sunscreen usage behaviour change was Initial Holiday Sunscreen usage (See Table 2.5). Initial Holiday Sunscreen usage registered a negative value suggesting that those with higher initial sunscreen usage tend to engage in less holiday sunscreen usage behaviour change.

Table 2.5 *Variables Predicting Holiday Sunscreen Application Health Behaviour Change*

Variable	Adj R <sup>2</sup>	B	SE B	β
Initial holiday sunscreen use	0.108	-.267	.375	-.370*

\* $p < .05$

Active sun protection behaviour change was investigated using a blocked stepwise multiple linear regression analysis. The dependent variable for this analysis was active sun protection. A significant model emerged which explained 12.7% of the variance in active sun protection behaviour  $F(1, 30) = 5.509$ ,  $p < .05$ . The variable in this model which predicted active sun protection behaviour change was Avoidant Coping (see Table 2.6). Avoidant Coping

registered a negative value suggesting that avoidant copers tend to engage in less active sun protection. Consequently, it appears that an individual's avoidant coping is an important variable in predicting active sun protection behaviour change.

Table 2.6 *Variables Predicting Active Sun Protection Health Behaviour Change*

Variable	Adj R <sup>2</sup>	B	SE B	β
Avoidant Coping	0.127	-0.103	.044	-.394*

\* $p < .05$

As avoidant coping in general predicted active sun protection behaviour change, specific avoidant coping categories were entered into the analysis to investigate further. The dependent variable for the analysis was active sun protection. The predictors for this additional analysis were organised into 6 blocks. Block 1 contained Skin Cancer Information Recall and General Information Recall. Block 2 contained Anxiety (BAI at Time 2). Block 3 contained General Perceived Susceptibility (Time 2), and Skin Cancer Perceived Susceptibility (Time 2). Block 4 contained General Perceived Vulnerability (Time 2), Skin Cancer Perceived Vulnerability (Time 2). Block 5 contained Avoidant Coping Style categories (Cognitive Avoidance, Alternative Rewards, Acceptance, and Emotional Discharge) and Block 6 contained Condition, the indoor/outdoor worker variable, age and sex.

A significant model emerged which explained 11.6% of the variance in active sun protection behaviour  $F(1, 30) = 5.071, p < .05$ . The variable in this model which predicted active sun protection behaviour change was Cognitive Avoidance (see Table 2.7). Cognitive Avoidance registered a negative value suggesting that those who engage in cognitive avoidance tend to engage in less active sun protection.

Table 2.7 *Coping Variables Predicting Active Sun Protection Health Behaviour Change*

Variable	Adj R <sup>2</sup>	B	SE B	β
Cognitive	0.116	-0.232	.103	-.380*
Avoidance				

\* $p < .05$ 

Skin checking behaviour change was investigated using a blocked stepwise multiple linear regression analysis. The dependent variable for this analysis was active sun protection. No significant model emerged. It appears that none of the variables are important predictors of skin checking behaviour change.

A one-way ANOVA was performed in order to ascertain whether there was a difference in behaviour change between conditions. For holiday sunscreen usage, active sun behaviour, and skin checking behaviour there was no significant difference between conditions (All  $F < 1$ ). It was found that only everyday sunscreen usage showed a significant result ( $F(2, 29) = 4.139$ ;  $p < .05$ ). Tukey's post-hoc tests indicated that the mean score for the mild imagery condition ( $M = 5.68$ ,  $SD = .662$ ) was significantly different than the control condition ( $M = 5.40$ ,  $SD = .667$ ), ( $p < 0.05$ ). However, the graphic imagery condition ( $M = 5.53$ ,  $SD = .742$ ) did not differ significantly from the mild or control imagery conditions. Taken together, these results suggest that exposure to mild imagery has an effect everyday sunscreen usage. Specifically, results suggest that when individuals are exposed to mild skin cancer imagery, they increase their everyday sunscreen usage. It should be noted that benign imagery (control condition), does not have this effect and more graphic imagery does not seem to significantly increase everyday sunscreen usage.

## Discussion

The purpose of this study was to investigate the effect that graphic health text and imagery, like those presented in fear appeals, have on health information recall, moderating factors and subsequent behaviour change.

### **Graphic Imagery and Information Recall**

Fear appeal campaigns commonly use graphic imagery to evoke an emotional response or arousal to initiate behaviour change. Failure of fears appeals leading to a low information recall have been associated with the negative response to high graphic content. Surprisingly, this study shows no significant difference between imagery conditions for skin cancer recall and general information recall. This lack of correlation in skin cancer recall could be explained by a prior high level of knowledge within the Australian public, through over 20 years of sun smart campaigns, therefore presenting novel skin cancer related information to this group is difficult (Keeney et al., 2009; Marks, 1999; Montague et al., 2001). However, graphic imagery also had no effect on the level of information recall for general health information. Therefore high prior knowledge is not the only contributing factor.

Three current proposals could explain this phenomenon. Fear appeals are proposed to create negative arousal that leads to individuals processing information more deeply (Witte, 1992). A contrasting theory is that negative arousal leads to defensive processing (Keller, 1999). The fact that scores were comparable across conditions suggests that negative arousal did not occur at all. This study supports the Extended Parallel Processes Model, which suggests that if a threat is perceived as insignificant then there is low motivation to process the message further (Witte, 2000). Finally, it could be suggested that the independent variables were not effective, however this is impossible to ascertain without a manipulation check.

### **Predictors of Information Recall**

In investigating predictors of general health information recall, results show that the variables that predict recall were sun protective behaviours, including 'Holiday Sunscreen Use' and 'Cancer Council Visits'. Holiday sunscreen use shows a positive linear relationship with Health Information Recall while Cancer Council visits show a negative relationship. That is those who apply sunscreen more often during holidays will tend to have greater health information recall, while those who visit the Cancer Council more will have lower recall. The

relationship between holiday sunscreen use and information recall can be partially explained by the possibility that individuals who are more likely to use sunscreen on holidays may believe themselves to be people who engage in health protection behaviour generally. It is suggested that individuals tend to accept information that is consistent with their behaviour more readily than information that is not associated with their behaviour (Kunda, 1990). Therefore, if the information provided for general health issues is accepted as belief consistent individuals may then engage cognitive approach coping mechanisms that allow them to accept the information and message of the appeal (Roth & Cohen, 1986). In contrast, those who engaged more with the Cancer Council were likely to retain less general health information, they may not tend to believe themselves to be individuals who engage in health protection behaviour. It seems counter-intuitive that those who are attending the a health setting (Cancer Council) where information is readily available, may have already experienced high levels of sun exposure and a skin cancer threat. Therefore, they may consider that sun damage has already occurred or it is too late to make effective changes (Brinol & Petty, 2006). From a wider perspective, these individuals may believe that they have not engaged in overall health protective behaviour. This could suggest that avoidance coping mechanisms are engaged and there is a tendency to repress, ignore or attempt to divert attention from the stressor, which results in ignoring the message (Tanner et al., 1991).

The results of this study further shows that age is a predictor of skin cancer information recall. Age shows a negative linear relationship with skin cancer information recall suggesting that those participants who are younger remembered more skin cancer information than those who were older. Therefore consistent with other studies this work observed that older age is a predictor of lower general health information recall (Brinol & Petty, 2006). Moreover, it have been reported that older people are more likely to reject fear appeals information and overall messages to a belief that the damage has already occurred or it is too late to make effective changes (Brinol & Petty, 2006).

Research has shown that most adults in Australia have good knowledge levels regarding sun risks and protection behaviours and sun protection campaigns have gradually moved from a simple message of 'Slip, Slop, Slap' to providing more detailed information about specific dangers and protective measures (Smith, Ferguson et al., 2002). Instead of providing new information in an already established health area, younger participants may have simply been prompted or reminded about prior knowledge which had since been apparently forgotten.

### **Moderating Factors in Information Recall**

The hypothesis that participants in the graphic imagery condition would report higher levels of anxiety, vulnerability and susceptibility was also not supported in this study. Most participants' scores on the BAI were in the low range and scores on the vulnerability and susceptibility questionnaire were moderate. This shows that participants' anxiety and vulnerability levels were not high enough to have an effect on information recall. Participants were not shown to have higher levels of perceived vulnerability (skin cancer and general health) or susceptibility (skin cancer and general health) in the high graphic conditions compared to mild or control. In fact there was no significant difference between groups. DeHoog et al., (2005) found an association with level of fear and level of perceived vulnerability in relation to fear appeals, however the fact that vulnerability and susceptibility were not significantly different suggests that the images themselves did not evoke a sense of fear and therefore personal threat in the participants. This is supported by the apparent lack of negative arousal post intervention, in the form of anxiety, which was found to not be significantly different across conditions. Therefore lack of significant differences suggest that the fear appeal images did not have an impact on an individual's emotive state. This means that the presentation of the graphic imagery was not interpreted as personally threatening therefore did not result in increased negative arousal. It has been shown that if a fear appeal does not produce both an increase in negative arousal and in perceived vulnerability, the individual will not be motivated to process the message meaningfully (Witte, 1992). This lack of significant difference between conditions can further be explained by prior research which suggests that there is a 'law of

diminishing returns' with fear appeals. This means that when individuals are exposed repeatedly in the community to graphic fear campaigns there is a risk of desensitising individuals to the risks involved (Hastings, Stead & Webb, 2004). In this case with an ever increasing presence overall of fear appeals in the media and an already high level of sun protection knowledge in the area, people may be already 'emotionally numbed' to the graphic imagery shown.

### **Predictors of Behaviour Change**

In investigating predictors of behaviour change, study 2 showed that the behaviours for which significant models were found, were everyday sunscreen use, holiday sunscreen use and active sun protection. Everyday sunscreen use was predicted by perceived skin cancer vulnerability and initial everyday sunscreen usage in a negative linear relationship. This suggests that participants who feel low vulnerability to skin cancer change their everyday sunscreen use more than those who feel more vulnerable. This is the converse of what would be expected. In addition, those who engage in lower initial everyday sunscreen behaviour are more likely to change their behaviour. Holiday sunscreen use was also predicted by initial use in an inverse linear relationship. One explanation is that change in sunscreen use is a simple behaviour to enact, and those who are at lower risk or at least perceive themselves at lower risk are able to maintain that self perception by enacting a simple change. In addition, it suggests that those who already were likely to engage in the behaviour merely needed a prompt or reminder. This is backed by research which found that during sun protection campaigns, sunscreen usage increases but between campaigns the levels of the behaviour tended to drop to pre-campaign levels or below (Smith, Ferguson et al., 2002).

Active sun behaviour change, for example wearing a hat or long sleeves, was predicted by Cognitive Avoidance, in a negative linear relationship. This suggests that the less change that occurred with individuals in this behaviour type, the more they engaged in cognitive avoidance strategies. In other words, those who did not engage in the behaviour, instead engage the strategy of avoiding thinking about it. This may be able to be linked with the

assertion of Terror Management Theory, that in presenting health information fear appeals to those who have attitudes that do not align with the message may also increase mortality salience leading to defensive processing (Kunda, 1990). However, while this suggests that cognitive avoidance coping response leads to decreased health behaviour change, it is not related to lower information recall. This is in contrast to prior research predictions (Witte, 1992). The fact that information recall was not a predictor of any behaviour change suggests that information recall has no effect on an individual's decision to engage in behaviour change. This is in line with research which came from early fear appeal health campaigns in the 1970's which found that increased knowledge did not predict the effectiveness of a health campaign, in that case in terms of drug abuse (Tobler, 1986). However, one weakness of these results is that the avoidant coping measure had poor reliability (Cronbach's  $\alpha = .41$ ). The problem of reliability may be as a result of the small number of cognitive avoidance items on the scale, or perhaps the items presented were not appropriate for examining the coping of individuals in respect to sun behaviour change. Therefore, further study may be needed to look at cognitive avoidance in relation to sun behaviour change following fear appeals.

### **Implications and Further Research**

The initial aim of a fear appeal is to increase negative arousal, in the form of increased anxiety and vulnerability, in order to make the individual feel a sense of motivating personal risk to a health issue. However, the results of this study suggest that graphic imagery presentation does not achieve this. One of the aims of fear appeals is to raise anxiety and perceived vulnerability. It has been proposed that this can be attributed to a 'law of diminishing returns' with fear appeals (Hastings et al., 2004). Thus individuals repeatedly bombarded with fear evoking images there is the risk that they will be desensitised to those images and the health message. This suggests that future health campaigns evoking fear may struggle to elicit change and even more ominous, individuals may become emotionally numbed to any fear inducing images in the health realm which may result in vital steps not being taken to avert illness, injury or death. However, a weakness in the study (and therefore also in study 1) is that



there is no manipulation check for anxiety, which would serve to indicate whether or not participants in the graphic imagery group were in fact more anxious than the participants in the mild imagery and control groups. This would entail doing a pre-intervention check on anxiety for individuals in each group in order to determine whether the fear appeal had the desired effect on individuals.

The apparent link between higher engagement with health services and lower predicted information uptake has implications. It may be speculated that underlying beliefs about prior past health choices may result in acting purely from a post-illness perspective where the individual transfers all responsibility for health to medical services and not take in new information and increase future sun health self management. Underlying beliefs must be investigated further to add to this discussion.

The differences in information recall between younger and older participants suggest that health promotion campaigns need to be targeted differently towards differing age groups. This is strongly supported by prior research which has suggested that older people view health outcomes from the perspective of their age (Benet et al., 1993), while younger people are more likely to have poorer attitudes and adherence to health protective behaviours (Dobbinson et al., 2007). Therefore they may have differing motivations and barriers to change. This will also be further studied in study 3.

In addition, it was found that graphic imagery does not improve information recall. However, participants were able to recall some of the information presented, yet this was not a predictor of behaviour change. With different predictors for differing behaviour change types, this suggests that it is not just the type of behaviour (disease detection behaviour as opposed to a prevention behaviour) that have differing factors impeding or promoting their uptake, it is also specific behaviours themselves. For example, daily sunscreen use is a simple habit to adopt, as opposed to the less frequent GP skin checkups which require more forethought and planning. In addition behaviours which are complex to integrate into long term behaviour change may require more information aimed at guiding individuals through smaller steps as

opposed to trying to scare them into action. Therefore this needs to be taken into account when designing future health campaigns and thus also in designing and deciding whether to use fear appeals.

Finally, the lack of predictors for behaviour change in certain behaviours suggests that either these behaviours take longer to enact, or other factors that were not investigated are moderating or mediating factors. In the case of longer time to enact certain behaviours, e.g. going for a skin check, a longitudinal study with a longer time between retesting or multiple retests over time may be more effective at capturing change behaviour. Other factors which may not have been investigated should also be found (study 3).

### **Limitations**

The main limitation of the study was the poor response rate to the one-month follow up study into behaviour change. Of the 63 participants who agreed to the follow up, only 32 returned the mail-out questionnaires. A greater response rate may have yielded different results. Further studies could aim to recruit larger numbers to allow for non-respondent attrition. In addition, the lack of manipulation checks, and some low reliability of some of the measures, meant that stronger conclusions could not be reached.

A major weakness inherent in the current fear appeal studies and in most of the prior research in the area is that the research fear appeal setting is artificial and contrived thus not a real life situation (Witte, 2000). In a fear appeals, the graphic images and information are presented simultaneously, usually in combination with a voiceover giving further information. In this study imagery was presented immediately after the information. In addition, the lab setting does not expose individuals to the information in the same way. In the real world, individuals are often exposed multiple times, in various formats (television, the internet, radio, etc). In addition, as with many studies there can be an over reliance on university students as subjects (Hastings & MacFadyen, 2002). This can mean that the results are not indicative of the impact of fear

appeals on the public at large. Therefore, attempting to investigate fear appeals under more natural, less contrived conditions would be a useful addition to the body of research.

## **Conclusions**

Overall, the results here may suggest that fear appeals have no impact upon the recall of health information, whether the presentation is of benign, mild or graphic health imagery. The fact that imagery appears not to be associated with recall of information, may suggest that the fear appeals utilised in the study are no more effective tools for health information dissemination than the information alone. The study found that fear appeals also do not arouse trait anxiety or vulnerability in the individual, regardless of the strength of the imagery. Finally, behaviour change was not predicted by the graphic nature of the fear appeal but by perceived vulnerability, prior behaviour, or avoidance coping measures (although avoidance coping had low reliability) which appear to be unrelated to the fear appeal, but are perhaps more evidence that merely prompting individuals who already have health knowledge reminds them to act on protection measures. Of course this seems to only apply to those individuals who would already be likely to engage in health protective measures. This suggests that in future health campaigns there is the need to find other moderating factors which may motivate change in the most at risk but the least likely to change.

**Study 3 –**

**Perspectives on Skin Cancer and Sun Exposure**

Studies 1 and 2 investigated the predictors of health information recall (study 1, 2) and behaviour change (study 2) associated with the presentation of a fear appeal. The mixed results from the first two studies do not allow for a firm conclusion to be reached regarding the impact of fear appeals on sun protection and exposure behaviours, suggesting that other factors may be influencing individuals sun protection and exposure behaviours. So, given the mixed results between the two prior studies and indeed in fear appeal literature generally, further investigation is needed to allow us to look at broader underlying themes which arise for individuals and shape their environmental interaction in the context of Australian society. As fear appeals do not operate in a vacuum, and individuals are exposed to other factors which may be influencing their beliefs and behaviours, this study will endeavour to provide further understanding into the underlying beliefs and attitudes around sun exposure and protective behaviour. This in turn will allow for better identification of possible factors which may motivate or impede behaviour change.

