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**PREDICTING THE COGNITIVE CORRELATES OF  
SUN PROTECTIVE BEHAVIOUR**

**A thesis completed in partial fulfilment of the requirements for the  
degree of Master of Arts in Psychology at Massey University,  
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# ABSTRACT

Previous research has explored the cognitive correlates of sun protective behaviour and has found that intention to use skin protection is likely to affect an individual's decision to use such behaviour. Other research has used social cognition models such as the Theory of Planned Behaviour to predict the use of sun protective behaviours with mixed results. The present study examined sun protective behaviour on beaches in New Zealand (n=80) and used a modified version of the Jones, Abraham, Harris, Schulz & Chrispin (1998) model of sun protective behaviour to predict sunscreen use. This modified version of the model contained variables from social cognition models, including the Theory of Planned Behaviour and Stage models of Health Behaviour such as that of Gollwitzer (1993). Knowledge, norms, threat likelihood, perceived threat, self-efficacy and motivation to prevent negative effects of sun exposure together accounted for 36.5% of the variance in intention to use sunscreen. The findings also suggest that motivation to prevent negative effects of sun exposure and threat likelihood consistently have the strongest correlational relationship (of all the prior cognitions) with both intention and sunscreen behaviour. A measure of planning did not mediate the effects of intentions on sunscreen use as was originally expected, rather, intentions had the largest effect on sunscreen use. It is reasonable to assume that planning may not always be necessary for the prediction of sunscreen behaviours. It was concluded that a modified version of the sun protective behaviour model may be useful in predicting such behaviours but refinement is required of the model and its measures. Implications for further research and model modification are noted.

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# CHAPTER ONE

## INTRODUCTION

### SUN AND SKIN PROTECTION

The incidence of skin cancer has increased rapidly in Caucasian populations world-wide in recent years, with a corresponding increase in mortality from the most serious form, malignant melanoma (Boyle, Maisonneuve, & Dore, 1995). While Australia has the highest incidence (approaching 40 per 100,000 per annum in Queensland), the occurrence of the disease is increasing rapidly in New Zealand (approaching 18.6 per 100,000 per annum in men; and 23 per 100,000 per annum in women). As a comparison to this, in a 1982 New Zealand survey, the melanoma rate was 23 per 100,000 for Europeans; and the non-melanoma incidence was 384 per 100,000 (Freeman, Fairbrother & Rose, 1982). The average annual increase of malignant melanoma in New Zealand is 7% (Boyle et al., 1995, Boyle, 1997). Further to this, it is interesting to note that native residents of Australia and New Zealand, who themselves are mainly of British origins, have experienced incidence and mortality rates of malignant melanoma roughly twice those of recent British immigrants (Cooke & Fraser, 1985). More recent studies of emigrants to Australia and New Zealand show that those who arrive over the age of 15, have a substantially reduced risk of melanoma than those born in these sunny countries (Austoker, 1994).

Despite the levels of incidence and mortality, it is estimated that approximately 80% of all skin cancers are avoidable through protection against excessive exposure to ultra violet radiation (Melia & Bulman, 1995). There remains a need for further research into the efficacy of various types of sunscreen and their relationship to cancer aetiology (McGregor & Young, 1996; Autier, Dore, Schiffers, Cesarini, Bollaerts, Koelmel, Gefeller, Liabeuf, Lejeune, Lienard, Joarlett, Chemaly, & Kleeberg, 1995), but based on the current state of knowledge, most skin cancer campaigns recommend a range of



protective measures. These include the regular use of sunscreen that has a sun protection factor (SPF) of 15 or higher, as well as limiting sun exposure by covering up and avoiding the sun between the hours of 11 a.m. and 3 p.m.

Sun exposure has been linked to the perceived benefits of sunbathing and skin tanning, coupled with poor knowledge of the threat of skin cancer (Keesling & Friedman, 1987). There also prevails an attitude that having a sun tan is healthy and attractive (Broadstock, Borland & Gason, 1992; Carmel, Shani & Rosenberg, 1994; Robinson, Rigel & Amonette, 1997). Consequently, most interventions have been aimed at changing knowledge and beliefs towards sun tanning through the use of news media. For example, successive surveys of a population revealed that an Australian sun protection campaign with significant national investment resulted in increased knowledge and the establishment of a less positive attitude towards sun tanning, over successive surveys (Hill, White, Marks, Theobald, Borland, & Roy, 1992).

