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Starfished in the Sand: Developing the Theory of Planned Behaviour to Predict Intentions to Use Sunscreen on the Beach.

**A research project presented in partial fulfilment for the requirements
of the degree of Master of Arts in Psychology at Massey University,
Albany, Auckland, New Zealand.**

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Abstract

This study examined the predictive power of the theory of planned behaviour in explaining sunscreen use intentions among beach-goers in New Zealand (n = 148) and the United Kingdom (n = 280). Generally, the theory of planned behaviour performed well with attitudes, subjective norms and perceived behavioural control explaining 54.8% (NZ) and 39.5% (UK) of the variability in intention. In addition to the theory of planned behaviour constructs, several other variables were included to enhance the models predictive power. The concepts of descriptive norm, implementation intentions, outcome expectancy, anticipated regret, past behaviour, global self-esteem and conscientiousness were investigated. Implementation intentions, past behaviour and anticipated regret contributed significantly to the theory of planned behaviour in predicting sunscreen use intentions. In addition, partial mediation of the theory of planned behaviour constructs was found by implementation intentions. Interaction effects were evident between past behaviour and perceived behavioural control in the UK sample. Implications for further investigation of the concept of anticipated regret and including a measure of self-identity are discussed.

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1 SKIN CANCER, SUN TANNING AND SUN PROTECTION

1.1 Melanoma

Melanoma is the most serious of three forms of skin cancer, basal cell carcinoma, squamous cell carcinoma, and melanoma. Melanoma begins as a mole on the surface of the skin where the melanocyte cells, which are responsible for producing the skin's pigment, cluster with surrounding tissue (Schering-Plough, 2002). When a melanoma first appears, it is called a cutaneous melanoma. When it spreads to other parts of the body through the bloodstream and the lymph nodes, it is called metastatic melanoma. Melanoma can also be found in the eye (ocular or intraocular melanoma), in the digestive system, in the meninges or in the lymph nodes (Schering-Plough, 2002). Melanoma, like most cancers can be treated in its early stages, but it can also be fatal (Schering-Plough, 2002).

The main factors that contribute to a person being at greater risk of developing a malignant melanoma are genetic or environmental, but over the later stages of the last century further factors have intensified as contributors, these include the increased popularity of sunbathing, changes in clothing styles and depletion in stratospheric ozone levels, (Boyle, et. al., 1995). There is convincing evidence that both excessive sun exposure and episodes of sunburn cause skin damage and skin cancer, namely melanoma (Armstrong & Kricger, 1987). Sunburn is a reddening of the skin, which may last for a number of days, and might also cause blistering of the skin in severe cases (Turkington, 1999). Past occurrences of sunburn are positively related to risk of developing melanoma, but could be a result of individual susceptibility and/or intermittent exposure (Boyle, Maisonneuve and Dore, 1995). Thus, higher risk of melanoma cancer can be directly attributed to an individual's sun-related behaviour (Eiser, 1999). Melia and Bulman (1995) have found that sunbathing was the most frequent behaviour associated with severe episodes of sunburn. Most skin cancer can be avoided (Melia & Bulman, 1995), by staying away from the sun and its harmful ultraviolet rays between the hours of 11 am and 3 pm, by using protective clothing and by applying sunscreen.

1.2 Worldwide Trends

The rates of malignant melanoma are increasing rapidly in fair-skinned populations all over the globe - 92,000 cases were diagnosed in 1985 and the rate of reported incidences double every decade (Boyle, et. al. 1995). In 1995, incidence rates of melanoma in Britain reached about 10 per 10,000 per year. In Canada incidence rates have been tripling, and in America, the rate has increased by 20-40% among Caucasian populations every year (Boyle, et. al., 1995). Queensland State in Australia tops the rate of incidences of melanoma, around 40 per 100,000 per year (Boyle, et. al., 1995). The Melanoma Research Foundation in California (2002) reports that one person every hour dies from melanoma in America. Incidence of mortality from malignant melanoma in Japan has been relatively low, but has been increasing (Boyle, et. al., 1995). Melanoma featured fourth on the list of most frequently diagnosed cancers for men, and third for women in South Australia in the year 1997 (Kirke & Roder, 2000). It is the most common cause of cancer among 35-44 year old males in the United States (Boyle, et. al., 1995).