In addition to the areas already investigated in studies 1 and 2, there are many areas which could be explored in relation to beliefs and attitudes towards sun exposure and protection. Researchers argue that health intentions and behaviour change are dependent largely on personal and situational factors (Tay et al., 2000). Personal factors can be defined as socio-demographic, cultural, personality characteristics, individual differences and even transient states such as mood. While situational factors refer to the environment in which people are exposed to health messages (Janssens & DePelsmacker, 2005; Quinn et al., 1992). These areas must be explored in the context of a qualitative study in order to reveal possible strengths and limitations of health message delivery and behavioural intent.

### **Australian Cultural Impact**

Research has suggested that societal norms are important factors in shaping the intentions and behaviours of individuals (Jackson & Aiken, 2000). In Australia, one of the pervasive national normative symbols is the image of the 'bronzed Aussie', thus tanning is

perceived by Australians as the norm (Lupton & Gaffney, 1996). Conversely, paleness is associated with foreignness (Lupton & Gaffney, 1996).

Studies have also found that people continue to engage in tanning behaviours due to positive attitudes towards healthiness of a tanned appearance, perceived activeness and perceived increased attractiveness (Lamanna, 2004; Miller et al., 1990). This association negates the impact of their knowledge and perceived risk of skin cancer (Lamanna, 2004).

### **Age**

It has been found that age is a factor in the uptake of health behaviour change. This has been investigated in several different areas of health behaviour change (eg, Brinol & Petty, 2006; Leary & Jones 1993). Adolescents have been shown to be more reluctant to use sun protection and also found to describe more negative sun protection attitudes compared with children (Stanton et al., 2004). In contrast to this, some research has shown older people are more likely to reject the fear appeals information and message (Brinol & Petty, 2006). Age was also found to be a factor in the pilot (study 1) and main study (study 2) of this paper. Mixed results suggested that age may be of important consideration when designing health campaigns as differing age groups it seems have differing motivations and factors driving their behaviour.

### **Sex Differences and Gender Norms**

Some research has found that knowledge, attitudes and behaviours in relation to health behaviour differs in males and females (Leary & Jones, 1993; Lupton & Gaffney, 1996). It was found by Leary and Jones (1993), for example, that young women, in relation to certain health behaviour, such as tanning, although reporting knowing the risks of sun exposure and having been exposed to graphic skin cancer appeals, continued to engage in the risky health behaviour. It has also been shown that women are more likely to deliberately tan (Jackson & Aiken, 2000; Leary & Jones, 1993; Lupton & Gaffney, 1996). In contrast, men are shown as being more likely to have more incidental/unintentional sun exposure and tanning, and use clothing or hats as sun protection (Jackson & Aiken, 2000; Lupton & Gaffney, 1996).

The limitation of many previous studies is that, while showing patterns of attitude and behaviour, they do not show why these perceptions exist, due to a lack of examination of the underlying socio-cultural and individual differences inherent in moderating these risky health behaviours. This is primarily due to the studies being quantitative in nature (e.g. Lamanna, 2004; Leary & Jones, 1993; Miller et al., 1990). This study aims to address this limitation. And in order to effectively study fear appeals and health behaviours the individual differences described above, must be taken into account.

### **Aims**

As found in prior studies, individuals in Australia tend to have a high level of sun protection and sun cancer knowledge yet still continue to engage in unsafe sun practice or under utilise sun protection. The main aim of this study is to assist in a deeper understanding of the barriers and motivations to engage in sun health behaviours. A qualitative study focusing on the health behaviours related to sun exposure will allow for exploration of possible mediating factors influencing behaviour and barriers to change. In addition, the study will also assist in explaining factors which are not adequately addressed by the previous studies. Finally, there has been little research which investigates the influence of socio-cultural and gender normative influence on sun exposure behaviours, beliefs and attitudes. This study will explore what information individuals are extrapolating from their interactions in the Australian cultural context, both positive and negative. This approach will assist in understanding the formation of sun protective or exposure intentions and attitudes, in addition to the impact on subsequent behaviours. Exploring all of these areas will allow for further understanding as to why individuals continue engaging in negative health behaviour despite possibly having knowledge of health protective behaviours or negative health consequences of sun exposure.

The qualitative method employed will involve semi-structured interviews and the use of Interpretative Phenomenological Analysis (IPA; Smith & Osborn, 2003). IPA is an approach to qualitative research which is ideographic in nature and is useful in cases where research is concerned with complex issues, (Smith, Michie, Stephenson, & Quarrell, 2002) such as health

behaviour choices, as this approach means that it aims to offer insights into how an individual, in a given context, makes sense of a certain phenomenon or event. IPA therefore has its theoretical origins in phenomenology and hermeneutics whereby the experience is a complex concept which is taken in relation to phenomena, and it is defined by qualities of “directedness, embodiment, and worldliness” (Langdrige, 2006; Smith, 2007). An individual or public centred focus requires an individual or public centred research methodology, such as IPA, which can be considered to be most suitable to analyse the discourses as it allows the researcher to attempt to understand the individuals’ meanings and experiences in their life and society.

Semi-structured interviews and IPA will be used in an effort to explore an individual’s personal perception or account of events and phenomenon, as opposed to simply being a record of the events themselves (Smith & Osborn, 2003). Semi-structured interviews have the advantage of allowing for increased rapport with individuals and flexibility in the areas which can be covered as driven by the responses given by interviewees (Smith & Osborn, 2003). However, they do have the disadvantage of requiring greater time to conduct and are more difficult to analyse (Smith & Osborn, 2003). Finally, in order to extend the generalisability of the results from previous studies, a wider adult range of participants will be used who range from 18 – 67 years old.

In summary, the aim of the present study was to explore perceptions of sun protective and exposure behaviour in the Australian cultural context. In addition, patterns of sex differences, and gender normative influence on sun exposure behaviours, beliefs and attitudes were explored. Finally, a wide age range of adult participants will give some insight into age related patterns of difference in attitudes, beliefs and behaviour in relation to sun exposure and protection. This will be achieved using semi-structured interviews with participants and the interviews will be analysed using IPA (Smith & Osborn, 2003).



## **Method**

### **Design**

For this study, qualitative methodology was utilised whereby one-to-one semi-structured interviews were conducted and analysed using Interpretative Phenomenological Analysis (IPA, Smith & Osborn, 2003). This method of analysis is based on the concept of actively interpreting how the participant experiences an event or topic. This allowed the researchers to extrapolate the themes which arose from the interview discourses, in relation to sun and skin care behaviours, sun and skin care attitudes, perceived vulnerability and knowledge concerning sun exposure, sun protection and skin cancer.

### **Participants**

Criteria for inclusion into the study were that participants were required to be Australian citizens and over the age of 18. From those people who expressed an interest in participating in the qualitative study, twelve individuals were randomly selected and given information inviting them to participate in a one-to-one semi-structured interview comprising of questions pertaining to attitudes, beliefs and behaviours about sun and skin care. The individuals were then asked to contact the researchers via a supplied researcher email address if they wished to participate.

Using IPA requires a small sample in order to gain a depth of information through a detailed interpretative account of the cases included (Smith & Osborn, 2002). Whilst there is no standard agreed number of required participants, in order to allow for appropriate analysis of each case and detailed examination of the similarities and differences between cases with limited resources, 12 participants were considered to be acceptable.

Of the 12 qualitative study participants, 6 were male and 6 were female and participant's ages ranged from 18-67. The choice of 12 participants also allows for appropriate examination of differences and similarities between a range of ages and between men and women. All 12 participants were born in Australia and were Newcastle residents. Eleven of the participants identified as being Caucasian and one participant identified as being of Aboriginal

heritage. Two participants were recruited from the University of Newcastle (students), while ten participants were recruited from the general public.

### **Procedure**

Following ethics approval from the University of Newcastle participants were recruited for the study via advertising on the online recruitment system at the university. Students received course credit for their participation. General public participants were recruited via snowballing. Interested people were able to contact the researchers to arrange a suitable testing time. Of the interested individuals for the study 12 were randomly selected and invited to participate in the one-to-one semi-structured interviews.

The interviews took place in an Audio Visual Lab at the University of Newcastle. The interviews lasted in duration from 18 minutes to 53 minutes and followed a one-to-one semi structured format utilising a basic list of 21 questions covering the categories of sun and skin care behaviours, sun and skin care attitudes, perceived vulnerability and knowledge concerning sun exposure, sun protection and skin cancer, and were based on prior research results (Megargell & Shive, 2006; Lupton & Gaffney, 1996; Appendix C).

The interviews with each of the 12 participants were recorded and transcribed verbatim. From this, the researcher is attempting to develop an understanding of the participant's "life world" (Smith & Osborn, 2003). Therefore the interviews are semi-structured as it allows the participant the freedom to discuss issues of most importance to them in regards to the area of investigation.

The interviews were analysed using Interpretive Phenomenological Analysis (IPA; Smith & Osborn, 2004). The analysis was conducted following recommended IPA guidelines (Smith & Osborn, 2003). Using these recommendations the interviews were transcribed, repeatedly read and commented upon individually by two researchers. Comments about significant information were recorded and emerging themes noted. Then, subordinate and superordinate themes were identified in each transcript. Superordinate themes that were found

to be common across all transcripts were used to determine the results of the study. To ensure that these results were valid, both of the researchers followed the same procedure and only agreed upon themes found within the data were used.

## Results

The interviews were semi-structured with participants asked to talk about various aspects of their sun behaviour and beliefs. They were asked about their cognitions and practices related to skin cancer, sun exposure and protection. Themes were extracted using IPA from the interview transcripts and are made up of 7 superordinate themes and 42 subordinate themes (see Appendix C).

### Skin Colour

Tanned skin colour was reported by almost all participants as enhancing the appearance of individuals. In response to questions about some of the advantages of tanning, the majority of participants responded that they felt that tanned skin increased an individual's attractiveness and was healthier in appearance. A female participant noted:

*“...it makes me feel healthier, so I suppose it adds to my own self esteem”*

Participants frequently contrasted the appearance of a tan with pale skin, noting that they felt that a tan looked healthy while pale skinned individuals were viewed as seeming “anaemic” or “sickly”. A female participant described the contrast as:

*“I think when you’ve got pale skin maybe it’s sort of like a blank canvas... as opposed to if you’re tanned it’s covered up a bit and it seems more healthy. Like you’ve got a bit of colour as opposed to people a bit drained of colour – they look a bit sick”*

However, it was noticed that men were more accepting of women being pale and still appearing to be attractive, especially if their skin was “clear and white”. One male participant

suggested that a person's background was a factor as to whether a tan enhanced attractiveness:

*"Some women I think, do look better with a tan... their genetic background... Mediterranean women might just look better naturally tanned."*

### **Australian Culture**

Participants reported tanned skin as being associated with being stereotypically Australian. This was described by one participant as:

*"I think there's a perception in Australia that a tan equals health and that it's attractive... In summer I like a tiny bit of colour because I'm fair. And I think it's a bit of a social thing because everyone seems to be so brown in Australia."*

In contrast, pale skinned people were compared with tourists or as standing out unfavourably:

*"...extremely white pommy tourist who always stands out at the beach."*

Pale skinned participants also reported that their skin colour was seen as socially unacceptable in the Australian culture. They reported being criticised for their skin colour in the past. One participant noted:

*"...it's all about being accepted and being part of a group... some of us tanned quicker than others so there was a bit of status associated with that."*

Sun exposure and tanning behaviour was reported as being an Australian summertime behaviour and was positively associated with relaxation and enjoyment. Further to this, tanned individuals were also perceived as being more "active", "sporty", "outdoor's types", while their pale counterparts were perceived as indoor types and more serious in temperament. Pale skin

was also perceived as being something which some people had simply because their skin type meant that they could not gain a tan.

### **Perceived Knowledge**

Overall participants reported adequate skin cancer and sun protective awareness and knowledge and no patterns appeared to emerge by sex in knowledge responses, however participants who were aged over 30 years reported that they felt they had good sun care and skin cancer knowledge than below 30 years who reported that they felt they could learn more.

All participants were found to be aware of the relationship between sun exposure and skin cancer as well as recommended sun protection practices. They also reported allowing themselves some moderate sun exposure without sun protection for therapeutic purposes. Participants were aware of the benefits of some sun exposure, with several noting that sun exposure is helpful for obtaining vitamin D. One participant stated:

*“I know a little bit about Vitamin D... you get so much of that from the sun... it tends to be better [to get sun] if the weather isn't too hot”*

Although all participants reported a high level of knowledge regarding sun protection behaviour, it was found that most only used sun protection (particularly sunscreen) when engaged in typical outdoor recreational activities. These activities included barbeques, picnics, and visiting the beach or pool. While one participant described her sun smart behaviour while engaged in outdoor activities:

*“I always made sure I wore a hat and put suntan lotion on but there are parts of my body that I didn't protect, not being aware of the situation, what danger I was putting myself in by... exposing my legs, my hands and arms and my chest to the sun.”*

Looking at times of using sun protection, it was found that participants were more likely to engage in sunscreen usage when they had associated usage with specific activities. Another noted:

*“It seems to be when I opt for a pair of swimmers I feel the need to put it on (sunscreen), which is ridiculous. I mean when you walk around in the garden you should be equally aware of putting it on.”*

Participants revealed differing sources of their skin cancer knowledge. Several reported gaining knowledge with interactions with skin cancer clinics or as a result of personal interaction with someone with skin cancer. Several participants also noted that they got a lot of their skin cancer knowledge from health campaigns. One participant spoke of prior campaigns as her first source of information:

*‘... the TV campaign from the 80’s, the Slip Slop Slap when I was a kid... I guess that was more against getting sunburn than anything because... you would associate it with short term pain.’*

### **Perceived Vulnerability**

Perception of vulnerability to skin cancer was affected by several factors. The individual’s skin type was seen as an important factor, with a pale complexion being associated with the need for greater concern and awareness of sun care behaviours. Secondly, prior sun excessive sun exposure or sunburn was also a factor. Pale participants especially expressed concerns about having prior sun exposure and currently being aware of the need to take greater care. For example:

*“I’m very conscious of the fact that of how I’ve been exposed to the sun prior to now and um I therefore try and keep a check on my skin every 12 months just to make sure that nothing’s evolving as a result of my exposure to the sun as a young person”*

Decreased perceived risk was related to several protective factors. Firstly, participants reporting being vigilant in their skin checking behaviour, and having frequent skin checkups with their doctor or skin cancer clinic. Also, using more sun protection was related to decreased perceived risk. However, several participants expressed a lack of trust in general practice doctors to be able to detect skin cancers early. In talking of a visit to a GP one noted:

*‘One of my concerns, is that lots of times, I don’t think there’s... professionals out there that can make an accurate judgement call in whether or not something is serious’*

Almost all of the participants reported knowing someone who had been diagnosed with skin cancer, or had a personal experience with skin cancer. For example:

*“... if you’re a light white skinned person you’re in a lot of trouble. I’ve got friends who’ve had cancer in the throat and everything... A friend of mine... he’s fair haired and he’s had half his throat cut out from sun cancer.”*

## **Age**

All participants described experiencing more sun exposure and sunburn as a youth. An example of such sun exposure was explained by one participant as:

*“I know the damage is already done because basically all we had was coloured zinc when I was in you know primary school... So we didn’t really have the awareness until you know, the end of primary school the start of high school, is when we started learning about looking after your skin”.*

Older participants reported that they felt that people were less well educated about health risks of excessive sun exposure in the past as opposed to the level of awareness in the community currently. One participant stated:

*“I think science has changed too you know... So when you look at those days in the late 60’s and the early 70’s. I mean there was no consequence, the sun was good”.*

Younger participants reported that although they were educated and aware of the health risks of sun exposure they either stated that they didn't care or that they valued the other elements of sun exposure more.

All participants described the desire for a tanned complexion as being highest in their youth. It was reported in connection with peer influence, gender norms, and culturally normative expectations.

### **Sex and Gender Norms**

There were found to be a pattern of findings between the sexes in relation to perception of gender roles in tanning behaviour. Female participants reported tanned skin as being associated with increased attractiveness and were found to value having a tan more highly than men. They were also found to be more likely to suntan deliberately or use fake tans. In contrast the men reported acquiring a tan incidentally in the context of engaging in other outdoor activities, such as fishing. Male participants also reported that deliberate tanning by other males was seen as a more feminine trait and associated with vanity. One male participant noted:

*"My mates... they don't go out and tan, they just do things that involve... surf or other activities. It's a little bit vain if they were obsessed with their tan"*

It was found that male participants frequently associated the tanned male appearance with concepts of strength, muscularity and activeness. One participant commented on more pale males:

*"... they're not necessarily as robust men as someone that's tanned".*

The bodybuilder tanned physique was also reported by some as being more socially expected. In contrast women reported tanned skin on women as being associated with ideas of looking attractive for events, or to wear certain colours or clothes. One female participant noted:



*“...a lot of girls don’t like wearing hats cause it doesn’t look good or it messes up their hair or collared shirts, you know they want walk around in their bikinis and things and things like that. So I think fashion has a lot to do with it and tanned is meant to be beautiful, which is why I think some people don’t look after their skin.”*

The media’s perceived portrayal of tanned individuals was also reported as having an impact on perception of tanned skin. Women with tanned skin were felt to be associated in the media with glamour, celebrity and sex appeal. This media influence was also reported to have an impact on the self confidence of individuals. In particular it was also noted that men ascribed the portrayal of other tanned men in the media as being muscular and associated with exercise and fitness. For example one male participant stated:

*“... the guy that’s just got a tan you kind of picture him being a more athletic kind of guy than someone’s that pale, I think.”*

It was found that the sex of the participant did not correlate with engagement in sun protective practices and did not affect the types of behaviours that were generally adopted. Men and women were both found to wear protective clothing, hats and sunscreen. Both sexes reported using these items for sun protection and to decrease their risk for skin cancer development, however only women reported using sun protection to prevent advanced aging. One female participant stated:

*“I don’t want to kind of look 50 by the time when I’m 35”.*

Men did note that they thought that increased aging was a disadvantage of sun exposure but did not report this as a factor in their decisions to use sun protection.