Smaller scale evaluations have also been conducted in the U.K. Newton, Hughes, & Altman (1993) found that a school-based package increased knowledge and decreased positive attitudes towards sunbathing but, although knowledge was correlated with sunscreen use, it was not related to reported sunburn rates. More recently, Castle, Skinner & Hampson (in press) found that knowledge, and the personality trait of conscientiousness were predictors of sun protective behaviour. Additionally, young women who had received a health education leaflet showed an increase in knowledge, but no change in skin protective beliefs, relative to controls. Robinson, Rigel, & Amonette (1997), and Miller, Ashton, McHoskey & Gimbel (1990), found that women are more likely to be aware of information about skin cancer prevention, yet paradoxically, women are more likely to intentionally tan than men. It is also interesting to note that age is positively correlated with skin cancer prevention information awareness (Robinson et al., 1997).

Although sun protective knowledge has increased in terms of a wider recognition towards the dangers of sun exposure (1996 telephone survey, based on a 1986 American Academy of Dermatology survey which compared results over the two time spans), there has been a decline in the ability to identify skin cancer as dangerous (Robinson et al.,

1997). People know that others harm themselves by sun exposure but do not fully recognise the potential harm of sun exposure to themselves (Robinson et al.).

Similarly, Keesling & Friedman (1995) found that knowledge predicted sunscreen use intentions, but although the provision of information increased knowledge and knowledge seeking behaviours, it did not directly increase intentions. Mermelstein & Riesenberg (1992) also found that a school-based intervention was able to increase knowledge and perceived risk but not intentions to take precautions.

Intervention effectiveness may, however, be reduced by the absence of suitable models of psychological antecedents of sun protective behaviour. For example, learning about a potential health hazard may be an essential first step towards preventive action but, as Arthey & Clarke (1995) found in their review of the psychological literature on sun protection, knowledge may not generate preventive action unless other motivational prerequisites are also in place (Weinstein, 1988). It may not be surprising, therefore, that knowledge is not always found to be a useful predictor of sun protective behaviours (e.g., Foot, Girgis, Boyle, & Sanson-Fisher, 1993; Rodrigue, 1996; Vail-Smith, & Felts, 1993). Even when personal susceptibility is recognised, protection may not be regarded as important enough to prompt action, resulting in weak associations between perceived susceptibility and preventive behaviour (Harrison, Mullen & Green, 1992). For example, Mermelstein & Riesenberg (1992) found that once a measure of perceived likelihood to take precautions had been considered, perceived susceptibility explained only 5% of the variance in sunscreen use. So then, if knowledge is not a useful predictor of sun protective behaviour, what factors should be looked at?

Research suggests a need for effective educational interventions to increase sun protective behaviour. For example, after eight years of the Australian Slip, Slop, Slap campaign, Hill et al., (1992) found that 18% of men and 14% of women in a Melbourne sample of 1,655 still reported skin burning (defined as reddening of the skin) during the previous weekend. Similarly, Foot, Girgis, Boyle, & Sanson-Fisher (1993) found that only 45% of 670 Australian beachgoers had a high level of protection (defined as SPF 15+, clothing or shade), with 16% using no protection. Some findings from the first large scale survey of sun protection and sunburn among New Zealand adults (McGee, Williams, Cox, Elwood, & Bulliard, 1995) suggested that on any fine summer weekend,

about three out of four adults are outside for relatively long periods of time on one or both days, with one in every five of those outside experiencing sunburn.