Increases in rates of incidence for melanoma have been higher than those of mortality. Generally, melanoma is as common in women, where melanoma's are usually found on the legs, as in men, where lesions are more often found on the face and back (Boyle, et. al., 1995). The frequency of cancerous growths found on the body area's that are ordinarily covered is much lower than on the aforementioned exposed sites (Boyle, et. al., 1995).

People who work inside have been found to be at a greater risk of melanoma (Beral & Robinson, 1981) because they are usually exposed to the sun for short periods such as when on holiday to hotter climates. This statistic could be ascribed to more people working indoors at office jobs in recent decades as opposed to labouring out of doors, as was more common earlier last century (Beral & Robinson, 1981). In Britain, there is a higher melanoma incidence rate among higher social classes (Boyle, et. al., 1995) perhaps a factor of professional-indoor type occupations evident in this population.

1.3 Trends in New Zealand

Ozone depletion leads to increases in ultraviolet radiation at the Earth's surface (McKenzie, 1996). New Zealand has a comparatively high level of UV radiation when

compared to other countries because the closest Earth-sun separation occurs during the Southern Hemisphere summer (McKenzie, 1996). New Zealand has experienced substantial decreases in summer ozone levels in the last five years (McKenzie, et al. 1999) and this ozone depletion has led to a higher level of UV radiation (that responsible for sunburning) than countries in Europe (McKenzie & Connor, 1999). The UV radiation in New Zealand has increased by about 6-9% from the 1970s to the late 1990s (McKenzie, 1996). When comparing New Zealand's latitude with areas in Australia on the same latitude, New Zealand has about 50% more reported incidences of melanoma (Bulliard & Cox, 1996). The resultant increase in UV radiation from ozone depletion over New Zealand may play a role in the higher rates of skin cancer experienced (McKenzie & Conner, 1999). If ozone levels are depleted by just 1%, it corresponds to nearly a 3% increase in non-melanoma type skin cancers (McKenzie & Connor, 1999).

1.4 Melanoma in New Zealand

New Zealand has the highest rate of mortality from melanoma and second highest (next to Australia) incidence rate in the world (Levi, Lucchini & La Vecchia, 1994) and in 1995 had one of the highest annual average increases (7%) in the world (Boyle, et. al., 1995). Mortality rates for males were 6.5/100,000 (Levi, et. al, 1996).

In the 1998 Registry of Cancer, melanoma was identified as the third most common cancer among females and fourth amongst males. Bulliard and Cox (1996) highlight that there has been a levelling off of reported incidences of melanoma from the 1980s onward. It is unclear whether this is a direct result of fewer cases or because of under-reporting. The Cancer Registry Act introduced in 1993 resulted in better reporting and may explain this trend. Cases from 1995 onward may not be comparable with earlier years. The incidence rate reported on the Cancer Registry can also be influenced by several social factors like number of spot-check health centres available to the public or a reduction in support of registration by certain groups of pathologists (Bulliard & Cox, 1996). Mortality from melanoma has been quite low in comparison to registrations. Deaths in 1998 were 143 for males and 105 for females, with both sexes experiencing an increase in mortality from 1989 onward.

1.5 Sunscreens

Complete avoidance of the sun's harmful rays is almost impossible, however there are various sun-protective behaviours that can be adopted to avoid sunburn and skin cancer. Several studies have investigated the use of sunscreen with a sun protection factor (SPF) of 15 or higher as one method of protection. One study found individuals (over the age of 40 years) showed fewer skin lesions over the period of one summer if they had used a sunscreen with factor 17 or higher (Thompson, Jolley & Marks, 1993). In addition Stern, Weinstein & Baker (1986) found that children and adolescents who used sunscreen on a regular basis could dramatically (78%) reduce their lifetime incidence rate of basal and squamous cell carcinomas.