### **Contradictions and Conflicts**

There were many conflicting and contradictory statements across the participant group. All participants regardless of age reported that while they were aware of the sun exposure risks in relation to sun cancer, they still desired a tan or engaged in tanning behaviour.

Participants also described conflicts between reported knowledge and vulnerability versus their lack of sun protection. This was suggested as being due to laziness, forgetfulness or inconvenience. One female participant stated:

*“I should wear sunscreen but sometimes I forget... It’s not always in the forefront of my head... sometimes if I do go to the beach I may forget sunscreen or it may be it’d be just so hot that I go swimming before I let it sink in...”*

Participants also supplied contradictions with their attitudes towards tanning against their actual behaviour. Many participants expressed negative views towards tanning behaviour and deny engaging in such behaviour, only to then describe various instances of their own premeditated tanning practices. Interesting to note that although all men denied engaging in deliberate tanning behaviour, several also spoke of not using sun protection and getting a little exposure *“to get a bit of colour.”*

### **Discussion**

Analysis revealed seven major themes affecting sun behaviour throughout the interview transcripts– skin colour, Australian culture, perceived sun care and skin cancer knowledge, perceived vulnerability, age, gender, and conflicting or contradictory ideals – and 42 subordinate themes (see Appendix C).

This qualitative study explored discourses regarding sun exposure and protective behaviour with regards to beliefs, Australian culture, and gender in order to provide in depth insight into the thoughts and beliefs which motivate people’s engagement in both sun exposure

and sun protective behaviour. This research has enabled a deeper understanding of certain issues that have been brought to light by the previous studies (such as differences between age groups), as well as unearthing some important new issues. This gives additional information about possible mediating factors which contribute to overall barriers to health behaviour change. From this research it is clear our initial predictions had merit. It was found that participants identified the strong influence of the Australian culture on their beliefs, attitudes, and behaviours surrounding sun exposure and sun protection. Further, participants identified a tan as the Australian norm, with an association with attractiveness, health, and reflecting the outdoor lifestyle of the culture.

### **Themes**

**Skin Colour.** Analysis showed that the dominant discourse surrounding sun exposure behaviour was that being tanned was considered the Australian norm. In addition it was suggested to be desirable and appearance enhancing. This result is consistent with prior research that finds tans strongly associated with a perception of increased attractiveness (Lamanna, 2004). The tan as a symbol of health was also a consistent concept amongst participants in partnership with the idea that a tan made individuals appear more attractive.

In contrast, pale skinned individuals were viewed as unhealthy, sickly or pasty looking. This is consistent with prior research which has found that a tan is associated with perceived attractiveness (Beasley & Kittel, 1993; Leary et al., 1997) and being pale as being less attractive (Beasley & Kittel, 1997). In addition, it also supports research suggesting that a tan is perceived by individuals as being correlated with good health (Broadstock et al., 1992). This suggests that appearance and perceived healthiness of tanning are two of the factors influencing decisions to engage in sun exposure behaviour. From a TPB perspective, this suggests that one of the reasons some individuals have a positive attitude towards a tan is because of a perception of increased attractiveness and health, associated with the outcome of tanning behaviour. This correlates with prior research which found that image norms were predictors of intent to sunbake but not as intent to sun protect (Jackson & Aiken, 2000).

**Australian Culture.** Results showed that having a tan is considered the norm in Australian culture. Participants suggested that those who were untanned were more likely to be perceived as foreigners, for example white English tourists with pale skin. This is contrasted with the ‘sun-bronzed Aussie’ who enjoys the outdoors and is a distinctive symbol of “Australian-ness” (Lupton & Gaffney, 1996). This is an ideal which has arisen from Australia's outdoor lifestyle and lead to the association of tanned skin with health, attractiveness and beach culture (Lupton & Gaffney, 1996). The strength of this concept was evident in the participants reporting of feeling rejected if they did not fit with this mould, especially during adolescence. Therefore tanning is associated with subjective norms and peer pressure to conform.

It was also found that there was the perception of a distinct Australian outdoor culture, of which ‘fun in the sun’ and tanning were inherent part of. This was evident from interviews, with all participants reporting enjoyment of their experience of outdoors activities and lifestyle—for example barbequing or going to the beach. Tanning in particular was reported as being a pleasurable leisure-time activity. This was also found to be a perception expressed in previous research (Lamanna, 2004). It was something which was also associated with summer, holidays and relaxing. In addition, some participants related that getting a tan was associated with being outdoors generally, thus not always something that was being deliberately sought but rather something which occurred as a natural consequence of being Australian and engaging in typically Australian activities. This suggests something of a symbiotic relationship between tans and being active outdoors, and subsequently tanning without trying.

Overall, people with a tan were considered to be a symbol of Australian culture and outdoor activity. In contrast those who were seen as pale by others were considered to spend more time indoors or be more serious and less fun. In addition to exposing the extent of the influence of Australian cultural norms this also suggests an underlying motivating factor for engaging in health risk behaviour – societal and peer group acceptance. To be an Australian is to be tanned and to be tanned is to healthy, active, fun and accepted.

**Perceived Knowledge & Perceived Vulnerability.** In terms of knowledge, participants were found to be well informed about sun smart practices and health risks associated with sun exposure. Individual differences were found in relation to knowledge, perceived risk and sun smart awareness. These were associated with various factors including age – with older participants presenting a pattern of findings suggesting had a higher level of sun smart knowledge and generally showing a personal experience with skin cancer or knowing someone who had. However, this was also associated with a tendency to underestimate their risk and a mistrust of medical professionals to be providing information which was accurate and non-manipulative. There was also a perception that any developing problem would be found by the medical profession or that any damage was already done and further sun smart behaviour was pointless. This was particularly salient with older respondents and backs research suggesting that older people are more likely to reject health messages because of a belief that it is too late to make effective preventative changes as the damage has already been done (Brinol & Petty, 2006). In addition having fair skin or a complexion that burns easily was associated with greater awareness of the need for protection. It was found that sunscreen was the most common skin protection that participants referred to using as protection from the sun.

Interestingly, participants also noted that engagement in specific outdoor activities was also associated with an increase in certain sun smart behaviours. They reported that they tended to remember to use items, such as sunscreen, when deciding to engage in typical Australian outdoor activities, such as when heading to the beach. The increase in sun protection use, when associated with activities, suggests that when sun protection is a simple task, and can be associate with an activity, it is more likely to be a behaviour which is engaged in. In contrast, in their study Lupton and Chapman (1995) found some participants who, despite being aware of health behaviours in regards to diet and good nutrition, still struggled to engage with the healthier behaviours regularly citing that they required too much extra ‘work’ to incorporate into their life. When protective behaviours are not simple and associated with a regular habit, there may be additional challenges in enacting behaviour change motivation.

It was found that participants felt that they had obtained their skin cancer and sun protection knowledge from several sources. Older participants tended to report gaining information following attendance at skin cancer clinics, having already found a possible skin cancer. They reported, however, that this increased knowledge did not result in an increase in sun protective behaviour. This further strengthens the theory that many older people do not engage in preventative measures fearing that it is too late (Brinol & Petty, 2006). Many participants reported that they became aware of skin cancer risks after interaction with a family or friend who had been diagnosed with skin cancer. Several participants also noted that they gained a lot of their information from health campaigns. This shows the importance of accurate health campaign information being disseminated in the community for early intervention as many seemed to gain information only after already having a history of sun exposure. Thus, as some individuals still engage in sun health risk behaviour, despite their knowledge, other factors may be more important as a focus of future health campaign.

In addition having fair skin or a complexion that burns easily was associated with greater awareness of the need for protection. This supports research which shows that countries such as Australia, who have a high prevalence of skin cancer also have a higher saturation of skin cancer protection knowledge in the community (Smith, Ferguson et al., 2002). The high level of sun health knowledge combined with participants acknowledgement of sun exposure behaviour suggests that individual factors are important in the development of effective health campaigns with reasons for non-compliance with health directives being related to individual assessment of threat amongst other factors.

The participants reported an awareness of risks associated with sun exposure, however it would appear that other factors influenced their decisions to continue to engage in sun exposure behaviour. It was found that despite participant's knowledge, the majority of those interviewed reported that they still wanted to be tanned, and engaged in deliberate sun exposure or used little or no sun protection. This group included individual's who were at a high risk for skin cancer or who had already had prior skin cancers removed. This suggests that

knowledge and vulnerability are moderated by demographic and factors which affect attitudes and subsequent behaviour. Therefore this must be taken into account when developing effective health campaigns, with reasons for non-compliance with health directives being targeted to a specific group's assessment of threat.

**Age.** Research findings suggest that pressure to conform to Australian norms in regards to skin colour were highest during adolescence. Participants recalled feeling less attractive or more unpopular in comparison to their peers, as adolescents if they were not tanned. This resulted in participants engaging in sun risk behaviours or feeling unaccepted if they did not. This has been found in prior research which has found that adolescence is when concern about appearance is at a peak and desire for peer group acceptance is high (Cororve & Gleaves, 2001). This also correlates with research suggesting that it is during adolescence that Australians demonstrate the highest sun risk behaviours – sun tanning and burning, in addition to holding the strongest positive views about the desirable results of sun exposure (Leary & Jones, 1993; Williams, Jones, Caputi & Iverson, 2011). This also explains the reluctance to use sun protection (Dobbinson et al., 2007; Stanton et al., 2004). A consequence of this pressure in early life to conform to tanning behaviour is that sun protection behaviour decreases. Research that has found that sun protection behaviour generally begins to decline in pre-adolescence, reaching its lowest level at approximately 17 years of age and then improves into adulthood (Coogan, Geller, Adams, Benjes & Koh, 2001). Thus a barrier to sun protection behaviour change is peer pressure which is especially high during adolescence.

**Sex and Gender Norms.** Increased attractiveness and social acceptance were seen to be important factors in sun exposure behaviour, especially for women. Interestingly, there was a difference in perceived attractiveness of a tan between men and women, with men suggesting that women could still be attractive and pale. Research has shown that women with a higher concern about their appearance are more likely to be interested in tanning (Prentice-Dunn et al., 1997). This was reflected in responses by participants – with female participants indicating that they felt that tanning increased attractiveness and was the feminine norm. They further

connected this with increased self acceptance and self esteem. Women appeared to value tanning more than men and deliberate tanning was more accepted. In males deliberate tanning was considered to be a pursuit of vanity and feminine. In contrast to the view of female attractiveness being the main basis for tanning behaviour, male participants concerns related to the male tanned norm as being connected with physical strength, robustness and athleticism. Tanning was associated with body building in males. Some male participants reported that the perception of male tanning being associated with body building, increased feelings of societal pressure on them to aspire to this body type and look. This is supported in prior research (White et al., 2008) and suggests that both women and men feel pressure to conform to societal norms.

The difference in the perspective on tanning behaviour between men and women supports prior research, which suggests that women are more likely to deliberately expose themselves to the sun more than men, with men tending to more incidental exposure through activities based in the sun (Wichstrom 1994; Leary & Jones 1993). In females it was considered a way of increasing sex appeal and conforming with media ideals of glamour. This supports research indicating that media images have an effect on the perception of tanned bodies as the norm and in fact, a beauty ideal to be aspired to (Garvin & Wilson, 1999; Lupton & Gaffney, 1996). It also corresponds with research which suggests that the media presents a mixed message in relation to social acceptability and desirability of tanning with the use of tanned models in magazines, on television and in other media contrasting with the health media campaigns which have been largely successful in increasing community awareness about the risk factors for skin cancer, dangers of sun exposure and protection measures that individuals can utilise (Lupton & Gaffney, 1996). This suggests that the masculine tanned norm is connected to masculine outdoor activities seen as more an incidental occurrence, while female tanning is connected with deliberate attempts at increasing attractiveness and gaining social acceptance.



**Conflicts and Contradictions.** Despite high knowledge and awareness of the dangers of sun exposure, participants still expressed a desire to gain a tan and still engaged in deliberate or incidental sun exposure both with and without sun protection. This included those at high risk of skin cancer and even those individuals who had already had an experience with skin cancer. This suggests that there are more powerful factors at play than being a simple case of increased knowledge leading to adoption of more healthy behaviours. Individuals at times were aware of the contradictory nature of their attitudes, knowledge and behaviour. Female participants noted that at times they felt that appearance or conforming to societal expectations was more important than sun protection. Males often referred to tanning as 'getting a bit of colour', which they engaged in before putting on sun protection. This is in contradiction to these participants suggesting that they do not deliberately tan and consider it non-masculine to do so. Thus this underlines the complex nature of the reasoning's and justifications which underpin the individuals decisions to continue to engage in unhealthy behaviour. This also supports research which suggests that knowledge and increased risk of unhealthy behaviours are not sufficient to change positive attitudes which exist for some unhealthy behaviours, such as sun exposure (Lamanna, 2004; Lupton & Gaffney, 1996).

### **Implications and Further Research**

Based on the results of the study, there are several strong barriers which impact on sun protection behaviour. The research shows that Australian's have a good knowledge of sun cancer risks and sun protection behaviour, but clearly this knowledge is not sufficient to alter both positive attitudes towards tanned skin and prevent sun exposure behaviour. The study shows that there are strong age, cultural, and gender related meanings towards tanning attitudes, beliefs and subsequent behaviours. In addition, there are large differences in the patterns of findings between age groups in sun protective and exposure attitudes, beliefs and behaviours which need to be addressed.

The barrier to sun protection health behaviour change is related to cultural norms and pressure to conform to them. In this case, the Australian norm is one in which 'a little bit of

colour' is celebrated as being attractive, healthy and associated with the outdoors and being active. Thus this is a strong motivator for sun exposure and barrier to sun protection, with individuals knowingly engaging in sun exposure despite the risks because of positive associations with tanning (Lamanna, 2004; Leary & Jones, 1993). The Australian tanned norm is shown to be perpetuated by both the Australian outdoor lifestyle and the media. Thus any intervention campaign needs to consider the cultural barriers to sun protection behaviour change in order to better target campaigns.

The impact of media on the perception of tanning as a norm is very invasive. This suggests that future health campaigns aimed at decreasing sun exposure need to firstly, be targeted at specific risk groups. In particular, as much sun exposure occurs in early life, there needs to be adolescent targeted campaigns. Adolescence is a time when the need for peer acceptance is at an all time high and sun protection behaviours are at an all time low (Hill & Boulter, 2002). This is an important area where change is vital as it's been estimated that simply using sunscreen regularly during the first 18 years of life could reduce the incidence of some skin cancer by around 60% (Whiteman, Whiteman & Green, 2001). In order to address the barrier of adolescent peer pressure and conformity, interventions should be aimed at changing beliefs of peer pressure for a tan, to peer support for sun protection and campaigns could focus on celebrated pale media figures to increase acceptance of a new norm (White et al., 2008).

The influence of the media on female perceptions of tanned bodies as the norm suggests that it is important that the media be incorporated into future health promotion strategies. This could involve using paler models and developing positive associations for this look, while focusing on the negative perceptions of vanity associated with individuals who deliberately tan (Mahler et al., 2003). Alternatively, given the value placed on appearance in relation to tanning, campaigns could focus on the long term negative appearance outcomes related to sun exposure, such as wrinkles (Lamanna, 2004). In contrast health campaigns

targeting men should focus on increasing sun protective behaviour during outdoor activities and incidental tanning opportunities.

### **Limitations**

The main limitation of this study was its small sample size meaning that it has limited ability for generalisation across the Australian landscape. As this was a qualitative study and exploratory in nature, this small sample size was necessary due to the detailed analysis required for each interview and limited resources. This means that the results are less likely to be representative of the general population. In addition, the small sample size meant that a representative sample for multiple age ranges was not possible.

Furthermore, the interviews were not conducted during the summer months, this may have meant that sun exposure and protection practices were not at the forefront of people's minds and therefore they may have under or overstated their own sun exposure and protection practices. In addition, this may have also blunted people's responses about their attitudes towards sun tanning and motivations to tan or protect themselves. Therefore we may have received differing or more accurate information closer to a time when they would have been usually engaging in those behaviours.

### **Conclusions**

This study has provided deeper understanding of the individual factors which affect sun exposure and protection behaviour, beliefs and attitudes. It has given a greater understanding of the barriers and motivations to engage in health protective behaviour and also an understanding of individual's desire to engage in sun exposure behaviour despite knowing the dangers and increased skin cancer risk. The results have shown that individuals' behaviours are shaped by the values and meanings emerging through Australian culture that have been associated with tans. In addition, a pattern of differences in findings between the sexes and a pattern of different findings in gender perception related to sun exposure were found. By considering the socio-cultural aspects of sun exposure; the pattern of differences in findings in

relation to sex in behaviour and beliefs around tanning; and appearance related beliefs and perceived norms which emerged through the discourse, future research and health campaigners can create more targeted and effective skin cancer prevention and sun protection campaigns.

### **General Discussion**

This current body of research investigates both the factors which impact on health information recall and behaviour change following a skin cancer fear appeal. In addition, it provides discourses around sun exposure behaviour, which illuminate the underlying beliefs and attitudes driving health behaviour choices.

The research provided analysis and insight into the role of health information recall, graphic imagery, internal processes and individual factors in predicting skin cancer behaviour change. Method triangulation was utilised in order to explain more fully the complex relationships involved in health message acceptance or rejection, health behaviour and change and incorporated both quantitative research (study 1 and 2) and qualitative research (study 3). Study 1 was a quantitative study which primarily investigated the effects of fear appeals on information recall, anxiety, perceived susceptibility, and perceived vulnerability. In addition study 2 utilised a longitudinal design and examined the predictive factors which result in sun protection behaviour change as measured one month after a fear appeal information presentation. To gain further understanding of the factors which impact both current sun health behaviour and barriers to health behaviour change, study 3 utilised a qualitative design via semi-structured interviewing, the results of which were analysed using Interpretative Phenomenological Analysis. This was in order to provide deeper insight into individual's underlying motivations, beliefs and attitudes which drive compliance and non-compliance with sun protection behaviour. The combination of studies served to add to the current body of literature and offer further exploration into the factors which may affect health behaviour change choices.

