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Predicting adolescent intentions to use sun protection: extending the theory of planned behaviour

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Predicting Adolescent Intentions to Use Sun Protection: Extending the Theory of Planned Behaviour

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Bachelor of Arts (Psychology)

Honours

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Predicting Adolescent Intentions to Use Sun Protection: Extending the Theory of Planned Behaviour

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A report submitted in Partial Requirements for the

Award of Bachelor of Arts Honours

Faculty of Computing, Health and Science

Edith Cowan University

May 2009

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Predicting Adolescent Sun Exposure and Sun Protection:

A Review of the Literature

Geoffrey S. Carastathis

Predicting Adolescent Sun Exposure and Sun Protection: A Review of the Literature

Abstract

There has been much psychological research conducted on the motivations to engage in suntanning and to a lesser extent, sun protective behaviours. The research has shown that compared to all other age groups, adolescents have the greatest desire to obtain a suntan, expose themselves to the sun the most and typically do not engage in sun protective behaviours. The theory of planned behaviour has been used a number of times to predict the intentions and the behaviours of deliberate sun exposure and to a lesser extent, sun protection. However, the theory of planned behaviour has often been unsuccessful in accounting for the majority of explained variance for these particular intentions and behaviours. This paper provides a review of research that has investigated important variables that influence adolescent sun exposure and sun protection. In particular, these predictor variables are reviewed for their inclusion within the theory of planned behaviour. The review highlights several factors that should be considered when predicting adolescent sun-related behaviour. These include, skin type, perceptions of tanned skin, age, descriptive norms, and unrealistic optimism. The paper concludes with implications of review findings and directions for future research.

KEY WORDS: Theory of planned behaviour, adolescents, sun exposure, sun protection, predictor variables.

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Predicting Adolescent Sun Exposure and Sun Protection: A Review of the Literature

Skin cancer is the most common form of cancer in the world (Peattie, Peattie, & Clarke, 2001), with Australia having the highest skin cancer rates compared to all other nations (Dobbinson et al., 2008). One in two Australians will develop skin cancer some time during their life (Montague, Borland, & Sinclair, 2001) and tragically, more than 1,000 Australians die from skin cancer each year (Livingston, White, Hayman, & Dobbinson, 2007). These figures are disconcerting because it has been estimated that an overwhelming majority of skin cancer cases (80% to 90%) could have been avoided through the adoption of simple sun protective behaviours such as, applying sunscreen, avoiding ultraviolet radiation during peak times of the day and covering up exposed skin (Eiser & Arnold, 1999; Peattie et al., 2001).

Skin cancer awareness, including sun protective methods, have been well advertised to the Australian population over several decades. For example, one of the most well known is the SunSmart campaign (Dobbinson et al., 2008; Livingstone et al., 2007). Despite these campaigns, the incidence of skin cancer continue to rise across all age groups (Baade & Coory, 2005), indicating that sun protective methods are not being consistently practised by the Australian public. Of particular concern is that of the adolescent age group. Research has consistently indicated that this age group spend the most time in the sun, have a greater desire for suntans and generally do not engage in sun protective behaviours (e.g., Arthey & Clarke, 1995; Dixon, Borland, & Hill, 1999; Montague et al., 2001; Stanton, Janda, Baade, & Anderson, 2004). Adolescent sun-related behaviour (i.e., suntanning, sun protective behaviour) is surprising as they are generally well aware of the ramifications overexposure to the sun and a lack of sun protection can have (Livingston et al., 2007). It is therefore apparent that there are other factors,

apart from awareness, that influence adolescent sun-related behaviour. One method of investigating the underlying influences of behaviour is through the use of the theory of planned behaviour (TPB; Ajzen, 1991). The theoretical framework of the TPB emphasises psychological and sociological factors that influence behaviour. In turn these factors are able to predict both intention and behavioural outcomes (Ajzen, 1991). The framework of the TPB has been applied to a wide range of health-related behaviours, including sun-related behaviours (Armitage & Conner, 2001). Yet, the few TPB studies that have investigated sun-related behaviours have often been unable to account for a large portion of behavioural and intentional variance.

This literature review begins with a brief overview of the prevalence and major risk factors associated with skin cancer. It discusses the implications of early life sun exposure and highlights the sun-exposure behaviour of adolescents. The efficacy of the TPB is discussed and its application toward adolescent sun-related behaviour is reviewed. Due to large amounts of unexplained variance explained by many sun-related TPB studies, the focus of the present paper is that of reviewing additional predictor variables. Specifically, these variables are reviewed for their use to predict adolescent sun-related behaviour. Several predictor variables are reviewed: Skin type, perceptions of tanned skin, age, descriptive norms, and unrealistic optimism. The review concludes with a discussion of findings and suggestions for future research.

Overview of Skin Cancer

Prevalence

There are three main types of skin cancer: Melanoma, basal cell carcinoma and squamous cell carcinoma (American Cancer Society [ACS], 2008). In Australia, basal cell carcinoma is the most common of the cancers, occurring in about 70% to 85% of cases; squamous cell carcinoma occurs in 15% to 20% of cases, while melanoma is the rarest of the three types and occurs in

approximately 5% of skin cancer cases (Cancer Council NSW, 2005; Eiser & Arnold, 1999). Most skin cancer cases are treatable, provided they are noticed early enough (Eiser, Eiser, & Pauwels, 1993). Death occurring from basal cell carcinoma and squamous cell carcinoma is rare. For example, American statistics show that over one million cases of these types of skin cancer are diagnosed annually and roughly only 2, 000 of these cases (0.2%) result in death (ACS, 2008). Although melanoma is the rarest form of skin cancer, it accounts for the majority of skin cancer related deaths (ACS, 2008). If melanoma is not treated early enough the cancer can spread to other parts of the body and once it has spread, the five year survival rate (percentage of patients who live at least five years after being diagnosed) dramatically drops from 99% to 18% (ACS, 2008). The actual cause of skin cancer is not yet known (Lower, Girgis, & Sanson-Fisher, 1998). However, there are two major risk factors associated with skin cancer: ultraviolet radiation and early life sun exposure.

Ultraviolet Radiation

The leading risk factor in developing skin cancer is over exposure to ultraviolet radiation, in particular ultraviolet B radiation (Saraiya et al., 2004; Wichström, 1994). Ultraviolet radiation causes approximately 65% to 90% of all melanomas (Saraiya et al., 2004). People are exposed to ultraviolet radiation mainly through exposure to sunlight and to a lesser extent, through tanning beds (Saraiya et al., 2004). Ultraviolet radiation damages DNA and if too much damage has occurred, cell growth and cell division can be affected, resulting in the formation of cancer (ACS, 2008; Saraiya et al., 2004). Exposure to ultraviolet radiation during childhood is of particular importance for the development of skin cancer in later life (e.g., Boldemann & Sinclair, 2007; Dixon et al., 1999; Saraiya et al., 2004).

Implications of Early Life Sun Exposure

Sun exposure during the early years of one's life determines the risk of developing skin cancer in later years (Peattie et al., 2001). Being sunburned at an early age can dramatically affect the chances of developing melanoma in later life: If a young person suffers one serious incident of sunburn, the lifetime risk of developing melanoma doubles (Peattie et al., 2001). An accumulation of ultraviolet radiation is also positively related to the risk of developing skin cancer, not just sunburn itself (Boldemann & Sinclair, 2007). Children and adolescents are exposed to ultraviolet radiation three times more regularly than adults (Saraiya et al., 2004; Stanton, Saleheen, O'Riorda, & Ray, 2003). Therefore, children and adolescents are at a much greater risk of accumulating excessive ultraviolet radiation and experiencing sunburn (Saraiya et al., 2004). The risk of sun damage affecting cell growth and division is also greater during childhood because skin cells have yet to mature and the skin itself is thinner and more sensitive (Livingston et al., 2007; Livingston, White, Ugoni, Borland, 2001). It is therefore imperative that children and adolescents are adequately protected from ultraviolet radiation. Although it has been shown that early life sun exposure during both childhood and adolescence is an important risk factor in the formation of skin cancer, adolescence emerges as a period of particular concern.

Contribution of Adolescent Behaviour to the Risk of Developing Skin Cancer

It has been consistently shown that as children get older, sunburn rates tend to increase, while the use of sun protection decreases (Dixon et al., 1999; Livingston et al., 2007; Lynagh, Schofield, & Sanson-Fisher, 1997; Stanton et al., 2004). This is alarming as research indicates that severe sunburn between the ages of 15 and 20-years significantly increases the risk of developing melanoma in later life (Livingston et al., 2007). Adolescent behaviour, however, is incongruent with their needs to take precautionary action. For example, an Australian study on

adolescents found that only 54% of males and 44% of females were adequately protected during weekend sun exposure (Lower et al., 1998). Livingston et al. (2007) found that between the years of 1993 and 2002 adolescent sun protection levels were generally below adequate. More alarmingly, research indicates that the increased rate of skin cancer is the result of sun protection levels significantly decreasing each successive year (Livingston et al., 2007). These low sun protective behaviours appear typical of the adolescent age group at a global level. For example, Cokkinides and colleagues' (2001) found that less than one-third of American youth, aged 11 to 18 years, sufficiently practiced sun safe procedures. Another study found that 81% of American adolescents reported spending a significant time in the sun and of these; only 9% reported using sunscreen while a further 33% reported never using sunscreen (Banks, Silverman, Schwarts, & Tunnessen, 1992). Similar results have also been found in countries such as Belgium (de Vries, Mesters, van't Riet, Willems, & Reubsaet, 2006) and Sweden (Bränström, Kristjansson, & Ullén, 2005). Australia recognised and responded to the need for introducing sun-safety practices. One of the main approaches focuses on school-based interventions.