Sunscreen of protection factor 15 provides 15 times more protection than no sunscreen at all, i.e. if it takes 10 minutes in the sun to be burned, SPF15 will protect for 150 minutes (Standards New Zealand, 1998). Sunscreens need regular re-application, and the SPF factor must not be taken as an indication to stay in the sun for longer periods (Kirke & Wilson, 2000). Sunscreen should also be used with other forms of sun protective behaviour like wearing light clothing or seeking shade. In South Australia, studies have found that in general, people do not thoroughly understand the meaning of sunscreen protection factors (Kirke & Wilson, 2000). The use of sunscreens, while important, is shrouded by controversy because while protecting from the harmful rays of the sun it may actually encourage people to spend more time in the sun (McGregor, & Young, 1996). It follows that the promotion of sunscreen could involve education about sun protection factors.

1.6 Worldwide Sun Behaviour and Sun Protection Campaigns

In countries where the population is predominantly fair skinned, numerous sun protection promotional campaigns have been implemented to try and reduce the rates of skin cancer. However campaign effectiveness has come into question because of continuing rising trends in skin cancer (Everitt & Colditz, 1997). In a review of skin cancer prevention, Everitt and Colditz, (1997) outline several factors that are necessary in the execution of successful sun protection promotional campaigns: education about the risks of excessive exposure to the sun, methods to reduce these risks, education of parents on how to set examples for their children, including sun protection education in

school curriculum's, altering fashionable perceptions that a tan is more healthy and attractive, educating also the non-white populations, and increasing awareness of the need to reduce harmful substances that result in the depletion of the ozone layer. It is essential that any melanoma prevention promotion campaign must have appropriate medical backing and advice to ensure up-to-date knowledge of features of malignant melanoma and subsequent treatment (MacKie, 1995).

A number of studies have examined target risk groups, like outdoor workers, patrons at swimming pools and prior skin cancer sufferers. Results of campaigns with these target groups, where programmes are usually focused on single a strategy, tend to vary from programmes designed for the general population where there are multiple strategies and multi media used (Morris & Elwood, 1996). Campaigns targeting large community groups generally use several intervention strategies to change behaviour, whereas campaigns for exclusive groups usually have one intervention designed especially for that group (Morris & Elwood, 1996). Studies on particular groups like outdoor workers have used intervention methods like skin screening and video education to improve sun protective behaviours (Girgis, Sanson-Fisher & Watson, 1994). However, in general, these studies needed improvement in methodological issues like sample size, assessment methods and follow-up measurement (Morris & Elwood, 1996).

In the United Kingdom, the Health Education Authority presented a cancer prevention programme called 'Are you dying to get a suntan?' and later, 'Sun know how' that were designed to in increase the wider publics knowledge about the dangers of the sun and increase sun protective behaviour. However, after implementation of these campaigns most of the respondents surveyed still thought that intermittent exposure, for example while on holiday was okay and that getting skin cancer was relatively unlikely and rare Howard (1995).

Some research has investigated sun behaviour and related cognitions without the use of an intervention. These studies seek to explore factors involved in decision-making processes of an individual that are related to sun-seeking and sun-protective behaviours. For example, Everitt and Colditz (1997) in a study carried out in New Jersey in 1994 found that 15% of beachgoer's found using sunscreen "uncool", only 45% used sunscreen regularly, just over one third of this percentage applied SPF or higher, and

only 54 % applied sunscreens on all exposed areas of the body. The general consensus found in this study was that among those surveyed using sunscreen was socially unappealing.

Furthermore, the Cancer Forum reported in 2000 that in Queensland Australia, one half of respondents surveyed did not use sunscreen when out in the sun in the summertime. It was found, conversely that people who did not meet guidelines for sun protection, perceived themselves as being in control of their health, as being adaptable, and able to take care of themselves (Centre for Health Promotion and cancer Prevention Research, 2000). The study suggested that further promotional campaigns should focus on more abstract concepts, like self-identity in order to be more effective (CHPCPR, 2000).

1.7 Sun Behaviour in New Zealand

High UV levels, and a predominantly outdoor lifestyle are all factors that may contribute to New Zealand's high melanoma incidence rate (McKenzie, 1996; Richards, McGee & Knight., 2001). While attitudes about how much time to spend in the sun have remained fairly stable over the past decade, the New Zealand public's attitude toward using sunscreen as protection from the sun has begun, more recently to change (McKenzie, 1996; Richards, et al., 2001). In a study by the Cancer Society in 1994, 34% of people indicated they used sunscreen the previous weekend, and in replicated research in 1997 and 2000, this had increased to 36% and 39%, respectively (NFO, CM Research, 2000). These studies also identified prevention of sunburn as the primary reason for wearing sunscreen. Reasons given for not wearing sunscreen were; poor weather conditions, sunscreen unnecessary for type of skin, and forgetting (NFO, 2000).