Discussion of each study has been presented following the reporting of their respective results. Therefore in this general discussion, the results of the studies will be examined in the broader sense of the overarching questions regarding fear appeals and sun health behaviours.

### **Integration of Key Findings**

The current body of research had a number of overall aims. The first major aim was to investigate the impact of graphic imagery on health information recall. The studies incorporated factors from health behaviour models such as the PRM (Leventhal, 1970), PMT (Rogers, 1975),

EPPM (Stephenson & Witte, 2001; Witte, 1992) and TMT (Greenberg et al., 1997) and individual factors, to allow a theory-based assessment of the influence of graphic imagery in fear appeals on the individual's information recall. The impact of fear imagery on perceived vulnerability, susceptibility, and anxiety was assessed, then predictors of subsequent information recall were found (study 1 and 2). Therefore studies 1 and 2 assessed the impact of the presentation of differing levels of sun cancer imagery on individuals.

Secondly, we aimed to examine the effect of fear appeals on behaviour change by investigating which variables predict changes in sun protective behaviour. Thus study 2 incorporated a longitudinal design in which participants were contacted one month following the initial intervention and responded to questionnaires on behaviour, anxiety, vulnerability, susceptibility and coping for a subsequent measure of behaviour and differences in internal processes.

Based on the principles of the TPB (Ajzen, 1991), the third aim of the research was to provide a discourse on the individual and cultural differences which impact on sun exposure and sun protective behaviour in the Australian populous. This aim was operationalised by conducting semi-structured interviews and analyzing them using IPA to examine those underlying themes underlying the formation of sun exposure and sun protection beliefs, attitudes and motivations to behaviour.

The overall aim this research was to investigate the role of fear appeals on behaviour change and the impact of other individual factors which affect sun exposure and sun protective behaviour choices. The results of the current studies show an inconsistent impact of fear appeals, with two studies each showing different factors predicting health information recall; and provide support for the influence of individual and cultural factors on behaviour change.

### **Skin Cancer Health Knowledge**

Studies have shown that there is a large amount of skin cancer information available to the Australian community (Garvin & Eyles, 2001; Smith, Ferguson et al., 2002). Research shows that countries such as Australia that have a high prevalence of skin cancer also have a higher saturation of skin cancer protection knowledge in the community (Smith, Ferguson et al., 2002). Results from the health knowledge questionnaires (studies 1 and 2) showed

participants' mean reported skin cancer knowledge as moderate. Participants in study 3 reported that they felt they were well informed about sun smart practices and health risks associated with sun exposure. However, participants still reported that they felt they were engaging an excess of unsafe sun behaviours. This shows that despite a high level of skin cancer and sun protection health information available in the community, individuals continue to engage in risky sun exposure behaviours. Further, it may suggest that despite reporting that they 'felt well informed' (study 3), individual's may not actually have high enough levels of health knowledge to impact health behaviour choices. Alternatively, the moderate levels of skin cancer knowledge, yet engagement in unsafe sun exposure that were found, may support other behaviour change research which has found that a lack of behaviour change is not the result of a deficit of knowledge and understanding of the issues (Bulkeley, 2000). Therefore the reasons for non-compliance with health and fear appeal campaigns may be related to a more complex set of factors than simply level of health knowledge.

In study 3, the pattern of responses from older participants showed a perceived higher level of sun smart knowledge than reported by younger participants. Interestingly, although the pattern of responses from older participant suggested that they felt they had higher levels of knowledge, the pattern of responses also showed that they felt they had a decreased responsibility to engage in sun smart behaviours due to a perception that any disease would be cured by the medical profession or that any damage was already done, rendering sun protection pointless. This supports research which suggests that older people are more likely to reject health messages because of a belief that it is too late to make effective preventative changes as the damage has already been done (Brinol & Petty, 2006). The level of sun health knowledge found across studies 1 and 2, combined with participants' acknowledgement of sun exposure behaviour (study 3), suggests that individual factors, may be important in the development of effective health campaigns.

### **Fear Appeals and Health Information Recall**

One aim of the research (study 1 and study 2) was to investigate the impact that graphic imagery, such as those presented during fear appeals, has on information recall. The effect of graphic imagery was examined in order to investigate whether individuals' exposure to

graphic imagery may lead to lower recall of associated health information. The results showed that only the control group in study 1 (no images shown) showed a significant difference, with increased recall. Once images were added to control condition in study 2 there was no difference in recall. Research found that distraction during information presentation in a health learning environment has an impact on recall, resulting in a decrease in learning (McDonald et al., 2004). It may be therefore that the images presented are a distraction which result in decreased information recall. Therefore in practical terms the presentation of images may impact on the efficacy of a health campaign if information recall is an important factor in health behaviour change. The results of the current study may therefore suggest that the presentation of images, whether benign, mild or graphic may simply provide a distraction to processing of information presented immediately prior, therefore affecting recall.

Based on study 1 and 2 of the current research, it appears that there is no difference in health information recall when exposed to mild, graphic or benign imagery. Thus, more graphic images do not appear to impede information retention to any greater or lesser extent than mild or benign images, but also do not appear to facilitate information retention either. Therefore, as one of the aims in fear appeal research is to increase both awareness and knowledge about a health issue, such as skin cancer, these results suggest that graphic imagery may not be useful in best achieving this aim. The results of study 1 suggest that when individuals are not exposed to imagery after presentation of health information, they recall that information more than if they are exposed to either graphic or mild imagery. Therefore, utilising images at all, in addition to the presentation of health information, may result in lower recall and thus may result in less effective retention of health information than simply presenting the information alone. This does not support the theory that it is only highly graphic fear appeals which result in decreased health information recall (Cho, 1999; Keller & Block, 1996). Instead it suggests that any imagery presented during an appeal distracts the individual and results in decreased recall of health information.

**Factors Associated with Health Information Recall and Behaviour Change.** The current research aimed to investigate factors impacting health information recall as it is considered to be a possible factor which influences people's attitude to related behaviour



(Ajzen, 1991). The predictors for information recall were investigated (study 1 and 2) and mixed results were found. It was found that skin cancer information recall was predicted by perceived skin cancer vulnerability and perceived skin cancer susceptibility in study 1, with skin cancer susceptibility having a positive linear relationship with recall. This suggests that higher feelings of susceptibility to skin cancer are associated with higher recall, yet a negative linear relationship with vulnerability. Thus it was proposed that people who feel more personally vulnerable to a health risk and are likely to reject more of the skin cancer information intake, in contrast to prior research suggesting the inverse (de Hoog et al., 2005). In addition, those who felt that they were susceptible to skin cancer showed increased recall. Vulnerability is defined in the studies as the personal perceived risk, while susceptibility is defined in the studies as the individual's perception of risk to a health issue in relation to others. Perceived vulnerability may therefore be affected by coping styles, which affect how people take in and process information from fear appeals (Roth & Cohen, 1986). It can be theorised that some individuals who feel more personally at risk (vulnerable) to a negative health outcome (such as development of skin cancer) employ avoidant coping strategies, in order to reduce the perceived risk and decrease their negative emotions.

Information recall was not predicted by avoidant coping in study 2, avoidant coping was however, a predictor of behaviour change. This suggests that information recall has no effect on an individual's decision to engage in behaviour change but individuals engage in avoidant coping when the behaviour change is not related to sunscreen usage or skin checking behaviour. Instead, active sun protection measures such as remembering to wear long sleeves or avoiding the sun during the hottest hours of the day were predicted by avoidant coping. It is perhaps that these behaviours require more complex lifestyle alteration and therefore the individual's appraisal of the threat versus the cost (time, expense, etc) of enacting change resulted in an avoidant coping response. This would fit with PMT's (Rogers, 1975) assertion that it is the individual's threat and coping appraisals which determines whether behaviour change will be adopted following a fear appeal.

Rimmel (2001), also found that increased knowledge does not predict behaviour change. However, this was not found in study 2, where age was the predicting factor for skin

cancer information recall, in a negative linear relationship. However, the results of study 1 found age to be a predictor of general health information recall, in a negative linear relationship, consistent with other studies this work observed that older age is a predictor of lower general health information recall (Brinol & Petty, 2006). Once again in contrast, in study 2 investigating predictors of general health information recall, results showed that the variables that predict recall were sun protective behaviours, including 'Holiday Sunscreen Use' and 'Cancer Council Visits'. Holiday sunscreen use showed a positive linear relationship with Health Information Recall while Cancer Council visits showed a negative relationship. The results of study 2 for general health information recall may suggest that those who engage in holiday sunscreen use are more health aware overall and therefore are more likely to take in new health information as it is presented. In contrast, the negative relationship between general health information and Cancer Council visits suggests that those individuals who rely on detection of illness rather than prevention, also deflect responsibility for general health, and do not take on board this information. This is supported by evidence from discourses in study 3, which showed that while participants felt that had obtained their skin cancer and sun protection knowledge from several sources, older participants tended to report gaining information following attendance at skin cancer clinics. Older participants reported attending cancer clinics after having engaged in years of sun exposure behaviour, when they felt that they may have skin cancer. This suggests that Cancer Council clinics are attended by those who feel that the damage to their skin many have already been done. This further strengthens the proposition that many older people do not engage in preventative measures, fearing that it is too late (Brinol & Petty, 2006). Thus in terms of general health information, the same cognitions surrounding the concept that 'it's already too late' may be occurring. This may then result in less new health information being adopted.

The apparent mixed results for health information recall predictors may be explained due to the influence of several different factors. The results of study 1 and 2 showed that mean prior knowledge of participants was moderate. In addition, the majority of participants reported very low levels of trait anxiety. Therefore since it is proposed that negative arousal may lead to defensive processing (Keller, 1999), or as suggested by Witte (1992) deeper processing, the low trait anxiety reported may suggest that the expected negative arousal did not occur and

neither mode of processing was initiated. Thus if there was higher negative arousal, then either defensive or deeper processing modes may have occurred and more consistent predictors may have emerged. It also adds to the evidence that information recall is not a major factor in driving behaviour change in fear appeals as it is not predicted by a consistent factor or set of factors. The moderate levels of prior knowledge may have affected the results as it may have been only obscure or newer facts which were different across participants and these may have been predicted by specific factors unrelated to the fear appeal. Finally, the appearance of age as a predictor in various types of information recall suggests that this may be an important factor in information recall.

### **The Effects of Fear Appeals on Perceived Vulnerability, Susceptibility, and Anxiety**

The effect of fear appeal imagery on perceived vulnerability, perceived susceptibility and anxiety was investigated to establish whether there was support for increased negative arousal as a factor in fear appeal effectiveness. It was found in both study 1 and 2 that there was a moderate level of perceived susceptibility and vulnerability across all of the conditions (control, mild and graphic) which was not significantly different across groups. This adds support to the evidence that the images themselves are not having an effect on negative arousal. This can be explained due to the prevalence of fear appeals, there is an increase in the effect of the law of diminishing returns (Hastings et al., 2004). There is less negative emotional arousal to fear appeals and therefore less likelihood that individuals will feel personally at risk. This is backed by research into fear appeals as they relate to dangerous driving where it was found that participants indicated that they were less accepting of negative health campaigns and felt numb to 'shock tactics' (Lewis, Watson, White et al., 2007) thus rendering fear appeals less effective.

It was also found in both study 1 and 2 that the majority of participants had BAI scores suggesting very low levels of anxiety. In the case of study 2, there was no significant difference between imagery conditions (control, mild and graphic), however, in study 1 there was a significant difference between graphic and control conditions, with those in the control condition reporting significantly lower levels of anxiety than those in the graphic condition. This suggests that for some, fear appeals may still evoke anxiety, however, this result was not consistent. The

difference in results between studies may also be due to the use of the BAI to measure anxiety. As noted in the study 2 discussion, the responses given to the BAI may not have reflected accurately the individual's anxiety to the fear appeal but more as a reflection of everyday anxiety. Therefore overall anxiety scores may have not been a useful measure of anxiety in response to imagery.

### **Individual Differences and Predictors of Behaviour Change**

One of the overarching aims of the current set of studies was to investigate the role of individual factors and their impact on the sun exposure and influence on engaging in sun protective behaviours. The results of the studies may provide support for the notion that individual factors are important moderating variables in the process of health message acceptance or rejection and also behaviour change decisions.

The predictors of behaviour change were investigated. Study 2 showed that there were significant models for the behaviours - 'everyday sunscreen use', 'holiday sunscreen use' and 'active sun protection'. Everyday sunscreen use was predicted by perceived skin cancer vulnerability and initial everyday sunscreen usage in a negative linear relationship. This suggests that participants who feel low vulnerability to skin cancer change their everyday sunscreen use more than those who feel more vulnerable. This is the reverse of what would be expected. In addition, those who engage in lower initial everyday sunscreen behaviour are more likely to change their behaviour. Holiday sunscreen use was also predicted by initial use in an inverse linear relationship. One explanation is that change in sunscreen use is a simple behaviour to enact, and those who are at lower risk, or at least perceive themselves at lower risk, are able to maintain that self perception by enacting a simple change. This is also supported by the results of study 3, where participants noted that engagement in specific outdoor activities was also associated with an increase in certain sun smart behaviours. They reported that they tended to remember to use items such as sunscreen when deciding to engage in typical Australian outdoor activities such as when heading to the beach. The increase in sun protection use, when associated with activities, suggests that when sun protection is a simple task and can be associated with an activity it, is more likely to be a behaviour which is engaged in. In addition, it suggests that those who already were likely to

engage in the behaviour merely needed a prompt or reminder. Prior research also suggests that effective fear appeals are the result of high fear arousal, followed by recommendations for reducing the negative effects (Witte & Allen, 2000). However, Keller (1999) found that the effectiveness is modified by the characteristics of the participants. It was found that fear appeals were effective for those who were already following the recommendations but not for the unconverted, thus in fact acted as prompts. This adds to research which found that during sun protection campaigns, sunscreen usage increases amongst people who consider themselves to be already sun aware (Smith, Ferguson et al., 2002). Interestingly, Smith, Ferguson et al., (2002) found that between campaigns, the levels of the behaviour tended to drop to pre-campaign levels or below. Thus for those individuals, the campaigns act as a prompt.

The results of study 2 showed that a change in active sun behaviour (e.g. wearing a hat or long sleeves), was predicted by cognitive avoidance, in a negative linear relationship. This may suggest that the less change that occurred with individuals in this behaviour, the more they engaged in cognitive avoidance strategies. In other words, those who did not engage in the behaviour, instead engage the strategy of avoiding thinking about it. This can be linked with the assertion of Terror Management Theory that in presenting health information fear appeals to those who have attitudes that do not align with the message may also increase mortality salience leading to defensive processing (Kunda, 1990). Despite being aware of health behaviours, individuals may still struggle to engage with the active health behaviours regularly due to the perception that they required too much extra 'work' to incorporate into their life (Lupton & Chapman 1995). When protective behaviours are not simple and associated with a regular habit, there may be additional challenges in enacting behaviour change motivation. However, the low reliability of this measure does not allow for more than speculation. Future research is needed in this area.

### **The Role of Australian Cultural Norms on Sun Exposure and Protection**

**Behaviour.** Study 3 found Australian cultural norms as a factor influencing sun exposure behaviour and decreasing sun protection. Results from study 3 showed that the dominant discourse surrounding sun exposure behaviour was that being tanned was considered the

Australian norm. This was strongly evident with participants reporting that they associate pale skin with 'foreignness', while the archetypal Australian was reported as the 'sun-bronzed Aussie'. The tan as a symbol of health was also a consistent concept amongst participants in partnership with the idea that a tan made individuals appear more attractive and desirable. The results are consistent with prior research which has found that a tan is associated with perceived attractiveness (Beasley & Kittel, 1993; Lamanna, 2004; Leary et al., 1997) and good health (Broadstock et al., 1992), while being pale is associated with being less attractive (Beasley & Kittel, 1997). This is an ideal which has arisen from Australia's outdoor lifestyle and beach culture (Lupton & Gaffney, 1996) and was evidenced by participants reporting feelings of rejection if they did not fit with this mould, especially during adolescence. Therefore tanning is associated with subjective norms and peer pressure to conform. This suggests that appearance and perceived healthiness of tanning are two of the factors influencing decisions to engage in sun exposure behaviour. From a TPB perspective, this suggests that one of the reasons some individuals have a positive attitude towards a tan is because of a perception of increased attractiveness and health, associated with the outcome of tanning behaviour. This correlates with prior research which found that image norms were predictors of intent to sunbake but not as intent to sun protect (Jackson & Aiken, 2000).