In New Zealand, surveys have documented that children and adolescents often experience excessive exposure to the sun with high rates of burning. For instance, in a sample of 345, adolescents aged 13-15 year olds, over one-third reported getting sunburned to the point of soreness at least once over the preceding summer; with 6% reporting blistering of the skin. Despite relatively high awareness of melanoma as a dangerous form of cancer associated with sun exposure, a significant proportion of the sample showed high positive attitudes towards tanning and sun exposure without adequate sun protection. On a more positive note, reports of exposure to sources of information about melanoma were correlated with melanoma awareness, which in turn predicted use of sun protection measures.

Health promotion efforts of the Cancer Society of New Zealand have increased awareness of melanoma, but it is unclear if this is associated with increased sun protection (McGee, Williams, & Glasgow, 1997). Findings suggest that campaigns such as those of the New Zealand Cancer Society have an important role to play in reducing high levels of sun exposure among adolescents (McGee & Williams, 1992). Melanoma then, is a major public health problem in New Zealand and Australia, and there is clear evidence that sunburn is a major risk factor for melanoma (Whiteman & Green, 1994). Reducing the frequency of sunburn in the community remains the prime focus of efforts to prevent the disease, especially for children and adolescents.

A study undertaken by McGee, Williams & Glasgow (1997) found that younger children are better protected from sunburn than adults, and that the strongest predictor of sun protection among children was the actual use of sun protectants by their parents. Likewise, children were about nine times more likely to be wearing sunscreen if the parent reported sunscreen use. This result was also supported by Zinman, Schwartz, Gordon, Fitzpatrick, & Camfield (1995) who found that sunscreen use in parents is a key determinant of whether they will use it on their children. Parents who have a history of sunburn or perceive their child to be at risk of sunburn will be more likely to protect their child from the sun. Morris, Bandaranayake, & McGee (1998) investigated awareness of sun protection behaviours in a sample of New Zealand primary school children, and

found that the data revealed a bias towards sunscreen as a method of sun protection compared with other protective methods such as clothing and the use of shade.

A comparison between results of children resident in Australia, New Zealand and England indicated a greater awareness of sun protection methods amongst the Australian and New Zealand children compared with children living in England. In addition, they also found that children as young as 5 and 6 can describe the consequences of overexposure to the sun, and can illustrate methods of sun protection, with sunscreen seen as the main method of sun protection. It appears then, that efforts promoting sun protection should be more focused on children and adolescents. This is supported by the literature that suggests that children tend to spend more time outdoors than adults, and that children's activities are more likely to result in more midday sun exposure than adults (Truhan, 1991). Stronger support for this comes from research which states that the lifetime risk of melanoma is at least doubled by having had one or more severe sunburns during adolescence, and excessive exposure to the sun early in life (i.e. prior to 20 years old) is the best predictor of later development of nonmelanoma and melanoma skin cancers (Baum & Cohen, 1998). Under normal circumstances (weather conditions), children receive three times the annual sun exposure of adults; and most of one's lifetime exposure occurs in childhood (Truhan, 1991). Thus, early childhood sun exposure is an important factor (Austoker, 1994). Because of findings like these, children and adolescents have been identified by researchers as a key group for primary prevention.

## **SUMMARY**

Exposure to sunlight should be a readily modifiable risk factor for skin cancer. Most intense exposures to the sun are intentional (e.g. sunbathing) and can be minimised by use of shaded areas when outside, by wearing protective clothing, and by appropriate use of sunscreen (Baum & Cohen, 1998). The ready availability of methods for protecting oneself belie the difficulty of changing these behaviours. Publicity about sun exposure and skin cancer have made many people aware of the risks, but has not produced large-scale behaviour change. Social norms in many groups still associate a suntan with a desirable, healthy appearance. Advertising reinforces the view that having a tan looks good, and there are many reports in the popular press on safe methods of achieving a tan

(Arthey & Clarke, 1995). Together with unrealistic optimism and tendencies to minimise health threats, these factors decrease the likelihood that people will seriously consider or adopt sun protective behaviours.

In the next couple of chapters, we want to look at models of health behaviour and see how they can help to predict use of certain health protective behaviours, in this case sun protective behaviours. We want to look in some depth at a couple of the models and the research using these models undertaken to date. From this, we then want to propose a model to be used to study sun protective behaviours and use this model in conjunction with recent research in the area of sun protective behaviours.