Somewhat surprising results from the NFO (2000) study show that more people think that having a tan aids in protection against skin cancer, and that the family members of the respondents think that sun-tanning is acceptable. One other notable feature of this study is that skin type and perceptions of susceptibility to sunburn seem to play a role in sun protective behaviour and attitudes (NFO, 2000). People with medium or olive coloured skin report more often (as opposed to less often) that they like tanning, and are more likely to apply sunscreen later, i.e. after they have spent time in the sun without sunscreen (NCO, 2000).

Overall in 1997, in excess of 50% more New Zealander's reported sunburn the previous weekend than in 1994, (Bulliard & Cox, 1999). Conversely, in surveys carried out by the Department of Preventive and Social Medicine at the University of Otago in 1994 and 1997, it was found that incidences of sunburn were lower in 1997 than in 1994, but this survey was used among people who were partaking in organised sport (Bulliard & Cox, 1999). Conclusions drawn from these studies were reached after taking into account differing weather conditions between the two years, which resulted in differing ground UV levels (Bulliard & Cox, 1999).

Most of the research on sun protective behaviours in New Zealand has centred behaviour of children, with some studies being performed with adolescents; it follows that there is a need for further research on adult sun protective behaviour. The focus on children and adolescents has likely been more intensive because it is estimated that instances of sunburn before the age of 15 can considerably increase the risk of developing melanoma or skin cancer later in life (Armstrong & Kricger, 1993).

1.8 New Zealand Promotional Campaigns

Two key advertising campaigns about sun protection; the 1992 Australian 'Slip, Slop, Slap' campaign which also ran in New Zealand, and the Cancer Society's 1992 'SunSmart' campaign have featured during the past eight years (Morris & Elwood, 1996). Following these campaigns, surveys in Melbourne indicated that the most commonly reported method of sun protective behaviour was sunscreen use at 85%, this is over and above use of hats, shirts, and shade, or avoidance of the sun around midday (Morris & Elwood, 1996). Those who identified themselves as unlikely to burn easily reported less often that they used sun protection methods. Morris and Elwood (1996) report that these two campaigns showed encouraging changes in sun protective behaviours over the early 1990s.

Research by the NCO (2000) has shown that recollection of information from these campaigns was high in 1994 (76%) and 1997 (77%) when the campaigns were broadcasting. However since 1997 there has been virtually nil on screen advertising and subsequently a drop in information recollection, 56% for 2000 (NFO, 2000). The most

important features the 1250 people surveyed learned from the promotional campaigns were to wear sunscreen, be careful of the sun and to be aware of the possible health risks from excessive sun exposure (NFO, 2000).

Richards et.al (2001) found little change in attitudes and sun protection behaviour among New Zealand adolescents from 1991-1997. The reasons suggested for this lack of change, were that the promotional campaigns specifically targeted young children and concentrated on increasing protection behaviour rather than changing cognitions. Richards, et.al (2001) point out that emphasising the reasons why sun protection should be used (i.e. to prevent skin cancer) may be a more effective strategy in changing sunscreen behaviour among adolescents.

In 1996, Morris and Elwood reported that while there have been successful promotional campaigns to promote prevention of melanoma, they have only centred on methods to increase knowledge and change attitudes, without clearly linking them to changing the associated sun behaviour. In review of pre-intervention and post-intervention strategies employed by sun-exposure intervention programmes, Morris and Elwood (1996) highlight the need for changes for both the short term and the long term, and more consistent definitions of sun exposure and behaviour to aid more efficacious comparisons between studies.

In summary, a high rate of melanoma around the world, and in particular New Zealand, is cause of concern. While there has been some success with sun protection campaigns globally, research has indicated gaps in effectiveness. Because of the outdoor lifestyle of most New Zealanders, sunscreen would appear to be the most practical method of sun protection. It follows that sun protection campaigns in New Zealand could benefit from focusing on the promotion of sunscreen. In order to successfully do this factors like cognitions, motivations and personality variables that contribute to New Zealanders sun related behaviours should be explored.