Sun exposure behaviour was not only found to be associated with cultural and social acceptance. The results of study 3 also showed that it was associated with the perception of enjoyment of the Australian outdoor culture i.e. 'fun in the sun'. Tanning itself was reported as being a pleasurable leisure-time activity associated with summer, holidays and relaxing, something also found in previous research (Lamanna, 2004). Not all participants reported actively seeking a tan, but considered it a natural occurrence and consequence of being Australian and engaging in outdoor activity. Overall, tanning was considered, normal, healthy and a symbol of Australian culture and outdoor activity. The effect of cultural and social norms may also be explained in terms of TMT. It is suggested in this model that when reminded of death, individuals defend their cultural normative beliefs (Hayes, Schimel, Arndt, & Faucher, 2010). These cultural beliefs are proposed to be important in increasing the self esteem of individuals. It is suggested that this is achieved by allowing the individual to connect and adhere

to what they consider to be the shared views of their society (Greenberg et al., 1997). This connection and increase in self esteem then acts as a buffer against the fear of death. So in linking the results in study 3, to the results of the fear appeals studies (1 and 2), it suggests that skin cancer fear appeals may be ineffective due to the overriding impact of culture. However, this cannot be clearly established as the results do not show whether the individuals were reminded of death and it was shown that anxiety was not raised significantly. Regardless, these results are still important as they suggest that there are underlying motivating factors for engaging in health risk behaviour – cultural norms, societal and peer group acceptance. To be an Australian is to be tanned and to be tanned is to be healthy, active, fun and accepted. Thus this is an important barrier which health campaigns may need to overcome in order to affect health behaviour change.

**The Effect of Sex on Sun Behaviour.** Study 1 and 2 found no sex differences in fear appeal information recall (study 1 and 2) or behaviour change prediction (study 2). However, study 3 revealed a pattern of differing attitudes and beliefs around sun exposure and protection between the sexes, which may influence behaviour.

Research has shown that women with a higher concern about their appearance are more likely to be interested in tanning (Prentice-Dunn et al., 1997) and this was supported by study 3 where women who reported tanning also reported that they felt that tanning increased attractiveness and was the feminine norm. They further connected this with increased self acceptance and self esteem. Women appeared to value tanning more than men and deliberate tanning was more accepted. Thus increased attractiveness and social acceptance were found to be important factors in sun exposure behaviour for women. However, men reported that they felt that women could still be attractive and pale.

Tanning in men was found to be associated with body building and also connected to physical strength, robustness and athleticism. Deliberate tanning is seen as a feminine pursuit and a sign of vanity when sought by males. The association with body building meant that the social pressure to tan that males described was often associated with aspirations to achieve that body type and appearance. Thus this presents evidence that both men and women feel pressure to conform to gender & societal norms, and is supported in prior research (White et al.,

2008). However, it also shows that the societal pressures are different for men and women with the effect of gender roles being evident.

Women reported engaging more often in deliberate tanning and the media was found to have a strong effect on the perceptions of tanning for women. In females it was considered a way of increasing sex appeal and conforming to media ideals of glamour. This supports research indicating that media images have an effect on the perception of tanned bodies as the norm and in fact, a beauty ideal to be aspired to (Garvin & Wilson, 1999; Lupton & Gaffney, 1996). It also confirms research which suggests that the media presents a mixed message in relation to social acceptability and desirability of tanning. It does this through the use of tanned models in magazines, on television and in other media. This contrasts with the health media campaigns which have been largely successful in increasing community awareness about the risk factors for skin cancer, dangers of sun exposure and protection measures that individuals can utilise (Lupton & Gaffney, 1996).

Male participants reported not engaging in deliberate tanning however, prior research shows that men are more likely to gain a tan through more incidental exposure via activities based in the sun (Leary & Jones 1993; Wichstrom, 1994). This suggests that the accepted norm of the masculine tan is connected to masculine outdoor activities and seen as more an incidental occurrence, while female tanning is connected with deliberate attempts at increasing attractiveness and gaining social acceptance. Therefore a differing approach may be required in health campaigns and fear appeals in order to enact or enable change in men and women.

**The Impact of Age.** The results of study 1 and 2 found that age was a predictive factor in the recall of health information, however, it was not found to predict behaviour change post-fear appeal. The results of Study 3, in contrast, suggest that age is a factor in sun protective or exposure behaviour. Participants reported that they felt that the pressure to conform to Australian norms, in regards to skin colour, were at their peak during adolescence. Research suggests during adolescence Australians engage in the highest sun risk behaviours – sun tanning and burning, whilst holding the strongest positive views about the positive results of sun exposure (Williams et al., 2011). Participants in study 3 showed a pattern of responses which suggested that they felt less attractive or more unpopular in comparison to their peers, as



adolescents, if they were not tanned. This resulted in participants engaging in sun risk behaviours or feeling unaccepted if they did not. Prior research has found that adolescence is when concern about appearance is at a peak, desire for peer group acceptance is high (Cororve & Gleaves, 2001), and reluctance to use sun protection is high (Dobbinson et al., 2007). As a consequence of this pressure to conform to tanning behaviour, sun protection behaviour decreases (Coogan et al., 2001). Coogan et al., (2001) found that sun protection behaviour declines in pre-adolescence, (reaching its lowest level at approximately 17 years of age) but then increases during the transition to adulthood. Thus a barrier to sun protection behaviour change is peer pressure which is especially high during adolescence. However, older participants tended to report not utilising sun protection at times because they feared that they had already been exposed to sun cancer dangers and it was 'too late'. Therefore factors related to age, such as peer pressure or fear that 'the damage has been done' are important in understanding low adherence to sun protection behaviours and decreased effectiveness of health campaigns for certain groups.

Importantly, it was found in study 3, that despite high knowledge and awareness of the dangers of sun exposure, participants still expressed a desire to gain a tan and still engaged in deliberate or incidental sun exposure both with and without sun protection. This included those at high risk of skin cancer and even those individuals who had already had an experience with skin cancer. This suggests that there are more powerful factors at play, than it being a simple case of increased knowledge leading to an adoption of more healthy behaviours. The study showed that there are underlying complex reasoning's and justifications in individuals' decisions to continue to engage in unhealthy behaviour. This also supports research which suggests that knowledge and increased risk of unhealthy behaviours are not sufficient to change positive attitudes which exist for some unhealthy behaviours, such as sun exposure (Lamanna, 2004; Lupton & Gaffney, 1996).

The results of the research have provided insight into the complex reasons and decision-making that is enacted when people choose to engage in unsafe sun behaviours despite knowing the risk factors and appropriate protective behaviours. In addition, the fear appeals studies (study 1 and 2) have provided evidence that moderate levels of health

knowledge prior to a fear appeal do not predict subsequent behaviour change. Instead behaviours which were simple to enact were predicted by initial low behaviour, and those which took more 'work' to enact (such as active sun protection measures) were predicted by avoidant coping. The coping scale had low reliability however, we speculate that future research investigating this area may find that people avoiding processing thoughts related to behaviours which they consider difficult to utilise, whilst they are prompted to engage in behaviours which are simple to enact. The results of study 3 do show support for this and show some of the factors which affect health behaviour decision making.

### **Implications**

Australia has the highest rates of skin cancer in the world (Staples et al., 2006). Therefore the investigation into fear appeals and sun exposure behaviour change is important, in order to understand why individuals continue to expose themselves to the sun, and barriers to behaviour change. The results show the need to investigate further, the usefulness of fear appeals. In particular, they may provide evidence that fear appeals are not effective in eliciting change, and individual differences may play a more significant role in non adherence to sun smart behaviours.

As Australian's are more aware of sun exposure risks and sun protective behaviours, there is an increased need to investigate the other factors which influence message uptake and underlying beliefs and attitudes which may expose inconsistencies between knowledge and behaviour. The fact that respondents reported knowledge of health campaigns, including fear appeals, and reported a that they felt they had a moderate level knowledge of sun protective behaviour and skin cancer risks, yet reported continuing to engage in unsafe sun behaviours, should be of major concern to researchers and public health campaigners. The qualitative findings suggest that individuals engage in unsafe sun behaviours as a result of associating positive social attitudes with tanning as it related to perceptions of health, attractiveness and social activity, confirming and extending prior research (Hanley et al., 1996; Lamanna, 2004). Thus in investigating culture and societal factors, a deeper understanding of what drives these factors (such as the media or gender roles) has been uncovered. Therefore, in order for health campaigns to be effective they must address these barriers.

This research also has important implications for the applicability of current fear appeals models in predicting effectiveness of fear appeals in changing behaviour. No support was found for drive theory (Hovland et al., 1953) as a moderate amount of fear arousal was not linked to the greatest amount of behaviour change (Janis & Terwilliger, 1962). In addition, behaviour change was also not predicted levels of anxiety. However, the lack of anxiety arousal overall, may have impacted on this result. There was little support for PRM (Leventhal, 1970) due to the low anxiety arousal found in the results. In PMT (Rogers, 1975) it is theorised that the individual appraises the presented threat and also their own coping. They assess their vulnerability and susceptibility to that threat and contrast this with the relative rewards associated with the current unhealthy behaviour. In assessing their coping, the individual appraises the response efficacy (i.e. the effectiveness of the recommended response), self-efficacy (i.e. the individuals perceived ability to perform the response) and costs (e.g. time to perform, expense of action, difficulty of action) associated with engaging in the positive health behaviour. Behaviour change is proposed to be most likely when the threat is perceived as serious and coping is perceived to be effective. Thus there was some support for PMT, with active sun behaviour change being predicted by cognitive avoidance, in a negative linear relationship. This suggests that the perceived costs may have been too high for more complex behaviours to be enacted. However, it would be expected that perceived vulnerability or susceptibility would also be a predictor in this case. Vulnerability was a predictor of everyday sunscreen use in a negative linear relationship. Therefore participants who felt low vulnerability to skin cancer changed their everyday sunscreen use more than those who felt more vulnerable. Thus individuals do not appear to be weighing their perceived vulnerability against the perceived costs. A weakness in this model overall is that it fails to addresses other individual emotional responses and focuses only the on responses which arise from cognitive appraisals of the threat (Tanner et al., 1991). EPPM (Stephenson & Witte, 2001; Witte, 1992) was not supported as it is proposed that negative arousal may lead to defensive processing and a rejection of the health message (Keller, 1999), however negative arousal did not occur (low anxiety was reported). The results of study 3 together with the results of the fear appeals studies (1 and 2), offer some evidence for TMT's (Greenberg et al, 1997) concept of the

‘worldwide view’ as a moderating factor impacting on behaviour change. The results suggest that skin cancer fear appeals may be ineffective due to the overriding impact of culture. However the link to fear of death was not established. Overall, no single model explains all of the factors involved in message acceptance or rejection. This suggests that the existing constructs of these models individually are unable to account for factors such as socio-cultural, age and sex differences, and other issues which may affect the sun exposure decision making process. Therefore, in order to improve their ability to predict fear appeal message acceptance or rejection, constructs need to be developed that are more sensitive to external social and cultural motivating factors.

The results from the studies on fear appeals (study 1 and 2) showed that individuals reported a moderate level of total health knowledge prior to the intervention and overall anxiety was not aroused by the graphic imagery presented. In addition, participants had moderate levels of information recall. From this, it may be suggested that perhaps presenting graphic imagery does not significantly increase or decrease information recall overall, thus it is not lack of knowledge or poor health information recall which results in a lack of behaviour change. Therefore a major issue with fear appeals is that they assume that when people are presented with evidence of unhealthy behaviours, they will engage in appropriate behaviour change in order to lower their risk of adverse outcomes. However, study 3 suggests that other factors, such as social pressure or cultural expectations may be moderating factors. Thus individuals may believe that the benefits of engaging in the unsafe behaviour, such as social acceptance, outweigh the risks of illness (Carmel, Shani & Rosenberg, 1994). In addition, although little negative arousal occurred in the research, at higher levels of negative arousal people may engage in defensive processing (Kunda, 1990) thus adding another possible barrier to behaviour change.

The lack of ability to consistently and significantly raise negative emotional states such as anxiety and perceived vulnerability suggests that the presentation of graphic images does not contribute to this end. Perhaps due to the law of diminishing returns (Hastings et al., 2004) individuals are less sensitive to the presentation of graphic imagery rendering it almost useless. This has serious implications in terms of the effectiveness and arguments for developing future

fear appeal campaigns for skin cancer prevention and detection in Australia. Alternatively, it could also be that having a manipulation check for anxiety in study 1 and 2, may have revealed that despite the relatively low levels of anxiety across the groups, there was a significant difference in anxiety for the graphic imagery groups pre and post intervention in contrast to the mild and control groups.

Simple behaviour change, such as sunscreen use every day or on holidays, was predicted by vulnerability (for everyday sunscreen use) and prior behaviour (for everyday sunscreen use and holiday use). This may suggest that, as prior knowledge was already moderate and negative arousal was not significantly different regardless of images presented, it is in fact the prompt to act which results in change. This is supported by research which suggests that although behaviour change occurs for some individuals post fear appeal, those levels soon revert to pre-campaign levels over time (Smith, Ferguson et al., 2002). This suggests that health promotion campaigns may be just as effective if they remind individuals of the behaviour without utilizing fear tactics. For the unconverted therefore, it may be that campaigns need to be developed which challenge other factors, such as cultural or societal norms.

More complex behaviour, such as active sun protection in the form of clothing or deliberate sun avoidance, were found to be predicted by a negative relationship with cognitive avoidance whereby individuals who engaged in cognitive avoidance were less likely to change their behaviour. Due to the unreliability of the measure we can only speculate that perhaps this may suggest that when individuals feel that a behaviour is too much 'work' to integrate into their lives they avoid thinking about it in order to avoid thinking of the threat of the consequences (Lupton & Chapman 1995). Thus campaigns which require a more complex change in behaviour may have to ensure that they give reassurance that the behaviours are easily incorporated into the life of the individual or recommend ways in which the behaviours can be easily integrated. However, further research is needed in this area.

The results of study 3 show a pattern of differences in tanning behaviour between the sexes. Both sexes reported the pressure to conform to gender norms. It was noted that female tanning was connected with deliberate tanning, social acceptance and attractiveness, while men

reported that deliberate tanning was considered feminine. As prior research shows that men are more likely to gain a tan through incidental exposure (Wichstrom 1994; Leary & Jones 1993), this suggests that in developing health campaigns men's incidental tanning needs to be targeted. This is especially important as men spend more time in the sun than women, are at higher risk of developing skin cancer and are less likely to use sun protection (CCA, 2011).

### **Strengths and Limitations**

Limitations of the individual studies have been discussed in their relevant sections, however, there are a number of strengths and limitations inherent in the current research overall. Firstly, a strength of the research was the use of method triangulation in order to gain a deeper understanding of the factors associated sun protection behaviour and behaviour change. In addition, the recruitment of participants was from different sections of the population. Across the body of the current research, participants were recruited from a broad range of contexts - university students and the general public, consisting of both indoor and outdoor workers, young professionals, retired older persons, and beach visitors. The program of studies thus utilised samples from a diverse range of contextual settings which makes the findings of the research more robust and more able to be generalised. However, the predominance of Caucasian participants does lower this generalisability but leaves the door open to further research analysing the distinction between the skin cancer and sun protective attitudes and behaviours across a broader range of participant cultural backgrounds. Finally, self report data may be criticised due to the possible skewing of reporting because of factors such as social desirability (Cummings & Worley, 1997). However, this is a factor which is difficult to overcome in present research.

Another weakness in study 1 and 2 may have been the use of the BAI to measure anxiety. The BAI ask for individuals to indicate how often various anxiety symptoms have been experienced in the past month. This means that the responses to the BAI may not have reflected accurately the individual's anxiety to the fear appeal but more as a reflection of everyday anxiety. In addition, many of the items are more applicable to pathological anxiety (eg., difficulty breathing). Therefore overall anxiety scores may have not been a useful measure of anxiety in response to imagery. Finally, the emotional and physiological responses to fear

arousal can include distress, nausea, repulsion, disbelieving, depression, shame, anger, discomfort, or helplessness (Steele & Southwick, 1981). Future research could use different measures to more accurately record anxiety and other emotional and physiological responses.

Finally, a limitation of the study is that it took place in a university setting and did not mirror the presentation of a fear appeal as it would be encountered in everyday life. In a fear appeal campaign, images are generally presented simultaneously with text or oral information. This information is then encountered in various forms of media (television, posters, etc), at various times, and in varying conditions (distracted, noise, quiet, etc). In the current studies (study 1 and 2), the information was presented prior to the presentation of images and was only presented once, whereby the participants were asked to attend to the information. This may have affected the results and is a limitation common to fear appeals research (Ruiter et al., 2001).

### **Future Research**

Taking into consideration the support shown for the role of individual difference factors as influencing behaviour in the current research, future research could incorporate these factors into research, which aims to develop targeted interventions to change sun exposure and sun protective behaviours. In further examining cultural factors impacting behaviour, it may also be useful to further tease out differing social and cultural groups and possible differences in attitudes and beliefs within the Australian society. For example, prior research has studied the effects of individualist and collectivist cultures in relation to fear appeals (Murray-Johnson et al., 2001). Individualistic cultures focus on self-need primarily, while collectivist cultures value group needs above the individual. While most research has focused on individualistic cultures, it was found that in comparing individualist and collectivist cultures, cultural affiliation is an important factor that should be included in research into fear appeals. Thus future research into different cultural groups or backgrounds found within Australian society may provide further factors affecting health campaigns, fear appeals, and behaviour change.

The research shows that there is not a 'one size fits all' approach which will result in behaviour change across different groups. Future research needs to investigate, for example, age group appropriate dissemination of health messages, as older people reported gaining

health knowledge from health professionals and knowledge of others who have had skin cancer, whilst younger individuals reported gaining most of their skin cancer knowledge from various health campaigns. Future research could investigate the effectiveness of media health information dissemination in relation to targeted sun-protection messages. In addition, future interventions could also be targeted to cultural or social normative factors affecting various age groups, such as peer pressure on adolescents.

The current studies investigated negative emotions and fear evoking consequences of sun exposure, however, the qualitative study showed that there is a positive association for people with sun exposure behaviours. Therefore future research may wish to focus on positive emotional engagement as a potential factor which may be able to drive behaviour change following a health campaign. It may be that by engendering the behaviour change with positive emotional association, it will override the positive association with the unsafe behaviours and result in change.