School-based interventions generally include at least one of the following strategies: provision of information, modelling of behaviour, attitude change, caregiver attitude and behaviour change, environmental changes (e.g., provision of more shade), and policy change (e.g., scheduling of outdoor activities and creating school rules; Saraiya et al. 2004). These interventions, especially those aimed at adolescents, have been unsuccessful in producing long-lasting behaviour changes (Girgis, Sanson-Fisher, Tripodi, & Golding, 1993; Lowe, Balanda, Stanton, & Gillespie, 1999; Milne et al., 2006; Saraiya et al., 2004; Schofield, Edwards, & Pearce, 1997). These interventions, however, have been noted for their success for increasing knowledge about skin cancer, including its risk factors and prevention. Yet, despite this

knowledge, this age group still has the highest incidence of sunburns and the lowest rates of sun protection. This indicates that adolescents are knowingly increasing their own risk for developing skin cancer. It is clear that knowledge alone is not enough to motivate young people to partake in better sun-safe practices. Given this discrepancy between knowledge and protective behaviour, it is important to discover other factors and theoretical explanations that influence adolescents' deliberate sun exposure and sun protective behaviours.

Theory of Planned Behaviour

One model that has been widely used to explore the influential factors behind behaviour and intention is the TPB (Ajzen, 1991). The TPB posits that intentions and perceived behavioural control (PBC) are proximal determinants of actual behaviour (Ajzen, 1991). Generally, the stronger the intent and the stronger the PBC, the more likely the behaviour will be executed. PBC refers to the perception of how much control an individual has over their behaviour as well as referring to the ease or difficulty of performing that particular behaviour (Ajzen, 1991). Intentions reflect how hard an individual is willing to perform any given behaviour and in turn are further determined by three different predictor variables. The first variable is attitude and it refers to an individual's evaluation of the behaviour, which can either be positive or negative (Ajzen, 1991). The second predictor, subjective norms, refers to the perception of how one *should* behave (according to perceived social approval or disapproval), while the final antecedent of intention is that of PBC (Ajzen, 1991). Typically, stronger intentions are reflected by, stronger attitudes, greater perceived social pressure and greater perception of control (Ajzen, 1991). The constructs of attitude, subjective norms and PBC are the general predictors of both intentions and behaviour (Conner & Armitage, 1998).

The framework of the TPB has generally been used to explain a wide variety of health and business-related behaviours (Armitage & Conner, 2001). Armitage and Conner (2001) reviewed 185 empirical studies (that varied in topic) and found that 27% of the variance in behaviour and 39% of the variance in intention could be explained by the model. The authors concluded that their findings provided evidence as to the efficacy of the TPB. These findings also highlight that the model is more accurate in predicting intentions than it is in predicting behaviour. Regardless, support for the TPB has been found in many health-related behaviours including; smoking (Higgins & Conner, 2003), healthy eating (Åstrøm & Rise, 2001), condom use (Albarracin, Johnson, Fishbein, & Muellerleile, 2001) and binge-drinking (Johnston & White, 2003).

The constructs comprising the TPB (e.g., attitude, social pressure) have been successfully applied by many studies in regards to understanding sun-related behaviours (Bränström, Ullén, & Brandberg, 2004; de Vries et al., 2006; Hillhouse, Adler, Drinnon, & Turris, 1997; Jackson & Aiken, 2000; Jones, Abraham, Harris, Schulz, & Chrispen, 2001; Myers & Horswill, 2006; Steen, Peay, & Owen, 1998; White et al., 2008), thus validating the model's use within the field. The several studies that have explicitly applied the TPB to predict sun-related behaviour have generally explained around 25% to 60% of the variance in intentions and 25% to 45% of the variance in behaviour. For example, Hillhouse et al. (1997) found the TPB was able to account for 60% of the variance regarding intentions to sunbathe and 37% of the variance in intentions to use sunscreen. Similar findings were reported by Myers and Horswill (2006), where the TPB (with an additional construct of self-efficacy; belief that one is capable of performing behaviour) accounted for 37% of variance in intentions to use sunscreen and 45% of the variance in actual sunscreen use. In general, most studies that have applied the framework of the TPB to sun-

related behaviour have investigated adult samples and most have concentrated on sunscreen use and a reduction in sun exposure rather than sun protection in general (e.g., Bränström et al., 2004; Hillhouse et al., 1997; Jones et al., 2001; Myers & Horswill, 2006).

To date, only the study of White et al. (2008) has explicitly applied the framework of the TPB to predict general sun protection (i.e., use of more than one sun protective method). It is also the only known sun-related study that has applied the TPB to an adolescent population. White and her colleagues (2008) found that the constructs of the TPB explained 25% of the variance in both sun protection intentions and behaviour. Two additional predictor variables, that of group and image norms, were used to extend the framework of the TPB. Group norms refer to the consideration of whether or not important members of a salient referent group perform a certain behaviour and whether that behaviour is approved or disapproved of by the group (White et al., 2008). Image norms refer to the stereotypical views of society upon certain groups (i.e., tanned people are attractive; White et al., 2008). With the inclusion of these two additional predictor variables, the explained variance in intentions to use sun protection increased by 11% to that of 36%, while the explained variance in actual sun protective behaviour increased by an additional 2%. It was further found that participants who had positive attitudes toward sun protection, perceived that personally important people approved of them using sun protection, and perceived that they had control over their use of sun protection generally had stronger intentions to perform sun protective behaviours (White et al., 2008). In turn, these strong intentions were able to predict actual sun protective behaviour.

Although the framework of the TPB has been credited as being effective in predicting sun-related intentions and behaviour, a large portion of unexplained variance exists within many of these studies. For example, White et al.'s (2008) study contained 64% and 73% of

unexplained variance in sun protective intentions and behaviour, respectively. Likewise, 63% of unexplained variance in intentions to use sunscreen was evident in Hillhouse et al.'s (1997) study. These large portions of unexplained variance appear to be inconsistent with studies that have applied the TPB within other health-related domains. Many of these studies have shown the theoretical framework to account for greater levels of variance. For example, Johnston and White (2003) found that the TPB explained 69% (31% unexplained) of the variance in intentions to binge drink and similarly, Connor and McMillan (1999) found the theory to account for 65% (35% unexplained) of intentions to use cannabis. This suggests that within the context of sun-related behaviour a wide range of predictor variables are needed to be adopted so as to increase the explained variance of sun-related intentions and behaviours. Research that has not explicitly used the TPB, have found a number of factors that influence adolescent sun-related behaviour. These variables include; skin type, perceptions of tanned skin, age, social influence and unrealistic optimism.

Predictor Variables of Adolescent Sun-Related Behaviour

Skin Type

Skin type is an important factor to consider in regards to sun exposure and sun protective behaviour. This is because most cases of skin cancer are found to be among Caucasians (Clarke, Williams, & Arthey, 1997). This is because darker skinned people are at a lower risk of developing skin cancer as their darker skin pigment provides greater protection from ultraviolet radiation (ACS, 2008; Clarke et al., 1997). However, within the Caucasian population risk can vary. There are four different skin types within the Caucasian population: Always burn, never tan (Type I); usually burn, tan less than average (Type II); sometimes mild burn, tan about average (Type III); rarely burn, tan more than average (Type IV; Fitzpatrick, 1988). People who burn

easily and tan poorly, (i.e. those with lighter coloured skin) are at greater risk of developing skin cancer compared to those who easily tan (Clarke et al., 1997; Livingston et al., 2007; Saraiya et al., 2004). No previous studies using the framework of the TPB have included skin type as an additional predictor variable for explaining sun-related behaviour. Studies have shown that skin type has a clear influence over sun protection and sun exposure behaviours.

Studies have shown that greater skin sensitivity is related to a greater avoidance of sun exposure and increased use of sunscreen and other sun protective measures (Banks et al., 2008; Cokkinides et al., 2001; Livingston et al., 2007). For example, an adult study revealed skin type and sun protection to be linearly related, with more sensitive skin being related to greater use of sun protection while, less sensitive skin being related to the use of less sun protection (Clarke et al., 1997). This has also been repeated within adolescent samples (e.g., Broadstock, Borland, & Hill, 1996; Cokkinides et al., 2001; Wichstrøm, 1994). For example, Broadstock et al. (1996) found that greater skin sensitivity (i.e., Type I-II) was associated with less self-reported sunburns and more positive attitudes toward sun protection. In terms of sun exposure, more sensitive skin is associated with greater avoidance of sun exposure. This is most notable amongst those with the most sensitive skin type as they are the most at risk of suffering sunburn (Clarke et al., 1997; Broadstock, et al., 1996).

Perceptions of Tanned Skin

Appearance enhancement, through obtaining a tan, is the key motivational force behind deliberate sun exposure (Mahler, Kulik, Gibbons, Gerrard, & Harrell, 2003). This has been confirmed in many studies. For example, Poorsattar and Hornung (2007) found that 75% of their sample reported that tanning was used to improve attractiveness. Other reasons for tanning are to feel better and to look healthier (Jones, Harris, & Chrispen, 2000; Murray & Turner, 2004).

These perceptions of attractiveness are because of cross-sex perceptions: Men think tanned females are more attractive than non-tanned females, while, females rate darker tanned males as being more attractive (Banerjee, Campo, & Greene, 2008; Broadstock, Borland, & Gason, 1992). Heterosexual females and males do not rate others who are of the same sex as being more attractive when having darker tanned skin (Broadstock et al., 1992). Therefore, the belief that tanned skin is healthier and more attractive is only held because they want to appeal to potential partners of the opposite sex. This rationale is supported in a study by Reilly and Rudd (2008), where gay men sought suntans in order to appear more attractive to potential partners, rather than to fulfil their own beliefs about tanned appearances.

Perceptions of attractiveness and health generally act as both motivators for sun exposure and barriers against sun protection. Those who perceive attractiveness and healthiness to be products of tanned skin purposefully expose themselves to ultraviolet light (Broadstock et al., 1992). Furthermore, to gain the desired tan, sun protection is not used (Paul, Tzelepis, Parfitt, & Girgis, 2008). Appearance enhancement, however, can also act as motivation to use sun protection. The use of sun protection is used to guard against freckles, moles, peeling and the appearance of sunburn (Paul et al., 2008). Thus, the type of motivation appears to be an important factor. Those that perceive tanned skin to be attractive will expose their skin accordingly and use less protection. Those, however, that want to gain (or maintain) attractiveness by avoiding the negative consequences of sun exposure, will most likely use sun protection and avoid sun exposure. The motivation to suntan and to use sun protection however, is directly related to skin type. Those who have more sensitive skin (i.e., those fairer in colour) are those that desire suntans, have more favourable attitudes toward a tan and thus, expose themselves accordingly (Clarke et al., 1997). Those who already have naturally tanned skin are

less motivated to suntan and to use sun protection (Clarke et al., 1997). This is because they are already naturally tanned and perceive that their darkened skin colour provides natural protection from the sun (Clarke et al., 1997). Deliberate sun exposure and engagement in sun protection have also been shown to be a function of age.

Age of Adolescent

Although adolescents, on the whole, are regarded as having the worst sun-safe behaviour, variation does exist within this population. Although relatively few studies have investigated age differences in sun-related behaviour, research has shown that different adolescent age groups have different sun-related behaviours and attitudes (e.g., Broadstock et al., 1996). Older adolescents (15 years and older) have a safer perception of tanned skin and have a lower desire for darker suntans than younger adolescents (Broadstock et al., 1996; Cokkinedes et al., 2001). For example, Cokkinides et al.'s (2001) study found that participants aged 16 to 18 years reported safer perceptions of sun exposure in terms of healthiness and attractiveness (i.e., no-tan being viewed as healthier) compared to participants who were aged 14 and 15 years. Surprisingly, sun protective behaviour, however, works in the opposite direction. Research has shown that older adolescents use the least sun protection (Broadstock et al., 1996; Cokkinides et al., 2001). For example, the wearing of hats and the use of sunscreen is the highest amongst 12-year-olds, while the use of these two methods decreases and stabilises amongst 15 to 17-year-olds (Broadstock et al., 1996). No known TPB study with respect to sun-related behaviour has incorporated age as an additional predictor variable. This may be because these age-related patterns of sun exposure and sun protection have been explained to be a product of conforming to age-related social norms (Lower et al., 1998). The framework of the TPB does include a

concept of norms within its structure, however, the model only measures one of two types of social norms.

Descriptive Norms

Social norms refer to two distinct types of social influence: Descriptive and subjective norms (Larimer & Neighbors, 2003). Descriptive norms represent the perception of how most people behave (i.e., typical behaviour) within a certain situation (Christensen, Rothgerber, Wood, & Matz, 2004; Reno, Cialdini, & Kallgren, 1993). Subjective norms, however, influence behaviour through what is perceived as being approved or disapproved of from significant others (Sheeran & Orbell, 1999). In other words, descriptive norms motivate behaviour through signifying what *is* done, while subjective norms influence behaviour through the perception of what *should* be done. Social norms have been shown to be influential in such behaviours as drinking (Spikerman, van Den Eijnden, Overbeek, & Engels, 2007), condom use (van Empelen, Schaalma, Kok, & Jansen, 2001), exercise (Latimer & Ginis, 2005) and gambling (Larimer & Neighbors, 2003). In regards to sun protection many studies have also noted the influence.

Suntanning and the use of sun protection are strongly related to the behaviour exhibited by friends (Banks et a., 1992; de Vries et al., 2006; Wichstrøm, 1994). Parents have also been shown to have a positive effect on sun protection. For example, Balanda, Stanton, Lowe and Purdie (1999) and Banks et al. (1992) both reported that children's appropriate sun protective behaviour was associated with greater parental sun protective behaviour. It has also been found that by manipulating subjective norms (i.e., increased the belief that one *should* use sun protection) and descriptive norms (i.e., increased the rates of peers using sun protection) within an appearance-based intervention, a participant's own sun protective behaviour was increased

(Mahler, Kulik, Butler, Gerrard, & Gibbons, 2008). Thus highlighting the important role social influence has on sun protective behaviour.

As seen, social norms are an integral component in understanding adolescent sun-related behaviour. The framework of the TPB, however, does not measure complete social influence. Although the structure of the TPB includes a measure of social norms, the theory only measures that of subjective norms. For this reason, the construct of subjective norms has often been acknowledged as the weakest predictor variable within the framework of the TPB (Ajzen, 1991; Armitage & Conner, 2001; Rivis & Sheeran, 2003). Several studies (e.g., Conner & McMillan, 1999; Johnston & White, 2003; Norman, Clark, & Walker, 2005) as well as a meta-analysis (Rivis & Sheeran, 2003) have found that with the inclusion of descriptive norms within the framework of the TPB, the amount of explained variance was increased. To date, no known study in relation to adolescent sun-related behaviour has incorporated descriptive norms as an additional construct of the TPB. White et al. (2008), however, incorporated a similar construct, that of group norms as an additional predictor variable.

Group norms differ from descriptive norms in a number of ways. Firstly, group norms are related to only a specific referent group and secondly, group norms involve not only the performance of behaviour, but, the group's attitude toward that behaviour (White et al., 2008). Therefore, group norms influence behaviour through not only what *is* done, but whether the group *approves* of such behaviour. White et al. (2008) found that the inclusion of group norms (along with image norms) within the TPB explained an extra 11% and 2% of the variance in intention and behaviour, respectively. Image norms were not found to influence intentions or behaviour, whereas group norms were. Group norms were found to be the most influential factor in intentions and the second most important factor when predicting behaviour. Although group

norms have been defined as a separate construct to that of descriptive norms, the study of White et al. (2008), however, provides evidence that friends' behaviour can influence sun protection intentions and behaviour and therefore, should be included within the framework of the TPB. Furthermore, the several studies that have examined the inclusion of descriptive norms have provided evidence and support for the inclusion of the construct as an additional predictor variable within the framework of the TPB. Intentions and behaviour can also be influenced through the mere presence of others, through the process of comparison.

Unrealistic Optimism

Unrealistic optimism, also known as optimistic bias, refers to the perception of being less likely than 'like' others (i.e., same age and sex) to experience negative events (Weinstein, 1980). Essentially, unrealistic optimism indicates a low perception of self risk. Gold (2008) noted that this belief may be held true when compared to any particular individual but, it would be unrealistic to perceive oneself as having lower risk than the average person at a group level. Unrealistic optimism decreases the worry associated with possible negative events and furthermore, acts as a barrier in adopting pro-health-related behaviour (Clarke et al., 1997). This suggests that in terms of sun-related behaviour, high levels of unrealistic optimism could predict low levels of sun protection and high levels of sun exposure. This phenomenon has been documented within many other health-related domains. For example, AIDS (Eiser et al, 1993), breast cancer (Clarke, Lovegrove, Williams, & Machperson, 2000) and smoking (e.g., Helweg-Larsen & Nielson, in press; Williams & Clarke, 1997). Generally, a large indication of unrealistic optimism has often been found within health studies. Few studies, however, have examined its effect on behaviour and/or intentions. The few that have have found promising results.

Dillard, McCaul, and Klein (2006) found unrealistic optimism was significantly associated with fewer intentions to quit smoking. Similarly, low levels of unrealistic optimism in regards to developing cardiovascular diseases was significantly associated with a greater intent to develop a plan to adhere to physical exercise (Schwarzer, Luszczynska, Ziegelmann, Scholz, & Lippke, 2008). A meta-analysis also found that greater perceptions of susceptibility (i.e., less unrealistic optimism) lead to a higher likelihood of getting vaccinated (Brewer, Chapman, Gibbons, Gerrard, McCaul, & Weinstein, 2007). Studies pertaining to skin cancer and sun-related behaviour have also shown some support for the construct.