Only one of the studies in the body of research was a longitudinal study. This study measured the impact of fear appeals at the one month mark. It is unlikely that the response to a fear appeal is the same over a longer period of time. It may be that initial behaviour change will revert to pre-campaign levels (Smith, Ferguson et al., 2002) over a longer period. In addition, repeated exposure to fear appeals is the norm in the real world, thus a longitudinal study could be developed whereby repeated exposure to fear appeals is explored. Differing levels of information processing may occur over time, repetition may lead to oversaturation and tuning out of health messages, or repeated exposure may lead to a change in behaviour from short term to long term. It has been suggested that shallow processing can lead to attitude change however this is more long lasting with deeper processing (Petty & Cacioppo, 1986). This could be explored fully in future research.

The use of a health issue that is well known in the community may have impacted on the results. Australians are likely to have encountered fear appeals for familiar issues like sun exposure risks, prior to their involvement in the study. This is supported by the moderate levels of sun health knowledge reported in the study. This means however, that sun exposure graphic fear appeals may no longer have as great an impact. Therefore future research into fear



appeals may wish to compare the impact of familiar issues to those which are relatively unfamiliar to the general public.

Finally, as the qualitative study (study 3) was aimed at gaining a broader understanding of the underlying issues which may affect behaviour of individuals in relation to sun exposure, a qualitative approach with a main focus on exploring people's ideas about the use and impact of sun safety messages, is a potential area for future study.

### **Summary and Conclusions**

In summary, the current studies highlight the importance of considering the many factors which may affect behaviour change decisions. As past research in relation to sun exposure and protection has not investigated a comprehensive range of differing individual and cultural influence factors, the current research adds to the literature by demonstrating that individuals' behaviour choices are influenced by various normative factors. Fear appeals and health campaigns in general should consider the vital importance of these cultural and individual factors in predicting behaviour change and barriers to change. Specifically, sun exposure and protective behaviour has been shown to occur in situational contexts which are influenced by both cultural and individual factors.

Study 1 and 2 investigated one type of health campaign, fear appeals, which have been used increasingly in Australian health campaigns, in order to investigate information recall and negative arousal as factors possibly influencing behaviour change. Valuable insight has been gained into the amount of sun health behaviour knowledge in the Australian community, and the lack of effect that fear appeal imagery appears to have on health information recall and behaviour change. Further, it appears to show a lack of negative arousal in response to fear appeals. This has thrown into doubt the usefulness of fear appeal imagery shown in the study, with the campaigns appearing to act as a 'prompt' to enact simple behaviour change.

The research showed the need to consider differing aspects of cultural and social influences on sun exposure and behaviour change. It identified that behaviour is highly influenced by the value and meaning placed on tanning and sun exposure behaviour which appears to be embedded in the Australian cultural fabric. Thus a deeper understanding of the barriers to change has been gained. This means that these results have important implications

for improving targeting of future health campaigns, developing more effective behaviour change messages, and adding to the underlying theoretical models for behaviour.

The current research shows that a targeted approach is required in order to develop effective health campaigns directed towards at risk populations, such as deliberate adolescent tanners and women or older people who may feel that the damage has been done. It uncovered attitudes and beliefs which distinguish between groups who engage and who do not engage in sun protective practices. For example, men and women appear to have differing motivators and attitudes to deliberate tanning.

Overall, the body of research provided comprehensive approach to investigating health behaviour change, from fear appeals to examination of the role of Australian cultural norms. It appears that more research is needed in both fear appeals and general health campaigns to incorporate individual factors which influence behaviour. In the case of fear appeals, it seems that graphic imagery does not result in higher negative arousal or uptake of health messages thereby calling into question the need to use fear at all.

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**Appendix A: Study 1 Items and Materials**

- A.1 Information Sheet
- A.2 Consent Form
- A.3 Demographics and Sun Health Behaviour Questionnaire
- A.4 Health Knowledge Questionnaire
- A.5 Mild and Graphic Skin Cancer Images
- A.6 Skin Cancer Vulnerability Questionnaire
- A.7 Skin Cancer Susceptibility Questionnaire
- A.8 Information Recall Test

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**INFORMATION SHEET***The effect of health messages on risk perception and vulnerability*

Dear Participant

Our names are Michelle Brooks, Jacqueline Vaughan and Jane Wheatley. We are postgraduate and 4<sup>th</sup> year Honours students being supervised by Dr. Martin Johnson. We are conducting research into the effectiveness of the media in changing health behaviour.

WE would like you to participate in our research project. WE would be asking for about 20 minutes of time commitment from you. The project will be completed in one session. During this session, we will ask you to complete a demographics questionnaire and a knowledge questionnaire. This may be followed by a short presentation on possible consequences of unhealthy behaviour. You will then be asked to complete a number of short questionnaires. You will then be asked to complete another knowledge questionnaire.

Completion of the questionnaires is voluntary and all responses are confidential, individuals will not be identifiable. If the results are published, this will only be a summary of all responses so that your privacy will be protected.

Your studies will in no way be affected by your participation or non-participation. However, those who choose to participate will receive course credit. Should you choose to participate in this study we ask that you please complete the attached consent form. Please remember that your participation is voluntary and that you may choose to withdraw at any time without academic penalty.

Thank you for considering to participate in this study.

Please keep this information sheet. Any enquires about this study may be directed to Dr. Martin Johnson, School of Psychology, Faculty of Science and Information Technology, The University of Newcastle, telephone: 49218864

Dr Martin Johnson

Michelle Brooks

Jacqueline Vaughan

Jane Wheatley

---

Ethics approval number-H-551-0807 The University requires that all participants are informed that if they have any complaints concerning the manner in which a research project is conducted, it may be given to the researcher, or if an independent person is preferred, to the University's Human Research Ethics Officer, Research Branch, Chancellery, University of Newcastle, 2308, telephone: 02 4921 6333.

## A.2 Consent Form

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## CONSENT FORM

## The effect of the media on health behaviour.

I have been invited to participate in the research project being conducted by Michelle Brooks, Jacqueline Vaughan and Jane Wheatley under the supervision of Dr. Martin Johnson (School of Psychology). I have read the information sheet for this study and I consent to participate.

By signing this form, I agree that:

1. I am aware that all the information gathered would be used for research purposes only and that no identifying information will be collected.
2. I understand that only the researchers associated with this research will have access to the data collected and that the data will be stored in a locked cabinet for a period of 7 years.
3. I understand that my participation is voluntary and that I am free to withdraw at any time or decline to answer any questions that I choose. The studies that I am undertaking will not be affected by my participation or non-participation.
4. Questionnaires will be carried out as described in the information sheet, a copy of which I have retained.
5. I have had all my questions answered to my satisfaction.

Name: .....

Signature: ..... Date: ...../...../2007

Enquires about this study may be directed to Dr. Martin Johnson, School of Psychology, Faculty of Science and Information Technology, The University of Newcastle, telephone: 49218864

If you wish to receive a summary of the results of this research, please supply your name and address below. A summary will be sent to you on completion of this study

Name: .....

Address: .....

.....

Ethics approval number-H-551-0807 The University requires that all participants are informed that if they have any complaints concerning the manner in which a research project is conducted, it may be given to the researcher, or if an independent person is preferred, to the University's Human Research Ethics Officer, Research Branch, Chancellery, University of Newcastle, 2308, telephone: 02 4921 6333.

**A.3 Demographics and Sun Health Behaviour Questionnaire****DEMOGRAPHICS**

Thank you for your decision to participate in this study. All responses will be kept strictly confidential and your identity will remain unknown. Each participant will be allocated a number and your responses will be identified using only this number.

*Please indicate your response by circling the corresponding letter or providing a written answer to the question.*

1. Sex
  - a. Female
  - b. Male
  
2. In which year were you born? \_\_\_\_\_
  
3. In a normal working week, how many hours per day would you spend in the sun?  
\_\_\_\_\_
  
4. When on holidays, how many hours per day would you spend in the sun?  
\_\_\_\_\_
  
5. On a normal day, do you wear sunscreen?
  - a. Yes
  - b. No
  - c. Sometimes
  
6. When sunbathing, do you wear sunscreen?
  - a. Yes
  - b. No
  - c. Sometimes

**A.4 Health Knowledge Questionnaire**

## **Knowledge**

**Please answer by circling either Yes (Y) or No (N) for each question.**

- |  |          |
|--|----------|
| 1. Did you know that melanoma can occur on unblemished skin?   | Y      N |
| 2. Did you know that a personal family history of melanoma increases an individual's susceptibility to skin cancer?                                | Y      N |
| 3. Did you know that one in six children suffer from asthma?   | Y      N |
| 4. Did you know that persistent asthma could cause permanent narrowing of the airways resulting in reduced response to available treatments?       | Y      N |
| 5. Did you know that UVA rays, the type of light used in tanning beds, cause skin photo aging and can lead to wrinkles, age spots and skin cancer? | Y      N |
| 6. Did you know that five-year survival rates for the most common cancers affecting men (prostate) and women (breast) are now more than 80%?       | Y      N |



- |   |        |
|---|--------|
| 7. Did you know that a suntan increases pigment in your skin, offering a slight level of protection from sun (equal to SPF 3.5) but the damage that occurs in the process outweighs the benefits? | Y    N |
|   |        |
| 8. Did you know that smokers are more likely than non-smokers to become impotent or have difficulty in maintaining an erection in middle life?  | Y    N |
|   |        |
| 9. Did you know that if your shadow is shorter than you are, the sun's ultraviolet rays are at their most damaging?   | Y    N |
|   |        |
| 10. Did you know that smoking causes complications during pregnancy, including bleeding, detachment of the placenta, premature birth and ectopic pregnancy?                                       | Y    N |
|   |        |
| 11. Did you know that if the edges of a mole are jagged or uneven, it may be a sign that you are about to develop a melanoma?   | Y    N |
|   |        |
| 12. Did you know that cardiovascular disease are mainly caused by a damaged blood supply to the heart, brain, kidneys and legs, and share a number of risk factors?                               | Y    N |

**A.5 Mild and Graphic Skin Cancer Images**

Mild Images





Graphic Images





**A.6 Skin Cancer Vulnerability Questionnaire**

## Vulnerability Questionnaire

**Please circle the number that corresponds to the most appropriate response that describes your opinion.**

What importance do you place on the following things?

1. A lot
2. some
3. A little
4. None at all

- |   |   |   |   |   |
|---|---|---|---|---|
| 1. Staying out of the sun between 10am and 4pm?   | 1 | 2 | 3 | 4 |
| 2. Reapplying sunscreen every hour when in the sun?   | 1 | 2 | 3 | 4 |
| 3. Wearing sunscreen every day?   | 1 | 2 | 3 | 4 |
| 4. Wearing a hat when in the sun?   | 1 | 2 | 3 | 4 |
| 5. Regularly examining your own skin for changes?   | 1 | 2 | 3 | 4 |
| 6. Using SPF 15 or above on exposed skin when in the sun?   | 1 | 2 | 3 | 4 |
| 7. Talking to your doctor about any changes in your skin including<br>itching, swelling, reddening and feeling sore.    | 1 | 2 | 3 | 4 |
| 8. Having a professional skin check-up every 3 years between<br>the ages of 20-40yrs and every year after 40yrs of age? | 1 | 2 | 3 | 4 |

**A.7 Skin Cancer Susceptibility Questionnaire**

## Susceptibility Questionnaire

**Please circle the number that corresponds to the most appropriate response that describes your opinion.**

Compared to your friends, how often do you feel you do the following?

1. Much less
2. Less
3. More
4. Much more

- |   |   |   |   |   |
|---|---|---|---|---|
| 1. Stay out of the sun between 10am and 4pm?  | 1 | 2 | 3 | 4 |
| 2. Reapply sunscreen every hour when in the sun?  | 1 | 2 | 3 | 4 |
| 3. Wearing sunscreen every day?   | 1 | 2 | 3 | 4 |
| 4. Wearing a hat when in the sun?   | 1 | 2 | 3 | 4 |
| 5. Regularly examining your own skin for changes?   | 1 | 2 | 3 | 4 |
| 6. Using SPF 15 or above on exposed skin when in the sun?   | 1 | 2 | 3 | 4 |
| 7. Talk to your doctor about any changes in your skin including<br>itching, swelling, reddening and feeling sore.     | 1 | 2 | 3 | 4 |
| 8. Have a professional skin check-up every 3 years between<br>the ages of 20-40yrs and every year after 40yrs of age? | 1 | 2 | 3 | 4 |

**A.8 Information Recall Test**

## **Health Questionnaire**

**Please circle the letter that corresponds to the correct response**

1. Melanoma
  - a. Is always lethal
  - b. Can occur on unblemished skin
  - c. Only occurs on fair skinned people
  - d. Is not a form of skin cancer
2. A personal history of melanoma \_\_\_\_\_ an individual's susceptibility to cancer?
  - a. Increase
  - b. Decreases
  - c. Does not effect
  - d. Don't know
3. How many children suffer from asthma?
  - a. 1 in 2
  - b. 1 in 6
  - c. 2 in 5
  - d. 3 in 9
4. Persistent asthma may cause ...
  - a. Narrowing of the airways
  - b. Stunting of growth
  - c. Lung cancer
  - d. Pneumonia



5. UVA rays

- a. Do not affect your skin
- b. Cause photo aging and can lead to skin cancer
- c. Give you a tan without damaging your skin
- d. Do not cause wrinkles and age spots

6. Five-year survival rates for the most common cancers affecting men (prostate) and women (breast) are now more than .....

- a. 30%
- b. 50%
- c. 80%
- d. 95%

7. Having a sun tan

- a. Protects you from skin cancer
- b. Does not protect you from skin cancer
- c. Is the equivalent of an SPF 15
- d. Increases the pigment in your skin and offers a slight level of protection

8. Male smokers are more likely than non-smokers to experience ...

- a. Premature ejaculation
- b. Baldness
- c. Intolerance to alcohol
- d. Impotence

9. If your shadow is \_\_\_\_\_, the sun's ultraviolet rays are at their most dangerous

- a. To the left of you
- b. Shorter than you
- c. Longer than you
- d. To the right of you

10. In the space below, please list four complications related to smoking and pregnancy

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_
- d. \_\_\_\_\_

11. A sign that you are about to develop a melanoma may be

- a. Ragged or uneven edges on a mole
- b. A mole becoming smaller
- c. There is no way of knowing if you are about to develop a melanoma
- d. The mole becomes symmetric

12. Please list the four main causes of cardiovascular disease

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_
- d. \_\_\_\_\_

**Appendix B: Study 2 Items and Materials**

- B.1 Information Sheet – General Public and Students
- B.2 Consent Form – General Public and Students
- B.3 Demographics and Health Behaviour Questionnaire
- B.4 Health Knowledge Questionnaire
- B.5 Benign Images
- B.6 Vulnerability Questionnaire
- B.7 Susceptibility Questionnaire
- B.8 Information Recall Test

## B.1 Information Sheet – General Public and Student

**FACULTY OF SCIENCE AND  
INFORMATION TECHNOLOGY**



### **INFORMATION STATEMENT** (version 5 general public) *The effect of the media on health behaviour*

You are invited to participate in the research project identified above. The research is part of Jane Wheatley's Professional Doctorate in Clinical and Health Psychology and Nathan Beehag, Lee Harrison and Jay Richard's Honours studies at the University of Newcastle supervised by Rev Dr. Martin Johnson from the School of Psychology.

#### **Why is the research being done?**

The purpose of the research is to examine the effectiveness of the media in changing health behaviour.

#### **Who can participate in the research?**

We are looking for volunteers aged over 18 years of age.

#### **What will you be asked to do?**

This study has two parts

The first part involves you coming to AVLG 20 in the Aviation Building; there you will be asked to complete a demographics questionnaire and a knowledge questionnaire regarding a number of health issues. This will be followed by a short presentation of images or a text. This may focus on possible consequences of unhealthy behaviour or may have no relevance to health; in this case the images and text will have landscapes as the focus. You will then be asked to complete a number of short questionnaires and an additional knowledge questionnaire.

If you agree to continue your participation; in the second part of the research this will consist of a postal survey one month following Part 1. For this we will send you a second version of the questionnaires that you completed in Part 1 of the research. This is to see if there have been any changes since your participation in Part 1. This code will appear on the front cover of the questionnaires. Only you and the researcher will have access to the code and it will only be used to help us to know that Part 1 and Part 2 questionnaires belong to the same person.

#### **How much time will it take?**

For the first part of the research we will be asking for a twenty minutes of time commitment from you.

Part two should take a maximum of 10 minutes.

#### **What are the risks and benefits of participating?**

Participating in this study will allow you to contribute to the increase of knowledge about the effects of the media on health behaviour and in the future, affect the effectiveness of health campaigns in the wider community. Although there are no known risks in participating in this type of research, participants can potentially find some questionnaires regarding health distressing as they may raise issues about your

own health status. If you are concerned about any of the health issues raised in this study, please contact your local GP. If you feel distressed at any time during the study please remember that you are able to withdraw at any time; also you can contact Lifeline 131114.

**How will your privacy be protected?**

Any information collected by the researchers will be stored securely and only accessed by the researchers unless you consent otherwise. The rating sheets are anonymous and it will not be possible to identify you from your answers.

Data will be retained for at least 5 years at the University of Newcastle. Confidentiality of your data will be ensured by assigning each participant a number at the outset of the experiment. This will be placed on all of your response sheets so we can match your two responses up. The number list will be stored separately from the response sheets and data will be discarded at the completion of the study.

**How will the information collected be used?**

The data collected may be presented at academic conferences and may also be used as part of a paper published in a scientific journal, but your anonymity will be preserved at all times and only aggregated data will be reported.

You will have the option of leaving your email address with the researcher if you would like to be provided with a brief overview of the results of the study once it is complete.