Five sun-related studies have investigated unrealistic optimism (Bränström et al., 2005; Clarke et al., 1997; Eiser et al., 1993; Eiser & Arnold, 1999; Sjöberg, Holm, Ullén, & Brandberg, 2004), with only one study finding no evidence to support the construct (Eiser et al., 1993). Three studies have also provided evidence that the construct influences behaviour. For example, Eiser and Arnold's (1999) study found that amongst British participants, greater levels of unrealistic optimism were associated with a greater value for a tan and lower levels of sunscreen use (Eiser & Arnold, 1999). Clarke et al. (1997), however, found that unrealistic optimism only accounted for an extra 2% to 5% of the variance in suntanning and sun protective behaviour. The small amount of variance explained within this study, however, may have been due to analysis error.

Typically unrealistic optimism is assessed directly or indirectly. The direct measure involves asking a participant to rate their personal risk compared to a peer who is of the same age and sex (French & Hevey, 2008). An example of this type of questioning is: *"Compared to other boys your age, what are your chances of being in a car crash sometime during your life?"* An indirect approach involves asking the participant to make two distinct judgements, one based on

their own risk and one based upon another's risk who is of the same age and sex (French & Hevey, 2008). For example, "*What is the chance that you will be involved in a car crash sometime during your lifetime?*", and, "*What is the chance another boy your age will be involved in a car crash sometime during his lifetime.*" When measurement consists of the indirect approach, the personal-estimates are subtracted from peer-estimates, with any positive figure indicating optimism (French & Hevey, 2008) and it is this score that should be used within analysis. Clarke et al. (1997), however, did not use this score and instead entered the data from self and peer estimates as two separate entities. Using scores in this way was incorrect as the score of unrealistic optimism (the difference between personal and peer estimates) was not used. Therefore, the variance within this study may have been higher if the correct figure was used within analysis.

Of the five studies utilising unrealistic optimism within sun-related behaviour, only Sjöberg et al. (2004) used an adolescent sample. Sjöberg et al.'s (2004) study comprised of participants aged 13, 15 and 17 years ($N = 2{,}615$). A large unrealistic optimism for both tanning and skin cancer was found within the sample, across all ages and genders. These results provide promising evidence that unrealistic optimism is associated with sun-related behaviour.

In summary, there is a lack of research on the application of unrealistic optimism in regards to adolescent sun-related behaviour. Firstly, only one study has examined its effect within an adolescent population and secondly, this study only applied unrealistic optimism in terms of sun exposure and not sun protection. Although many studies, across many health domains, have examined unrealistic optimism, they have merely explored the existence of the construct, rather than the effect it has on behaviour. The few studies that have explored its relationship between behaviour and intentions have provided evidence to its usefulness in

predicting sun-related behaviours. Given the influence unrealistic optimism can have over health-related behaviour, including sun-related behaviour, its use within the framework of the TPB appears valid.

Implications of Review Findings

The literature on sun protection has consistently reported the consequences of excessive sun exposure and inadequate use of sun protection. Unprotected ultraviolet radiation exposure, either from the sun or tanning beds, coupled with early life sun exposure are significant risk factors associated with developing both melanoma and non-melanoma skin cancers. Adolescence is an age group of particular concern because of the lack of sun protection used within this age group. The framework of the TPB can be implemented to investigate the underlying processes of adolescent sun-related behaviour. In the literature, the predictor variables of TPB have been widely used to investigate the motivating factors behind a wide range of health-related behaviours, including sun-related behaviour.

The few studies pertaining to sun-related behaviour have mainly investigated adult samples and have only concentrated on sun exposure and sunscreen use. Only one study, White et al. (2008) has examined general sun protection behaviours and it is also the only known TPB study that has used an adolescent sample in regards to sun-safety. Much like other sun-related TPB studies, White et al. (2008), contained a large degree of unexplained variance. The literature has indicated several useful predictors that could be added to the framework of the TPB, consequently increasing the predictive power of the model to explain more variability in both intentions and behaviour. No TPB study pertaining to sun-related behaviour has incorporated skin type, perception of tanned skin, age and unrealistic optimism as additional predictor

variables of sun-related behaviour. Therefore, the validation of their use as additional predictor variables of the TPB has been derived from non-TPB research.

Directions for Future Research

Future research should consider applying the constructs of the TPB toward examining predictor variables concerning adolescent sun-protection. This is because, as mentioned earlier, only one study has applied the TPB within an adolescent sample and it was the only study that investigated general sun protection. A large amount of unexplained variance was also evident within this study, inferring that there are several other predictor variables that could be used to gain greater understanding of adolescent sun-protection. In predicting adolescent sun protective behaviour, the TPB may benefit from the inclusion of skin type, age, unrealistic optimism and descriptive norms as additional predictor variables.

Skin type has been shown to be an influential variable in both suntanning and sun protective behaviour. It is also directly linked with motivations to gain and attitudes toward tanned skin. No known TPB studies have included skin type as an additional construct and therefore leaves an avenue for future exploration. Unrealistic optimism has been shown to be influential in a number of health-related behaviours, including suntanning. In addition, it may prove beneficial to apply this construct to a teen sample as it has been shown that in terms of smoking, adolescents have shown to have a greater unrealistic optimism than adults (Arnett, 2000). Furthermore, no known research has used unrealistic optimism within an Australian adolescent sample, nor has it been used in terms of sun protection. Relatively few studies have researched the association between unrealistic optimism and behaviour, therefore, any future research should examine this relationship so as to expand on the limited body of knowledge in this area. In addition to unrealistic optimism, it is proposed that future research should include

descriptive norms when applying the TPB toward sun-related behaviours. Several studies have noted the influence of friend's and family's behaviour on personal sun-related practices yet, only one TPB study has utilised descriptive norms when investigating adolescent sun protection. It may prove beneficial to utilise the additional components of skin type, unrealistic optimism and descriptive norms so as to increase the predictive power of the TPB, thus allowing for a greater explanation of behavioural variance. With a greater predictive power, the TPB could identify which of its constructs; attitude, subjective norms, PBC, intention, skin type, age, descriptive norms, and unrealistic optimism, account for the majority of variance in sun protective behaviour. From this, better interventions could be created based upon the most influential factors that are aimed at changing behaviour and increasing sun protective habits amongst Australian adolescents.

Summary

This review has discussed the prevalence and risk factors associated with skin cancer, highlighting adolescent sun-related behaviour and the implications their behaviour can have on the development of skin cancer. The efficacy of the TPB and its application toward sun-related behaviour was reviewed. The literature regarding additional predictors of adolescent sun exposure and sun protection was examined and in doing so, demographical, psychological and psychosocial factors associated with sun related behaviour were discovered. This paper has highlighted important avenues for research regarding sun protection, specifically utilising the TPB along with the additional variables of skin type, age, unrealistic optimism and descriptive norms, to increase the predictive power of the TPB within an adolescent population.

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Running head: PREDICTING ADOLESCENT SUN PROTECTION

Predicting Adolescent Intentions to Use Sun Protection: Extending the Theory of Planned Behaviour

Geoffrey S. Carastathis

Predicting Adolescent Intentions to Use Sun Protection: Extending the Theory of Planned Behaviour

Abstract

Adolescence presents itself as a particular time in which the adoption of sun protective behaviour is imperative. However, compared to all other age groups, adolescents have been acknowledged has having the worst sun-safety behaviour. It is therefore important to investigate what influences adolescents to engage in sun protective behaviours. The present study examined the sun protection intentions of adolescents (N = 102), living in Western Australia, through extending the theory of planned behaviour (TPB) to incorporate the additional influencers of descriptive norms, unrealistic optimism, age and skin type. Consistent with the hypotheses and previous non-TPB research findings, the inclusion of the additional predictor variables were able to account for significantly more of the variance in intentions to use sun protection than the original constructs of the TPB alone. Regression analyses, however, revealed that of the additional predictor variables, only age and unrealistic optimism made significant, unique contributions in predicting intentions to use sun protection. The research highlights the important influence age and unrealistic optimism can have upon adolescent intentions to use sun protection. The findings validate the use of these additional predictor variables along with the TPB to predict the intentions of adolescents to use sun protection.

KEY WORDS: Theory of planned behaviour, sun protection, adolescents, intentions.

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Adolescent Intentions to Use Sun Protection: Extending the Theory of Planned Behaviour

Australian adolescents are credited with having the highest level of knowledge of skin cancer of any group of young people in the world, including its causes and its prevention (Livingston, White, Hayman, & Dobbinson, 2007). Ironically, however, this age group spends the most time in the sun, have a greater desire for suntans and generally do not engage in sun protective behaviours (Arthey & Clarke, 1995; Dixon, Borland, & Hill, 1999; Stanton, Janda, Baade, & Anderson, 2004). The need to use sun protection is especially important for adolescents as their skin is more sensitive to the harmful effects of ultraviolet radiation (Livingston et al., 2007; Livingston, White, Ugoni, & Borland, 2001). For example, severe sunburn between the ages of 15 to 20 years significantly increases the risk of developing melanoma in later life (Livingston et al., 2007). This risk, however, can be significantly reduced by adopting and maintaining sun protective behaviours from an early age throughout one's life (Peattie, Peatti, & Clarke, 2001). These protective behaviours include wearing a hat; wearing clothes that cover up exposed skin; staying in the shade; avoiding peak ultraviolet radiation times and using sunscreen (Eiser & Arnold, 1999). It is evident throughout the world that these behaviours have not been adopted by adolescents (e.g., Bränström, Kristjansson, & Ullén, 2005; de Vries, Mesters, van't Riet, Willems, & Reubsaet, 2006). It is therefore important to investigate the underlying influences upon adolescent sun protection. One way to do this is to utilise the framework of the theory of planned behaviour (TPB; Ajzen, 1991). The use of the TPB is warranted because it is one of the most commonly adopted frameworks used to explain health-related behaviour.

The TPB is a social-cognitive model that asserts that behaviour is a function of intention (motivation to perform behaviour) and perceived behavioural control (PBC; the perception of how easy or difficult the execution of a particular behaviour is). Intention itself is influenced by the constructs of attitude (positive or negative evaluation), subjective norm (how one *should* behave according to perceptions of social approval or disapproval) and PBC (Ajzen, 1991). The constructs of attitude, subjective norms and PBC are the general predictors of behaviour and are used to determine both intentional and behavioural variance (Conner & Armitage, 1998). The stronger the attitude (i.e., the more positive it is), the greater the perceived social pressure and the greater the perception of control, in turn, typically reflects stronger intentions to engage in a particular behaviour (Ajzen, 1991).

Support for the use of the TPB to explain people's behaviour is widespread. For example, Armitage and Conner's (2001) meta-analysis of 185 studies (of various topics) concluded that the framework was an effective tool to predict both intentions and behaviour. The meta-analysis found that the TPB was able to account for 27% and 39% of variance in behaviour and intentions, respectively. Furthermore, the framework of the TPB has been successfully applied to predict a wide range of health-related behaviours such as smoking (Higgins & Conner, 2003), healthy eating (Åstrøm & Rise, 2001), condom use (Albarracin, Johnson, Fishbein, & Muellerleile, 2001) and binge-drinking (Johnston & White, 2003). Its application, however, to sun-related behaviours (i.e., suntanning, use of sun protection) is not as widely used, with only five known studies having investigated this domain (Bränström, Ullén, & Brandberg, 2004; Hillhouse, Adlerm, Drinnon, & Turris, 1997; Jones, Abraham, Harris, Schulz, & Chrispin, 2001; Myers & Horswill, 2006; White et al., 2008). Most of these studies have investigated sun exposure and sunscreen use, with only one study having investigated sun protection. Furthermore, this one

study, that of White et al. (2008), is also the only known sun-related investigation to have examined adolescent sun-safety behaviour. Thus, the application of the TPB to an adolescent sample regarding sun-related behaviour is under-researched.

In White et al.'s (2008) adolescent study, the framework of the TPB was able to account for a significant portion (25%) of the variance in both sun protective intentions and behaviour. White et al. (2008) also included two additional constructs, that of group and image norms, to the framework of the TPB. Group norms refer to the consideration of whether or not important members of a salient referent group perform a certain behaviour as well as take into consideration the group's attitude toward that behaviour (i.e., approve or disapprove; White et al., 2008). Therefore, group norms influence behaviour through not only what *is* done, but whether the group *approves* of such behaviour. Image norms refer to the stereotypical views of society upon certain groups (i.e., tanned people are attractive; White et al., 2008). With the inclusion of the predictor variables of group and image norms, the model was able to explain an additional 11% of the variance in intentions and 2% of the variance in behaviour. Furthermore, all predictor variables apart from image norm were found to significantly contribute to the prediction of intentions, while only group norms and intentions were able to predict behaviour. White et al.'s (2008) results appear to be consistent with previous studies that have investigated sunscreen use in adult samples. These studies found the framework of the TPB was able to account for 44% and 32% of the variance in intentions to use sunscreen (Jones et al., 2001; Myers & Horswill, 2006).

Although the predictors that form the basis of the TPB were able to account for a significant proportion of variance in adolescent sun protective behaviour and intentions, there was still a noticeable amount of unexplained variance. This appears to be common amongst the few

studies that have applied the constructs of the TPB to predict sun-related behaviour. For example, 63% of unexplained variance in intentions to use sunscreen was evident in Hillhouse et al.'s (1997) study. Similarly, the framework was unable to account for 68% of variance in intentions to use sunscreen within the study of Myers and Horswill (2006). These large portions of unexplained variance appear to be inconsistent with studies that have applied the framework of the TPB to predict other health-related behaviours and intentions. Many of these studies have shown the model to account for greater levels of variance. For example, Johnston and White (2003) found that the model explained 69% (31% unexplained) of the variance in intentions to binge drink and similarly, Connor and McMillan (1999) found the framework to account for 65% (35% unexplained) of intentions to use cannabis.

This inconsistency between sun-related behaviour and other health-related studies suggests that there are constructs other than those that comprise the framework of the TPB that need to be considered when predicting adolescent sun-related behaviour. The literature has noted psychological, psychosocial and demographical factors. These include descriptive norms, unrealistic optimism, age and skin type. To date, no known TPB study has incorporated these constructs as additional predictor variables when predicting sun-related behaviour of either adults or adolescents.

It is argued that there are two distinct types of social influences, namely, subjective and descriptive norms (Larimer & Neighbors, 2003; Rivis & Sheeran, 2003). As mentioned earlier, subjective norms refer to the perception of how one *should* behave, taking into account perceptions of approval or disapproval of their behaviour (Ajzen, 1991; Sheeran & Orbell, 1999). On the other hand, descriptive norms refer to the perception of how others actually behave (Christensen, Rothgerber, Wood, & Matz, 2004) and therefore behaviour is influenced through the perception of

what *is* done (Sheeran & Orbell, 1999). It is not clear which normative influence has the greater impact on motivating behaviour (Conner & McMillan, 1999; Norman, Clarke, & Walker, 2005). It is, however, argued that subjective norms have the least predictive power within the TPB, therefore, suggesting that the construct has a weak influence over behaviour (Ajzen, 1991; Armitage & Conner, 2001). This infers that descriptive norms may provide for greater understanding of motivations to perform or not perform any given behaviour. Descriptive norms have yet to be included within any sun-related study that has applied the framework of the TPB. The need to include descriptive norms when predicting adolescent sun protection is further emphasised through non-TPB research.

The concept of descriptive norms has been reflected in many suntanning and sun protection studies. These studies have shown that an individual's sun-related behaviour (suntanning, sun protection, and so on) is positively related to friends' behaviours (e.g., Banks, Silverman, Schwarts, & Tunnessen, 1992; de Vries et al., 2006; Mahler, Kulik, Butler, Gerrard, & Gibbons, 2008; Wichstrøm, 1994). Several TPB studies (e.g., Conner & McMillan, 1999; Johnston & White, 2003; Norman et al., 2005) as well as a meta-analysis (Rivis & Sheeran, 2003) have found that incorporating descriptive norms as an additional component of the TPB to be useful in increasing the framework's ability to accurately predict both behaviour and intentions. These studies clearly advocate the use of descriptive norms as an additional predictor variable within the TPB.

Another construct which may be beneficial to include within the TPB, with respect to adolescent sun protection, is that of unrealistic optimism (Weinstein, 1980). Unrealistic optimism (sometimes called optimistic bias) refers to the perception of being less at risk of experiencing something negative compared to other people who are of the same age and sex (Weinstein, 1980). Unrealistic optimism decreases the worry associated with possible negative events and therefore,

it acts as a barrier in adopting pro-health-related behaviour (Clarke, Williams, & Arthey, 1997). The TPB lacks any predictor variables that take into account a perception of risk. Norman, Conner and Bell (1999) suggested that the TPB should incorporate a construct that measures risk perception, as it plays a central role in the adoption of pro-health behaviour. The inclusion of unrealistic optimism as an additional predictor variable of the TPB, however, has not yet been investigated.

Various studies have found that people demonstrate unrealistic optimism in a range of health domains such as AIDS (Eiser, Eiser, & Pauwels, 1993), breast cancer (Clarke, Lovegrove, Williams, & Machperson, 2000), smoking (e.g., Helweg-Larsen & Nielson, in press; Williams & Clarke, 1997) and more importantly sun-related behaviour (e.g., Bränström, et al., 2005; Clarke et al., 1997; Sjöberg, Holm, Ullén, & Brandberg, 2004). Few studies, however, have examined how this construct influences behaviour and/or intentions. The few that have, however, have found the psychological construct to have some influence over behaviour and intentions such as smoking and receiving vaccinations (e.g., Brewer, Chapman, Gibbons, Gerrard, McCaul, & Weinstein, 2007; Dillard, McCaul & Klein, 2006)

Only three studies have examined unrealistic optimism and its influence on sun-related behaviour (Eiser & Arnold, 1999; Clarke et al., 1997; Sjöberg et al., 2004). Only one of these studies explicitly stated the relationship between the construct and behaviour, while the other two only included the construct as a variable to account for explained variance in suntanning and sun protective behaviour. For example, Eiser and Arnold's (1999) study found that amongst British participants, greater unrealistic optimism was associated with a greater desire for a tan and lower levels of sunscreen use (Eiser & Arnold, 1999). While, Clarke et al. (1997) found that the construct provided an additional 2% to 5% of explained variance in suntanning and sun

protective behaviours of an adult sample. Of particular importance was a study pertaining to adolescent sun exposure conducted by Sjöberg and colleagues (2004). They found a large degree of unrealistic optimism for both tanning and skin cancer, across all ages (13, 15, 17-years-old) and across both genders. No known study to date has incorporated unrealistic optimism within the framework of the TPB to explain sun-related behaviours. In general, these three studies that have examined unrealistic optimism and sun-related behaviour have provided merit to the use of the construct as an additional predictor variable within the TPB.