**What choice do you have?**

Participation in this research is voluntary. Only those people who give their informed consent will be included in the project. If you do decide to participate, you may withdraw from the project at any time without giving a reason and have the option of withdrawing any data, which may identify you.

**What do you need to do to participate?**

If having read this Information Statement you would like to participate please read and complete the Consent Form. If there is anything you do not understand, or you have questions, please ask the research for clarification

Thank you for considering participating in this study. If you are interested in participating or would like further information please contact Jane Wheatley on [Jane.Wheatley@studentmail.newcastle.edu.au](mailto:Jane.Wheatley@studentmail.newcastle.edu.au)

**Rev Dr Martin P. Johnson**  
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**Lee Harrison**  
Honours Student

**Jay Richards**  
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**Nathan Beehag**  
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*Complaints about this research:* This project has been approved by the University's Human Research Ethics Committee, Approval No. H-5510807. Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to the researcher, or, if an independent person is preferred, to the Human Research Ethics Officer, Research Office, The Chancellor, The University of Newcastle, University Drive, Callaghan NSW 2308, Australia, telephone (02) 49216333, email [Human-Ethics@newcastle.edu.au](mailto:Human-Ethics@newcastle.edu.au)

**FACULTY OF SCIENCE AND  
INFORMATION TECHNOLOGY**



**INFORMATION STATEMENT** (version 5 student)  
*The effect of the media on health behaviour*

You are invited to participate in the research project identified above. The research is part of Jane Wheatley's Professional Doctorate in Clinical and Health Psychology and Nathan Beehag, Lee Harrison and Jay Richard's Honours studies at the University of Newcastle supervised by Rev Dr. Martin Johnson from the School of Psychology.

**Why is the research being done?**

The purpose of the research is to examine the effectiveness of the media in changing health behaviour.

**Who can participate in the research?**

We are looking for volunteers aged over 18 years of age.

**What will you be asked to do?**

This study has two parts

The first part involves you coming to AVLG 20 in the Aviation Building; there you will be asked to complete a demographics questionnaire and a knowledge questionnaire regarding a number of health issues. This will be followed by a short presentation of images or a text. This may focus on possible consequences of unhealthy behaviour or may have no relevance to health; in this case the images and text will have landscapes as the focus. You will then be asked to complete a number of short questionnaires and an additional knowledge questionnaire.

If you agree to continue your participation; in the second part of the research this will consist of a postal survey one month following Part 1. For this we will send you a second version of the questionnaires that you completed in Part 1 of the research. This is to see if there have been any changes since your participation in Part 1. This code will appear on the front cover of the questionnaires. Only you and the researcher will have access to the code and it will only be used to help us to know that Part 1 and Part 2 questionnaires belong to the same person.

**How much time will it take?**

For the first part of the research we will be asking for a twenty minutes of time commitment from you.

Part two should take a maximum of 10 minutes.

**What are the risks and benefits of participating?**

The benefit of completing this research is the attainment of applicable course credit for PSYC 1010/1020. You will also gain first hand experience of research approaches and methods used in psychology. Although there are no known risks in participating in this type of research, participants can potentially find some questionnaires regarding health distressing as they may raise issues about your

own health status. If you are concerned about any of the health issues raised in this study, please contact your local GP. If you feel distressed at any time during the study please remember that you are able to withdraw at any time; also you can contact the University Counselling Service on 49215801 or Lifeline 131114.

**How will your privacy be protected?**

Any information collected by the researchers will be stored securely and only accessed by the researchers unless you consent otherwise. The rating sheets are anonymous and it will not be possible to identify you from your answers.

Data will be retained for at least 5 years at the University of Newcastle. Confidentiality of your data will be ensured by assigning each participant a number at the outset of the experiment. This will be placed on all of your response sheets so we can match your two responses up. The number list will be stored separately from the response sheets and data will be discarded at the completion of the study.

**How will the information collected be used?**

The data collected may be presented at academic conferences and may also be used as part of a paper published in a scientific journal, but your anonymity will be preserved at all times and only aggregated data will be reported.

You will have the option of leaving your email address with the researcher if you would like to be provided with a brief overview of the results of the study once it is complete.

**What choice do you have?**

Participation in this research is voluntary. Only those people who give their informed consent will be included in the project. If you do decide to participate, you may withdraw from the project at any time without giving a reason and have the option of withdrawing any data, which may identify you.

**What do you need to do to participate?**

If having read this Information Statement you would like to participate please read and complete the Consent Form. If there is anything you do not understand, or you have questions, please ask the research for clarification

Thank you for considering participating in this study. If you are interested in participating or would like further information please contact Jane Wheatley on [Jane.Wheatley@studentmail.newcastle.edu.au](mailto:Jane.Wheatley@studentmail.newcastle.edu.au)

**Rev Dr Martin P. Johnson**

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**Jane Wheatley**

Intern Psychologist

**Lee Harrison**

Honours Student

**Jay Richards**

Honours Student

**Nathan Beehag**

Honours Student

*Complaints about this research:* This project has been approved by the University's Human Research Ethics Committee, Approval No. H-5510807. Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to the researcher, or, if an independent person is preferred, to the Human Research Ethics Officer, Research Office, The Chancellor, The University of Newcastle, University Drive, Callaghan NSW 2308, Australia, telephone (02) 49216333, email [Human-Ethics@newcastle.edu.au](mailto:Human-Ethics@newcastle.edu.au)



**B.2 Consent Form – General Public and Student**

**FACULTY OF SCIENCE AND  
INFORMATION TECHNOLOGY**



ID \_\_\_\_\_

**CONSENT FORM****The effect of the media on health behaviour.**

I have been invited to participate in the research project being conducted by Jane Wheatley, Nathan Beehag, Lee Harrison and Jay Richards under the supervision of Rev Dr. Martin Johnson (School of Psychology). I have read the information sheet for this study and I consent to participate.

By signing this form, I agree that:

1. I am aware that all the information gathered would be used for research purposes only. I understand that my personal information will remain confidential to the researchers.
2. I understand that only the researchers associated with this research will have access to the data collected and that the data will be stored in a locked cabinet for a period of 5 years.
3. I understand that my participation is voluntary and that I am free to withdraw at any time or decline to answer any questions that I choose.
4. Questionnaires will be carried out as described in the information sheet, a copy of which I have retained.
5. I understand I will be viewing a short presentation as described in the information sheet.
6. I have had all my questions answered to my satisfaction.

Name: .....

Signature: ..... Date: ...../...../2009

Enquiries about this study may be directed to Rev Dr. Martin Johnson, School of Psychology, Faculty of Science and Information Technology, The University of Newcastle, telephone: 49218864 or [Martin.Johnson@newcastle.edu.au](mailto:Martin.Johnson@newcastle.edu.au).

In order for us to send you the one-month follow-up questionnaires by mail, please supply your name and address below:

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

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

☐ Please ☒ if you wish to receive a summary of the results of this research.

**Complaints about this research:** This project has been approved by the University's Human Research Ethics Committee, Approval No. H-5510807. Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to the researcher, or, if an independent person is preferred, to the Human Research Ethics Officer, Research Office, The Chancellery, The University of Newcastle, University Drive, Callaghan NSW 2308, Australia, telephone (02) 49216333, email [Human-Ethics@newcastle.edu.au](mailto:Human-Ethics@newcastle.edu.au)



**FACULTY OF SCIENCE AND  
INFORMATION TECHNOLOGY**



ID \_\_\_\_\_

**CONSENT FORM**

**The effect of the media on health behaviour.**

I have been invited to participate in the research project being conducted by Jane Wheatley, Nathan Beehag, Lee Harrison and Jay Richards under the supervision of Rev Dr. Martin Johnson (School of Psychology). I have read the information sheet for this study and I consent to participate.

By signing this form, I agree that:

1. I am aware that all the information gathered would be used for research purposes only. I understand that my personal information will remain confidential to the researchers.
2. I understand that only the researchers associated with this research will have access to the data collected and that the data will be stored in a locked cabinet for a period of 5 years.
3. I understand that my participation is voluntary and that I am free to withdraw at any time or decline to answer any questions that I choose. The studies that I am undertaking will not be affected by my participation or non-participation.
4. Questionnaires will be carried out as described in the information sheet, a copy of which I have retained.
5. I understand I will be viewing a short presentation as described in the information sheet.
6. I have had all my questions answered to my satisfaction.

Name: .....

Signature: ..... Date: ...../...../2009

Enquiries about this study may be directed to Rev Dr. Martin Johnson, School of Psychology, Faculty of Science and Information Technology, The University of Newcastle, telephone: 49218864 or [Martin.Johnson@newcastle.edu.au](mailto:Martin.Johnson@newcastle.edu.au).

In order for us to send you the one-month follow-up questionnaires by mail, please supply your name and address below:

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

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

☐ Please ☒ if you wish to receive a summary of the results of this research.

**Complaints about this research:** This project has been approved by the University's Human Research Ethics Committee, Approval No. H-5510807. Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to the researcher, or, if an independent person is preferred, to the Human Research Ethics Officer, Research Office, The Chancellery, The University of Newcastle, University Drive, Callaghan NSW 2308, Australia, telephone (02) 49216333, email [Human-Ethics@newcastle.edu.au](mailto:Human-Ethics@newcastle.edu.au)

**B.3 Demographics and Health Behaviour Questionnaire****DEMOGRAPHICS QUESTIONNAIRE**

*Please read each question and indicate your response by ticking the corresponding box or providing a written answer in the space provided.*

1. Sex ☐ Female ☐ Male (please specify)
2. In which year were you born \_\_\_\_ (please specify)
3. In your occupation, do you mainly work: indoors ☐ outdoors ☐ (please specify)
4. In a normal week, on average, how many hours per day would you spend in the sun? \_\_ (please specify)
5. On a normal weekend, on average, how many hours per day would you spend in the sun? \_\_ (please specify)
6. When on holidays, on average, how many hours per day would you spend in the sun? \_\_ (please specify)
7. Below are a number of statements regarding individual's behaviour while outside in the Sun in a normal week. Please read each statement and then circle the response that *best* describes what you normally do. There are no right or wrong answers.

When outdoors in everyday activity do you...	Never	Less than 50% of time outdoors	More than 50% of time outdoors	All of the time outdoors
Apply sunscreen	1	2	3	4
Wear a hat	1	2	3	4
Wear long sleeved clothing	1	2	3	4
Try to stay in the shade	1	2	3	4
Try to stay out of the sun between 10am-2pm	1	2	3	4

*Please continue overleaf*

8. Below are a number of statements regarding individual's behaviour while outside in the Sun while on holiday. Please read each statement and then circle the response that *best* describes what you normally do. There are no right or wrong answers.

When outdoors on holiday do you...	Never	Less than 50% of time outdoors	More than 50% of time outdoors	All of the time outdoors
Apply sunscreen	1	2	3	4
Wear a hat	1	2	3	4
Wear long sleeved clothing	1	2	3	4
Try to stay in the shade	1	2	3	4
Try to stay out of the sun between 10am-2pm	1	2	3	4

9. Below are things some people do to check their skin. Please read each statement and then circle the response that *best* describes what you normally do. There are no right or wrong answers.

How often do you...	Regularly (once every 6-12 months)	Irregularly (less than every 6-12 months)	Never
Check whole body for skin changes (self check)	1	2	3
Monitor specific moles (self check)	1	2	3
Have whole body mole check (doctor)	1	2	3
Visit Cancer Council Clinic	1	2	3

The following questions ask in regard to smoking behaviour.

10. Do you smoke or use tobacco products?

☐ Yes (please go to question 11)      ☐ No (please go to question 18)

11. Which of the following tobacco products do you use: (✓ all that apply)

☐ Cigarettes      ☐ Cigars      ☐ Pipe

☐ Chewing tobacco      ☐ Snuff      ☐ Other: \_\_\_\_\_ (please specify)

*Please continue overleaf*

12. How many/much ...  
 Cigarettes do you smoke per day? \_\_\_\_\_ (please specify)  
 Cigars do you smoke per day? \_\_\_\_\_ (please specify)  
 Pipe tobacco do you smoke per day? \_\_\_\_\_ (please specify)  
 Chewing tobacco do you use per day? \_\_\_\_\_ (please specify)  
 Snuff do you use per day? \_\_\_\_\_ (please specify)  
 Other do you smoke/use per day? \_\_\_\_\_ (please specify)
13. In the home in which you grew up, did anyone else smoke?  
☐ Yes (please go to question 14)      ☐ No (please go to question 15)
14. Who smoked?  
☐ Father   ☐ Mother   ☐ Brother   ☐ Sister   ☐ Other : \_\_\_\_\_ (Please specify) (✓ all that apply)
15. At what age did you start smoking? \_\_\_\_\_ (Please specify)
16. Have you ever tried to quit smoking?  
☐ Yes (please go to question 17)      ☐ No (please go to question 25)
17. What is the longest time you have ever quit for? \_\_\_ months (please go to question 25)
18. Have you ever smoked or used tobacco products?  
☐ Yes (please go to question 19)      ☐ No (please go to question 25)
19. Which of the following tobacco products did you use: (✓ all that apply)
- ☐ Cigarettes      ☐ Cigars      ☐ Pipe
- ☐ Chewing tobacco      ☐ Snuff      ☐ Other: \_\_\_\_\_ (please specify)

*Please continue overleaf*

20. How many/much ...  
 Cigarettes did you smoke per day? \_\_\_\_\_ (please specify)  
 Cigars did you smoke per day? \_\_\_\_\_ (please specify)  
 Pipe tobacco did you smoke per day? \_\_\_\_\_ (please specify)  
 Chewing tobacco did you use per day? \_\_\_\_\_ (please specify)  
 Snuff did you use per day? \_\_\_\_\_ (please specify)  
 Other did you smoke/use per day? \_\_\_\_\_ (please specify)
21. In the home in which you grew up, did anyone else smoke?  
☐ Yes (please go to question 22)      ☐ No (please go to question 23)
22. Who smoked? (please ✓ all that apply)  
☐ Father   ☐ Mother   ☐ Brother   ☐ Sister   ☐ Other : \_\_\_\_\_ (Please specify)
23. At what age did you start smoking? \_\_\_\_\_ (Please specify)
24. What age did you stop smoking? \_\_\_\_\_ (Please specify)

**The following questions ask about behaviours associated with breast cancer.**

25. Have you ever performed breast self-examination?  
☐ Yes (please go to question 26)      ☐ No (please go to question 28)
26. How many times per year do you perform breast self-examination? \_\_\_\_\_ (Please specify)
27. Have you or anyone else ever found a lump in your breast?  
☐ Yes                      ☐ No
28. Have you ever had a mammogram (Breast Scan)?  
☐ Yes (please go to question 29)      ☐ No (please go to question 32)

*Please continue overleaf*

29. How many mammograms (Breast Scan) have you had? \_\_\_\_\_ (please specify)
30. How often do you have mammograms (Breast Scan)? Every \_\_ years (please specify)
31. Have you ever been diagnosed with breast cancer? ☐Yes ☐No
32. Do you have a family history of breast cancer? ☐Yes ☐No ☐Unsure

**B.4 Health Knowledge Questionnaire****Knowledge Questionnaire**

Please read each statement below and then answer by circling either Yes (Y) or No (N) for each question.

- |   |   |   |
|---|---|---|
| 1. Did you know that melanoma can occur on unblemished skin?  | Y | N |
| 2. Did you know that a personal family history of melanoma increases an individual's susceptibility to skin cancer?   | Y | N |
| 3. Did you know that one in six children suffer from asthma?  | Y | N |
| 4. Did you know that persistent asthma could cause permanent narrowing of the airways resulting in reduced response to available treatments?  | Y | N |
| 5. Did you know that UVA rays, the type of light used in tanning beds, cause skin photo aging and can lead to wrinkles, age spots and skin cancer?  | Y | N |
| 6. Did you know that five-year survival rates for the most common cancers affecting men (prostate) and women (breast) are now more than 80%?  | Y | N |
| 7. Did you know that a suntan increases pigment in your skin, offering a slight level of protection from sun (equal to SPF 3.5) but the damage that occurs in the process outweighs the benefits? | Y | N |
| 8. Did you know that smokers are more likely than non-smokers to become impotent or have difficulty in maintaining an erection in middle life?  | Y | N |

Please continue overleaf...

- |   |   |   |
|---|---|---|
| 9. Did you know that if your shadow is shorter than you are, the sun's ultraviolet rays are at their most damaging?   | Y | N |
| 10. Did you know that smoking causes complications during pregnancy, including bleeding, detachment of the placenta, premature birth and ectopic pregnancy?         | Y | N |
| 11. Did you know that if the edges of a mole are jagged or uneven, it may be a sign that you are about to develop a melanoma?                                       | Y | N |
| 12. Did you know that cardiovascular disease are mainly caused by a damaged blood supply to the heart, brain, kidneys and legs, and share a number of risk factors? | Y | N |
| 13. Did you know that smoking is the cause of up to 90% of lung cancer?   | Y | N |
| 14. Did you know that lung cancer is unusual under the age of 40?   | Y | N |
| 15. Did you know that its recommended that women over 50 years of age should have a mammogram every 2 years?  | Y | N |
| 16. Did you know that there are two main types of lung cancer – small cell lung cancer and non-small cell lung cancer?  | Y | N |
| 17. Did you know that lung cancer is the third most common cancer in men and fifth most common cancer in women?   | Y | N |
| 18. Did you know that researchers have found a link between passive smoking and lung cancer?  | Y | N |

Please continue overleaf...