Apart from psychological and psychosocial factors, the research has also suggested that skin type and age are important predictors of adolescent sun protection. Yet, no known TPB study pertaining to sun-safety has incorporated these two demographical factors. Studies have shown that greater skin sensitivity is related to a greater avoidance of sun exposure and increased use of sunscreen and other sun protective measures (Banks et al., 1992; Cokkinides et al., 2001; Livingston et al., 2007). More importantly, this has been repeated within adolescent samples (e.g., Broadstock, Borland, & Hill, 1996; Cokkinides et al., 2001; Wichstrøm, 1994). For example, Broadstock et al. (1996) found that greater skin sensitivity was associated with fewer self-reported sunburns and more positive attitudes towards sun protection.

Although adolescents typically have the worse sun-safe behaviour, variation does exist within the population (e.g., Broadstock et al., 1996). Adolescents around the age of 15 years have less positive attitudes towards tanned skin and a lower desire to gain a suntan compared to younger adolescents (Broadstock et al., 1996; Cokkinedes et al., 2001). By contrast, in terms of their actual sun protective behaviours, older adolescents use the fewest sun-protective methods compared to younger age groups (Broadstock et al., 1996; Cokkinides et al., 2001). The decrease seen in sun protection between younger and older adolescents has been suggested as being the

result of parents and schools having less influence over older adolescents (Sjöberg et al., 2004; Lower, Girgis & Sanson-Fisher, 1998). To date, no known TPB study with respect to sun-related behaviour has incorporated age as an additional predictor variable and given the effect that age can have on sun protection, it may prove beneficial to include this construct within the framework of the TPB.

In summary, little research using the framework of the TPB has predicted adolescent intentions and behaviour in regards to using sun protection. Typically, the TPB has been applied to adult samples when researching sun-related behaviour and most of this research has focused on sunscreen use rather than sun protection in general. Furthermore, the sun-related research using the TPB has often yielded large amounts of unexplained variance in both intentions and behaviours. Research, other than using the TPB framework, has shown age, skin type, descriptive norms and unrealistic optimism to be important factors relating to adolescent sun protection.

The first aim of the present study was to build on the limited research using the TPB to predict adolescent intentions to use sun protection. The second aim of this study was to incorporate and examine the effectiveness of the additional predictor variables of age, skin type, descriptive norms and unrealistic optimism, within the TPB framework. Based on previous TPB research, it was expected that descriptive norms would increase the predictive power of the model. The variables of age, skin type and unrealistic optimism were also expected to increase the explained variance, but this claim is only inferred from non-TPB studies as no actual studies have incorporated these three additional predictor variables. Based on previous non-TPB research, it was first hypothesised that the variance in intention to use sun protection would be better explained when the constructs of age, skin type, descriptive norms and unrealistic

optimism were added to the TPB framework. It was further hypothesised that the additional predictor variables would make a significant contribution to the prediction of intentions to use sun protection.

The study's design involved a self-report survey measuring components of the TPB along with descriptive norms, unrealistic optimism, skin type and age. These scores were then correlated with participants' intentions to use or not to use sun protection over a subsequent two-week period.

Method

Participants

The sample consisted of 102 participants (118 prior to data screening), including 57 females (56%) and 45 males (44 %). The age of participants ranged from 11 to 18 years, with a mean age of 14.27 years ($SD = 2.12$). Participants were recruited through schools or through family, friends and co-workers of the researcher. The majority of the sample was recruited using convenient sampling, though some participants were also recruited through snowball sampling.

A formal application form to conduct research in schools was completed for the Department of Education and Training (DET) of Western Australia. Information letters and consent forms were both given to principals (Appendix A) and teachers (Appendix B). Five secondary schools were approached and two offered their participation. Students were required to take home information letters for their parents (see Appendix C), a parental consent form (see Appendix D), a student information letter (see Appendix E) a student consent form (see Appendix F) and the sun protection survey (see Appendix G). Parental consent was required for participants aged less than 18 years.

Completed surveys that did not have an accompanied signed parent consent form were

not included within the study. Non-school recruited participants were also given information letters and were required to fill out consent forms. These documents were the same as those handed out to school recruited participants. Response rate was high for non-school participants (around 80%) and for schools it varied according to school (1% and 20%).

Materials

The self-report sun survey was constructed according to the standardised methodology detailed by Francis et al. (2004). The questionnaire contained direct measures of the main constructs of the TPB. The wording and types of questions used within this study to assess sun-related intentions were derived from previous sun-related behaviour studies which used the framework of the TPB (e.g., White et al., 2008). Most of these studies reported having a moderate to high level of internal reliability per construct, with Cronbach's alpha (α) ranging from .45 to .96 (e.g., Hillhouse et al., 1997; Myers & Horswill, 2006; White et al., 2008). Constructs were measured using a 7-point Likert scale (strongly agree – strongly disagree), unless otherwise specified. Construct scores were created by summing each scale's items (apart from unrealistic optimism, age, skin type), with higher scores indicating greater construct measures (i.e., higher scores on the attitude scale indicated more positive attitudes). All of the constructs measured in the survey are described below.

Intention. The strength of intention to use sun protection was assessed using three items: "Over the next two weeks, when I am in the sun for ten minutes or more: *I intend*; *I want*; *I expect* to protect myself." Consistent with previous research, this scale had a high internal consistency ($\alpha = .85$).

Attitude. The attitudinal scale consisted of seven items designed to assess whether attitudes toward sun protection were positive or negative. These items were assessed using a 7-

point semantic-differential scale. For example: "Performing sun protective behaviour every time I go in the sun for 10 minutes or more is: *Right – Wrong, Good – Bad, Pleasant – Unpleasant.*" Cronbach's alpha for these items were high ($\alpha = .84$).

Subjective Norm. Four items were used to measure subjective norm. For example, "If I am in the sun for ten minutes or more, people who are important to me (family/friends) think that I should use some form of sun protection." Items pertaining to subjective norms resulted in a Cronbach's alpha of moderate reliability ($\alpha = .65$).

Perceived Behavioural Control. Perceived behavioural control was assessed by using four items. For example, one of the items was "The decision to protect myself, when in the sun for ten minutes or more over the next two weeks, is beyond my control." The reliability of the items measuring PBC within this study was low ($\alpha = .24$) and therefore only one item was used (the one given above as an example).

Unrealistic Optimism. Unrealistic optimism was measured using the indirect method. Two separate questions were asked, one regarding a personal estimate of risk and one regarding a peer estimate risk (French & Heavey, 2008; Gold, 2007). Gold (2007) suggested that in using the indirect approach, a more accurate measurement of unrealistic optimism can be attained. When measurement consists of the indirect approach, peer-estimates are subtracted from personal-estimates, with any positive figure indicating optimism (French & Hevey, 2008). The two items used within this study were: (1) "What is the chance that the typical person (your age & sex) will develop skin cancer in his/her lifetime?" (peer-estimate). (2) "What do you think is the likelihood that you will develop skin cancer in your lifetime?" (self-estimate). The possible score for these measures ranged from 0 to 6, with 0 equalling no unrealistic optimism (i.e., realistic). Higher scores indicated greater unrealistic optimism.

Descriptive Norms. Three items were used to measure this construct. For example, "Many people my age, protect themselves when they are in the sun for ten minutes or more." Cronbach's alpha for these items showed a moderate reliability coefficient ($\alpha = .67$).

In addition to the above specified scales, participants were asked for demographic information. This included, age, sex, school grade and skin colour. Skin colour categories were derived from two previous studies and included: (1) Burn only, never tan; (2) Burn first, then tan; (3) Do not burn, just tan; (4) Do not burn, naturally dark skin (Clarke et al., 1997; Mahler, Kulik, Gibbons, Gerrard, & Harrell, 2003). Therefore, higher scores on skin type indicated less skin sensitivity.

Procedure

The survey took approximately five to ten minutes to complete. Schools participating in the project were supplied with the sun survey pack (i.e., information letters, consent forms, surveys). The classroom teachers handed out the sun survey pack and encouraged and reminded students to fill out the survey as well as to return the necessary completed paperwork within a one-week period. Non-school recruited participants were recruited through friends, family and co-workers and were also given the same sun survey pack as the school-recruited participants. Non-school recruited participants filled out the survey either at the location where they received it, or took it home and returned it to the researcher at a later stage.

Results

Data cleaning and screening

Prior to analysis, all surveys were checked for systematic responses (i.e., the same answer was given to all of the questions), missing responses, incomplete consent forms as well as participants who were outside the age range of the study. There were six surveys that had been

systematically filled out (e.g., the response 1 was given to all of the questions), two surveys had missing responses, four surveys did not have consent forms attached and two surveys fell outside the age range. All 14 of these surveys were not used within the study. The surveys with missing responses were not used within the analysis as they contained either one or several pages of incomplete data.

Before interpreting the results of the analysis, a number of assumptions were tested. The assumptions of normality, linearity and homoscedasticity of residuals were met. This was achieved by inspecting the normal probability plot of standardised residuals and the scatterplot of standardised residuals against standardised predicted values. Mahalanobis distance exceeded the critical χ^2 for $df = 7$ (at $\alpha = .001$) of 27.73 for one case in the data file. This case was deleted. Using the equation, $N \geq 50 + 8m$ (where m = number of independent variables; Tabachnik & Fidell, 2001), the sample size was shown to be short by four participants. This was deemed acceptable. Lastly, acceptable levels of tolerances and variance inflation factors indicated that multicollinearity would not interfere with interpretation.

Descriptive Statistics

The majority of the sample comprised of "burn first, then tan" (59%) and "do not burn, just tan" (29%) skin types. Of the 102 participants, only two reported not spending more than ten minutes in the sun over the past two weeks. Of those who had spent ten minutes or more in the sun, sun protection was mostly used "some of the time" (48%) followed by "most of the time" (48%), "never" (22%) and "all of the time" (4%). The most performed sun protective behaviour was using sunscreen (23%) followed by a combination of behaviours (i.e., use of one or more sun protective behaviours; 22%), seeking shade (19%), wearing a hat (10%) and wearing clothes to cover up exposed skin (5%). Twenty-one participants (21%), however, did not use any sun

protection. The majority of the sample (76%) reported not having being sunburned over the past two weeks, while sixteen participants (16%) experienced being "a little sunburnt", six participants (6%) responded to "quite sunburnt" and only two (2%) reported being "very sunburnt".

Inspection of the mean scores and standard deviations (see Table 1) revealed that the sample were overall quite positive to the use of sun protection. Subjective norms were also quite high, indicating a high perception of social approval toward the use of sun protection. Intentions and PBC were also fairly high within the sample, indicating a general intent to use sun protection and perception of control over their sun protective behaviour. Descriptive norms were mid-ranged, indicating a somewhat weak perception of peer influence.

Table 1

Means and Standard Deviations for Intention, PBC, Subjective Norms, Attitude, Descriptive Norms and Unrealistic Optimism

Variable	*M*	*SD*
Intention	15.79	3.53
PBC	5.04	1.98
Subjective Norms	22.95	3.57
Attitude	41.68	5.79
Descriptive Norms	14.58	3.27
Unrealistic Optimism	.9706	1.56

Predicting Adolescent Sun Protection

Table 2 presents the correlations among the seven predictor variables and more importantly with intentions. As seen in Table 2, all predictor variables were correlated with

intentions, with attitude, subjective norms and descriptive norms indicating the strongest positive relationship. Unrealistic optimism and skin type were weakly but, positively associated with intentions. These positive associations meant that greater scores were associated with a greater intent to use sun protection. Negative weak associations were seen between PBC and age, indicating that greater scores on these constructs were associated with a decline in intentions to use sun protection.

Table 2

Intercorrelations Among Intentions, Attitude, Subjective Norms, PBC, Unrealistic Optimism, Descriptive Norms, Skin Type and Age (N=103).

Scale	2.	3.	4.	5.	6.	7.	8.
1. Intention	.53***	.67***	–.29***	.39***	.23*	.50***	–.37***
2. Attitude	—	.51***	–.25**	.19*	.17*	.56***	–.19*
3. Subjective Norms	—	—	–.36***	.28**	.18*	.51***	–.39***
4. PBC	—	—	—	–.01	–.25**	–.35***	–.23**
5. Unrealistic Optimism	—	—	—	—	–.15	.08	–.11
6. Skin Type	—	—	—	—	—	.33***	.01
7. Descriptive Norms	—	—	—	—	—	—	–.10
8. Age	—	—	—	—	—	—	—

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

The two primary hypotheses deal with the effectiveness of the additional predictor variables in accounting for additional variance and proving to be significant contributors to the prediction of intentions to use sun protection. To examine these hypotheses, and the results from the correlation analysis, a regression analysis was conducted. To control for the effects of the

standard constructs of the TPB, so as to evaluate the effectiveness of the additional predictor variables, a hierarchical multiple regression technique was used (Tabachnick & Fidell, 2001). The predictors pertaining to the framework of the TPB were entered in the first step of the analysis, followed by the additional predictor variables in the second step. The results of the regression analysis are summarised in Table 3.

Table 3

Summary of Regression Analyses for Variables Predicting Intentions to use Sun Protection

Variable	*B*	*SE B*	β
Step One: Prediction of Intention			
Attitude	.15	.05	.25**
Subjective Norms	.52	.09	.53***
PBC	−.07	.14	−.04
Step Two: Prediction of Intention			
Attitude	.11	.05	.17*
Subjective Norms	.35	.10	.35***
PBC	−.01	.13	−.003
Unrealistic Optimism	.57	.16	.25***
Skin Type	.62	.37	.12
Descriptive Norms	.16	.10	.15
Age	−.28	.12	−.16*

Note. Prediction of Intention Regression: $R^2 = .50$ for Step 1; $\Delta R^2 = .09$ for Step 2 ($p < .001$).

*p<.05, **p<.01, ***p<.001

Original Framework of the TPB. In terms of the original framework of the TPB, the model was a significant predictor of intentions, $F(3, 98) = 32.59, p < .001$. The model was able to account for approximately 50% ($R^2 = .50$, Adjusted $R^2 = .48$) of the variance in intentions. Both attitude and subjective norms made significant contributions to the first step of the hierarchical regression. Both were positive predictors of intention such that higher levels of these two variables were associated with greater intent to use sun protection.

TPB with Additional Predictor Variables. Entry of unrealistic optimism, descriptive norms, age and skin type into the second step also proved to be a significant predictor of intention to use sun protection $F(7, 94) = 19.16, p < .001$. With the inclusion of the additional variables, the model accounted for around 59% ($R^2 = .588$, Adjusted $R^2 = .56$) of the variance in intentions. Thus, the additional variables explained around 9% more of the variance in intentions, which was significant ($p < .001$; see Table 3).

On analysis of the standardised regression coefficients (β) within step two of the hierarchical regression, the predictor variables of attitude, subjective norms, unrealistic optimism and age made significant and unique contributions to the amount of explained variance in the regression model. Attitudes, subjective norms and unrealistic optimism were positively related with intentions to use sun protection. Greater attitudes, subjective norms and unrealistic optimism were associated with a greater intent to use sun protection. Age, however, was negatively associated with intentions, such that older age was related with lower intentions to use protection (see Figure 1).

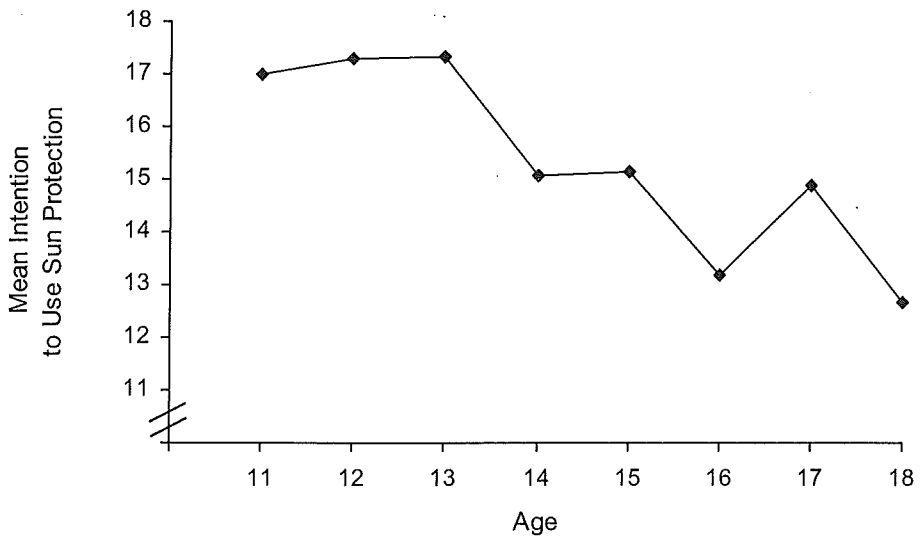

Figure 1. Mean intention to use sun protection with respect to age.

Unrealistic Optimism. The procedure used by Gold (2008) to assess unrealistic optimism was followed within this study and calculated in the following way. The overall unrealistic optimism scores were achieved by subtracting peer-estimates from self-estimates, with any positive figure indicating unrealistic optimism. A score of zero would indicate realism. Therefore, the sample's overall unrealistic optimism score was compared to zero. The sample's unrealistic optimism score ($M = .97$, $SD = 1.56$) was significantly greater than zero, $t(102) = 6.30$, $p < .05$, indicating that the sample as a whole displayed unrealistic optimism in regards to developing skin cancer.

Discussion

This study sought to apply an extended version of the TPB, incorporating the additional variables of unrealistic optimism, descriptive norms, age and skin type, to the prediction of intentions to use sun protection among a sample of Western Australian adolescents. This study has built on the limited research that had been conducted with respect to the application of the TPB to an adolescent sample when investigating sun protection. Furthermore, to date, no known

research has incorporated the additional predictor variables that were examined within this study in regards to their inclusion within the TPB framework. The results of this study supported both hypotheses, but only partially. It was first hypothesised that the additional predictor variables, when added to the framework of the TPB, would account for significantly more of the explained variance in adolescent intentions to use sun protection. It was further hypothesised that each of the additional predictor variables would contribute significantly to the prediction of adolescent intentions to use sun protection.