19. Did you know that the main symptoms of lung cancer include a new or altered cough, chest pain, breathlessness and coughing up blood?	Y	N
20. Did you know that a family history is a factor in less than 10% of cases of breast cancer?	Y	N
21. Did you know that around 1 in 8 breast cancers may be attributable to alcohol consumption?	Y	N
22. Did you know that women aged 50 or older have a greater risk of breast cancer if they are overweight or obese?	Y	N
23. Did you know that vigorous exercise when you're young may provide lifelong protection against breast cancer?	Y	N
24. Did you know that changes to the nipple or breast, such as change in shape, crusting, redness or a newly inverting nipple should be investigated by a doctor	Y	N

**B.5 Benign Images (Control Group Presentation)**





**B.6 Vulnerability Questionnaire****Vulnerability Questionnaire**

Using the scale below, please indicate *the extent to which you agree with the following statements* by circling the number that corresponds to the most appropriate response that describes your opinion.

Scale:

1. Not at all
2. A little
3. Some
4. A lot

- |  |         |
|--|---------|
| 1. I should abstain from smoking   | 1 2 3 4 |
| 2. You should talk to your doctor about any changes in your skin including itching, swelling, reddening and feeling sore.            | 1 2 3 4 |
| 3. I should have regular medical checkups  | 1 2 3 4 |
| 4. It is important to wear a hat when in the sun   | 1 2 3 4 |
| 5. It is important to visit the GP if I notice any changes in my health  | 1 2 3 4 |
| 6. Using SPF 15 or above on exposed skin when in the sun is important  | 1 2 3 4 |
| 7. I avoid being around people who smoke in my family  | 1 2 3 4 |
| 8. Talking to your doctor about any changes in your breast Including itching, shape change, reddening and feeling sore is important. | 1 2 3 4 |

*Please continue overleaf*

- |  |         |
|--|---------|
| 9. It is important to investigate any chest pain   | 1 2 3 4 |
| 10. Reapplying sunscreen every hour when in the sun is important   | 1 2 3 4 |
| 11. I gather information about how to look after my health   | 1 2 3 4 |
| 12. I know how my breasts feel and look normally   | 1 2 3 4 |
| 13. There is a need to wear sunscreen every day  | 1 2 3 4 |
| 14. I do regular breast self-examinations  | 1 2 3 4 |
| 15. You should stay out of the sun between 10am and 4pm  | 1 2 3 4 |
| 16. I avoid being around people who smoke socially   | 1 2 3 4 |
| 17. Having regular breast examinations by a doctor is important  | 1 2 3 4 |
| 18. I limit my alcohol intake to 1 standard drink a day  | 1 2 3 4 |
| 19. You should regularly examine your own skin for changes   | 1 2 3 4 |
| 20. I participate in regular exercise to maintain good health  | 1 2 3 4 |
| 21. Everyone should have a professional skin check-up every 3 years<br>between the ages of 20-40yrs and every year after 40yrs<br>of age?    | 1 2 3 4 |
| 22. Talking to your doctor about any changes in your<br>breathing including coughing, or shortness of breath<br>when exercising is important | 1 2 3 4 |
| 23. Everyone woman should have regular mammograms<br>every two years after age 50  | 1 2 3 4 |

*Please continue overleaf*

**B.7 Susceptibility Questionnaire****Susceptibility Questionnaire**

Please circle the number that corresponds to the most appropriate response that describes your opinion using the scale below.

*Compared to your friends, how often do you feel you do the following?*

1. Much less
2. Less
3. More
4. Much more

- |  |               |
|--|---------------|
| 1. Have regular medical checkups?  | 1   2   3   4 |
| 2. Regularly examine your own skin for changes?  | 1   2   3   4 |
| 3. Visit the GP if I notice any changes in my health?  | 1   2   3   4 |
| 4. Stay out of the sun between 10am and 4pm?   | 1   2   3   4 |
| 5. Avoid being around people who smoke in the family?  | 1   2   3   4 |
| 6. Talk to your doctor about any changes in your skin including itching, swelling, reddening and feeling sore.                             | 1   2   3   4 |
| 7. Avoid being around people smoking socially?   | 1   2   3   4 |
| 8. Investigate any chest pain?   | 1   2   3   4 |
| 9. Use SPF 15 or above on exposed skin when in the sun?  | 1   2   3   4 |
| 10. Talk to the doctor about any changes in your breathing including coughing, shortness of breath or shortness of breath when exercising? | 1   2   3   4 |

*Please continue overleaf*

11. Gather information about how to look after my health?	1	2	3	4
12. Know how your/their breasts feel and look normally?	1	2	3	4
13. Have a professional skin check-up every 3 years between the ages of 20-40yrs and every year after 40yrs of age?	1	2	3	4
14. Do regular breast self-examinations?	1	2	3	4
15. Wear sunscreen every day?	1	2	3	4
16. Have regular breast examinations by a doctor?	1	2	3	4
17. Limit alcohol to 1 standard drink a day?	1	2	3	4
18. Wear a hat when in the sun?	1	2	3	4
19. Abstain from smoking?	1	2	3	4
20. Participate in regular exercise to maintain good health?	1	2	3	4
21. Have a professional skin check-up every 3 years between?	1	2	3	4
22. Talk to your doctor about any changes in your breast Including itching, shape change, reddening and feeling sore?	1	2	3	4
23. Have preventative diagnostic tests such as scans/Xrays?	1	2	3	4



## B.8 Information Recall Test

### Health Knowledge Questionnaire

Please read each statement below and then circle the letter that corresponds to the correct response

1. Melanoma
  - a. Is always lethal
  - b. Can occur on unblemished skin
  - c. Only occurs on fair skinned people
  - d. Is not a form of skin cancer
  
2. A personal history of melanoma \_\_\_\_\_ an individual's susceptibility to cancer?
  - a. Increases
  - b. Decreases
  - c. Does not effect
  - d. Don't know
  
3. How many children suffer from asthma?
  - a. 1 in 2
  - b. 1 in 6
  - c. 2 in 5
  - d. 3 in 9
  
4. Persistent asthma may cause ...
  - a. Narrowing of the airways
  - b. Stunting of growth
  - c. Lung cancer
  - d. Pneumonia
  
5. UVA rays
  - a. Do not affect your skin
  - b. Cause photo aging and can lead to skin cancer
  - c. Give you a tan without damaging your skin
  - d. Do not cause wrinkles and age spots

*Please continue overleaf...*



6. Five-year survival rates for the most common cancers affecting men (prostate) and women (breast) are now more than ...

- a. 30%
- b. 50%
- c. 80%
- d. 95%

7. Having a sun tan

- a. Protects you from skin cancer
- b. Does not protect you from skin cancer
- c. Is the equivalent of an SPF 15
- d. Increases the pigment in your skin and offers a slight level of protection

8. Male smokers are more likely than non-smokers to experience

- a. Premature ejaculation
- b. Baldness
- c. Intolerance to alcohol
- d. Impotence

9. If your shadow is \_\_\_\_\_, the sun's ultraviolet rays are at their most dangerous

- a. To the left of you
- b. Shorter than you
- c. Longer than you
- d. To the right of you

10. In the space below, please list four complications related to smoking and pregnancy

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_
- d. \_\_\_\_\_

*Please continue overleaf...*

11. A sign that you are about to develop a melanoma may be
- Ragged or uneven edges on a mole
  - A mole becoming smaller
  - There is no way of knowing if you are about to develop a melanoma
  - The mole becomes symmetric
12. Please list the four main areas of damage to blood supply by cardiovascular disease
- \_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_
13. Skin Cancer
- Is always lethal
  - Is the cause of less than 50% of cases of lung cancer
  - Is the cause of up to 90% of cases of lung cancer
  - Is the cause of all cases of lung cancer
14. Lung cancer is unusual in people
- Who are exposed to passive smoke
  - Who are ex-smokers
  - Who are over 75 years old
  - Who are under 40 years old
15. How often should women over 50 years old have a mammogram?
- Never
  - Once
  - Once every year
  - Once every two years

*Please continue overleaf...*

16. The two main types of lung cancer are....
- Primary and secondary lung cancer
  - Central and peripheral lung cancer
  - Small cell and non-small cell lung cancer
  - Local cell and foreign cell lung cancer
17. How common is lung cancer?
- 5<sup>th</sup> most common in men and 3<sup>rd</sup> most common in women
  - Most common in both men and women
  - 3<sup>rd</sup> most common in men and 5<sup>th</sup> most common in women
  - 4<sup>th</sup> most common in men and 4<sup>th</sup> most common in women
18. It is known that passive smoking...
- Has no impact on developing lung cancer
  - Always causes lung cancer
  - Is linked to lung cancer
  - Has no impact on health
19. Please list the four main symptoms that may indicate lung cancer
- \_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_
20. A family history of breast cancer accounts for \_\_\_\_\_ of cases?
- 100%
  - More than 50%
  - Less than 10%
  - An unknown number

*Please continue overleaf...*

21. Alcohol consumption may account for \_\_\_\_\_ breast cancers
- a. 1 in 4
  - b. 1 in 25
  - c. 1 in 8
  - d. 1 in 10
22. Women aged 50+ have a greater risk of cancer if they are ...
- a. Obese
  - b. Underweight
  - c. Intolerant to alcohol
  - d. Stocky
23. When you are young \_\_\_\_\_ may provide protection from breast cancer
- a. Eating green vegetables
  - b. Being slightly overweight
  - c. exercising
  - d. Being slightly underweight
24. Please list four breast changes that should be investigated by a doctor.
- a. \_\_\_\_\_
  - b. \_\_\_\_\_
  - c. \_\_\_\_\_
  - d. \_\_\_\_\_

**Appendix C: Study 3 Items and Materials**

- C.1 Information Sheet
- C.2 Consent Form
- C.3 Semi-structured Interview Schedule
- C.4 Superordinate and Subordinate List

## C.1 Information Sheet

**Dr Martin P. Johnson**  
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### GENERAL INFORMATION SHEET

#### Attitudes and Behaviours Relating to Sun Care and Skin Cancer

##### *What is the purpose of the study?*

The aim of this study is to investigate beliefs, attitudes and behaviours of people in relation to sun care, sun smart knowledge and skin cancer.

##### *What will I be expected to do if I take part?*

If you decide to be interviewed, the interviews will take place in the School of Psychology at the University of Newcastle. It is anticipated that interviews will last approximately 1 hour, but this duration time may vary depending on how much individual participants have to say. The interviewer will have a series of questions as prompts to help lead you through a discussion about your beliefs, attitudes and behaviours in relation to sun care, sun smart knowledge and skin cancer.

At the beginning of the interview the researcher will ask if she can record the interview. Then again at the end of the interview she will ask if you agree to the content of the interview being used, if not the recording will be erased.

##### *How will the information I give be used?*

Verbatim transcripts of the interviews will be produced for analysis. As part of this process, any identifiers such as names will be removed. The results from the information you supply will be used to help us gain a fuller picture of individual beliefs, attitudes and behaviours in relation to sun care, sun smart knowledge and skin cancer. In the write up of the research extract of transcripts may be used to illustrate general points common across interviews. No one will be able to recognise your identity in any report or related publication based on the results of the study, except perhaps yourself.

All information that you will provide us with during the course of the study will be kept confidential. Following the end of the study your individual recordings will be destroyed. Transcripts of the interviews will be stored for a period of five years to satisfy research requirements. To protect your privacy the following measures will be taken to ensure that no one, apart from the researchers, has access to your identity:

- Your name will not appear on any recorded material.
  - Your name will not be used in the analysis or writing up of the findings derived from the research.
  - Your recorded interview and transcript will be kept in a safe locked cabinet and will only be reviewed by the researchers.
  - All information supplied will be kept confidential.
- Following completion of this part of the study a summary can be sent to you if you wish.

##### *What are the possible disadvantages and risks of taking part?*

There are very low risks for individuals who have participated in similar studies, however talking about health may be distressing for you. Should you feel anxious, or distressed at any time during the interview you are free to stop the interview at anytime. If you need to talk about the topics raised there are a number of avenues open to you. Lifeline can be contacted on, 131114 additionally the University Counselling service is available the Service is located in the Hunter Building and can be contacted via: Telephone: (02) 4921 5801 or Email: [counselling@newcastle.edu.au](mailto:counselling@newcastle.edu.au). Further if your participation raises any issues regarding your own risk to skin cancer this should be discussed with your medical practitioners

You should remember that your participation is entirely voluntary and that you are not forced to answer questions that might create discomfort to you. You are free to withdraw your participation at any time during the course of the research without any penalty.

##### **Contacts for further information**

If there is anything that is not clear to you or you would like further information regarding any aspect of the study and your involvement in it, please feel free to contact Dr Martin Johnson his contact details are at the top of this page.

Catherine Wroe

Jane Wheatley

Martin Johnson

Ethics approval no-H-483-0507 The University requires that all participants are informed that if they have any complaints concerning the manner in which a research project is conducted, it may be given to the researcher, or if an independent person is preferred, to the University's Human Research Ethics Officer, Research Branch, Chancellery, University of Newcastle, 2308, telephone 4921 6333.

## C.2 Consent Form

**Dr Martin P. Johnson**  
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### CONSENT FORM

#### Attitudes and Behaviours Relating to Sun Care and Skin Cancer.

I have been invited to participate in the research project being conducted by Catherine Wroe (Honours Student) and Jane Wheatley (Postgraduate Student) under the supervision of Dr. Martin Johnson (School of Psychology). I have read the information sheet for this study and I consent to participate.

#### CONSENT TO RECORDED INTERVIEW FORM

*Please tick each of the following points as applicable:*

- ☐ I confirm that I have read and understand the information sheet for the above study and have had the opportunity to ask questions.
- ☐ I am aware that the interview will be recorded and that verbatim transcripts will be produced from recording
- ☐ I understand that in the write up of the research extract of transcripts may be used to illustrate general points common across interviews.
- ☐ I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason and the tape/transcript will be destroyed if I wish not to continue my participation.
- ☐ I agree to take part in the above study.

Participant Name: \_\_\_\_\_ Signature \_\_\_\_\_ Date \_\_\_\_\_

Researcher Name: \_\_\_\_\_ Signature \_\_\_\_\_ Date \_\_\_\_\_

#### To be completed at the end of the interview

- ☐ I agree to my interview being used in its present form by the researchers who may also use quotes from the interview in the analyses and as described in the information sheet.

If you wish to receive a summary of the results of this research, please supply your name and address below. A summary will be sent to you on completion of this study

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

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

Ethics approval number-H-483-0507 The University requires that all participants are informed that if they have any complaints concerning the manner in which a research project is conducted, it may be given to the researcher, or if any independent person is preferred, to the University's Human Research Ethics Officer, Research Branch, Chancellery, University of Newcastle, 2308, telephone: 02 4921 6333.

### C.3 Semi-structured Interview Schedule

#### Sun Exposure and Sun Protection Interview Guide

##### Knowledge

- What do you know about skin cancer?
- What can people do to help prevent skin cancer?
- Which sun protection factors do you think are most important?
- How much do you know about sunscreen?
- Tell me about some of the risk factors you face?
- Do you know when you are at risk from sun exposure?
- Do you know what the effects of sunburn are?
- Where do you get your information on skin cancer from?
- Do you think you have enough information on skin cancer

##### Attitudes

- What do you think are the advantages of sun exposure?
- What do you think are the disadvantages of sun exposure?
- What are your views on suntans/suntanning?
- What do you think about fake tanning?
- What are your views about skin cancer?
- What concerns do you have about skin cancer?
- How vulnerable do you think you are to skin cancer?

##### Behaviours

- What sun smart behaviours do you practice?/What do you do to protect yourself from the sun?
- When do you practice these behaviours?
- When don't you practice these behaviours?
- If you do like to tan – in what ways are you most likely to get one? (eg. sunbake at the beach etc or outdoor activities ie intentionally/incidentally)



#### C.4 Superordinate and Subordinate Themes

Superordinate Themes	Subordinate Themes
Skin Colour	<p>Tanned people are more attractive</p> <p>Tanned skin is healthy</p> <p>Pale skin is not healthy and is sickly</p> <p>Pale skin is attractive on some</p> <p>Fake tanning is unattractive</p> <p>Having a tan increases self esteem/confidence</p>
Perceived Vulnerability	<p>Skin type predicts risk</p> <p>Incidental sun exposure is not a threat</p> <p>Being sun smart, skin checking or regular clinic skin checks lowers perceived vulnerability</p> <p>Previous sunburn increases risk</p> <p>Family history or personal experience increased perceived risk</p>
Perceived Knowledge	<p>Good perceived knowledge reported</p> <p>Family history of skin cancer increased knowledge</p> <p>Knowledge of risk times of the day/year</p> <p>Good protective knowledge</p> <p>Short term exposure deemed non harmful</p> <p>Increased knowledge related by individuals to decreased exposure</p>

Age	<p>Don't consider cancer risk as youth – more exposure</p> <p>Tanning is a youth experience – less important with age</p> <p>More information available than when older participants were young</p> <p>Pressure to conform with norms as youth</p>
Sex and Gender	<p>Sunscreen isn't masculine</p> <p>Tanned women are more attractive</p> <p>Tanned men are more athletic/masculine</p> <p>Men tanned incidentally through activities</p> <p>Men view deliberate tanning as feminine</p> <p>Women reported deliberate tanning</p> <p>Women value a tan for attractiveness</p> <p>Women use fake tan for special occasions</p>
Australian Cultural Impact	<p>Sun exposure and tanning are enjoyable</p> <p>Tans are the norm in Australia</p> <p>Tan associated with outdoor lifestyle</p> <p>Media impacts on tan attractiveness and gender stereotypes</p> <p>Pale skinned people associated with indoor lifestyle</p> <p>Tans associated with health</p> <p>Sun protection used in traditional activity contexts (eg beach)</p>

Contradictions/conflicts

Desire for sun exposure conflicts with risk knowledge

Tanning behaviour conflicts with risk knowledge

Fake tans are disliked but used for special occasions

Deliberate tanning seen as superficial while self tanning is acceptable

Reasons for non compliance with sun safe behaviours conflicts with sun protection knowledge

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