The standard components of the TPB were found to account for around 50% of the variance in intentions to use sun protection. With the inclusion of the additional predictor variables, the model was able to account for significantly more (additional 9%) of the explained variance in intentions to use sun protection. Thus, the first hypothesis of this study was supported along with supporting previous non-TPB research which identified descriptive norms, unrealistic optimism, age and skin type to be important influencers in regards to adolescent sun protection (e.g., Bränström et al., 2005; Clarke et al., 1997; de Vries et al., 2006). However, the second hypothesis was only partially supported with the results indicating, that of the additional predictor variables, only age and the construct of unrealistic optimism emerged as important variables. Both unrealistic optimism and age were shown to have unique effects upon intentions to use sun protection.

Although the results indicated that the sample as a whole were in fact unrealistically optimistic about their chances of developing skin cancer, it was however, found that greater unrealistic optimism scores were related to greater intentions to use sun protection. Interestingly, the construct of unrealistic optimism was shown to be the second most important variable of all the predictor variables (TPB variables and additional variables). Thus, those that perceived

themselves as being less at risk of developing skin cancer were also the ones who had the greater intent to use sun protection. This result is surprising, as it was expected that greater unrealistic optimism would be associated with fewer intentions to use sun protection. This expectation was based upon the research of Eiser and Arnold (1999) in which greater desires for a tan and lower levels of sunscreen use were related to increased levels of unrealistic optimism. A possible explanation for the discrepancy between this study's findings and those of Eiser and Arnold's (1999) may be because the majority of the sample (79%) used some form of sun protection during the two-weeks prior to the survey. In doing so, the sample may have perceived themselves as being less at risk because they were in fact protecting themselves from experiencing a sunburn and in turn, safeguarding against skin cancer. Furthermore, the majority of the sample (76%) had not experienced sunburn during the two weeks prior to the survey, again this may have increased their perception of being less at risk for developing skin cancer than others because they had not experienced sunburn, which is related to the development of skin cancer.

Consistent with previous research (e.g., Broadstock et al., 1996; Cokkinides et al., 2001), age was found to be negatively associated with intentions to use sun protection. It was evident from the results that, generally, as participants got older their intentions to use sun protection became weaker. This may reflect the suggestions brought forward by Sjöberg et al. (2004) and Lower et al. (1998). Sjöberg et al. (2004) suggested that parents had greater influence and control over their children when they are 13-years-old than they do when they are 17-years-old, thus being able to enforce correct sun protective behaviours. Lower and his colleagues (1998) suggested that primary school children are highly compliant with the sun protection practices that are heavily enforced during primary school. This compliance and routine practice of sun-

safety often carries over to the first couple of years of high-school (Lower et al., 1998). The carry over effect, however, eventually wears off once the behaviour of friend's and other social pressures start to become more influential within a young person's life (Lower et al., 1998). Of the two social influences measured within this study, only subjective norms emerged as an important variable.

Subjective norms were in fact found to be the strongest predictor variable out of all the variables measured within this study. This is contradictory to the research that has found subjective norms to be the weakest predictor contained within the framework of the TPB (Ajzen, 1991; Armitage & Conner, 2001). These findings, however, are congruent with the research of White et al. (2008), where it was found that subjective norms were one of the strongest predictors of adolescent intentions to use sun protection. Despite research indicating that descriptive norms would be an important predictor variable (e.g., de Vries et al., 2005; Rivis & Sheeran, 2003), the results of this study indicate that they were less influential than subjective norms within this sample. The impact of subjective norms on adolescent intentions suggests that, if young people perceive that they *should* perform sun protective behaviours, then they will most likely intend to use sun protection. This study's sample was quite young and based upon the suggestions of Sjöberg et al. (2004) and Lower et al. (1998), parental influence and a carry over effect from primary school may have accounted for the stronger perceptions of subjective norms and weaker perceptions of descriptive norms. Confirmation of this rationale can be found within Myers and Horswill (2006) who found subjective norms to have the weakest influence amongst their university-aged sample.

There are a number of limitations, within the study, that should be taken into consideration. Firstly, there was a presence of unequal distribution of participants per

demographical factor. While the study included both sexes, a higher proportion of participants were female. Similarly, although the study included all four skin types, the majority were of "burn first, then tan" skin type, which may explain why skin type was not found to be a significant contributor to the prediction of sun protection intentions. Age was also shown to be unequally distributed, with the majority of the sample comprising of adolescents that were aged below 14-years-old. The results found within the study may therefore be more representative of the sun protective intentions of younger aged adolescent females with "burn first, then tan" skin types. Other shortcomings of the present study involved the recruitment of participants and the timing of survey distribution.

Recruitment was conducted exclusively in the Northern suburbs of Perth, Western Australia. Furthermore, these participants were all recruited within neighbouring suburbs of one another. Consequently, the responses given by the sample may not be reflective of the broader adolescent population of Western Australia, or Australia for that matter. Although a sufficient number of participants were recruited, future research could endeavour to obtain a sample which comprises of adolescents from different areas, which may better represent the adolescent population at large.

A final limitation within the study was that of the unequal timing for the distribution of surveys. Surveys were handed out over a seven-month period, from October to April. Although October through to April represents the majority of Perth's summer period, different weather conditions may still have been present each time the survey was given to a participant. The different weather conditions may have meant that participants may have behaved differently during the two-weeks prior to the survey. For example, those that received the survey in February may have been out in the sun a lot more than those who received the survey in October.

Secondly, intentions to use sun protection may also have been influenced by weather conditions. For example, intentions to use sun protection may have been greater when the forecast was sunny and 30 °C rather than cloudy and 20°C. To overcome such a limitation, future research should distribute all surveys at the same point of time and therefore, weather conditions would be standard across all participants.

This project has only focused on predicting adolescent intentions to use sun protection. Therefore, it is unknown whether the additional predictor variables would account for a significantly greater portion of explained variance in actual sun protective behaviour. Furthermore, it is unknown whether the intentions of this particular sample translated into actual sun protective behaviour. Given these two uncertainties, future research could investigate the use of the additional predictor variables that were examined within this study and their effect on actual sun protective behaviour.

The current study has supported the use of the framework of the TPB to predict adolescent intentions to use sun protection. Furthermore, this study has built upon the limited research that has applied the TPB to predict sun-related behaviour. More importantly, this study has built upon the only known adolescent TPB study, that of White et al. (2008), that investigated sun protection. In doing so, the present study has expanded upon White et al.'s (2008) study and has shown that both age and unrealistic optimism should be taken into consideration when predicting adolescent intentions to use sun protection. This has important implications for the development of intervention programs aiming to reduce adolescent sun exposure while trying to increase the use of sun protection. These findings suggest that there is a need to focus on older adolescents in encouraging appropriate sun-safety behaviours. The findings suggest that interventions could focus on increasing subjective norms (i.e., perceptions

that one should perform a behaviour) while creating favourable attitudes toward sun protection could result in an increase in adolescent intentions to use sun protection.

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Appendix A

Principal Information Letter and Consent Form

Sun Survey

Dear Principal,

My name is Geoffrey Carastathis and I am writing to you on behalf of Edith Cowan University. I am conducting a research project that aims to identify the thoughts, attitudes and opinions of young people toward sun protection. The project is being conducted as part of an Honours degree at Edith Cowan University.

What does participation in the research project involve?

I seek access to all students from years 8 to 12 along with all teachers.

The students will be invited to participate in a survey. The will take about 5-10 minutes to complete and it will ask various questions relating to sun-related behaviour. For example attitude toward sun protection, if their parents/friends use sun protection etc. (please see the survey for all questions). The survey requires students to indicate their level of agreeableness to statements (e.g. *Strongly agree* to *Strongly Disagree*). It is proposed that the survey be distributed during a free period so as no class time is interrupted.

I will keep the school's involvement in the administration of the research procedures to a minimum. However, it will be necessary for the school's teachers to distribute information letters, consent forms and surveys to their students.

To what extent is participation voluntary, and what are the implications of withdrawing that participation?
Participation in this research project is entirely voluntary which includes all participating parties (i.e., principal, students, parents, teachers)

If any member of a participant group decides to participate and then later changes their mind, they are able to withdraw their participation at any time.
You can withdraw data from the study up to 2 months after your participation at no consequence.

There will be no consequences relating to any decision by an individual or the school regarding participation, other than those already described in this letter. Decisions made will not affect the relationship with the research team or with Edith Cowan University.

What will happen to the information collected, and is privacy and confidentiality assured?
Information that identifies anyone will be removed from the data collected. The data is then stored securely within a storage room located in the psychology building at Edith Cowan University. The data will be stored in a cabinet to which only the researcher and his supervisor will have access to. All electronic data will be password protected. The data will be stored for a minimum period of 5 years, after which it will be destroyed. This will be achieved by shredding all paper based data and deleting all electronic data.

The identity of participants and the school will not be disclosed at any time, except in circumstances that require reporting under the Department of Education and Training *Child Protection* policy, or where the research team is legally required to disclose that information.
Participant privacy, and the confidentiality of information disclosed by participants, is assured at all other times.

The data will be used only for this project, and will not be used in any extended or future research without first obtaining explicit written consent from participants.

Consistent with Department of Education and Training policy, a summary of the research findings will be made available to the participating site(s) and the Department. You can expect this to be available in June 2009.

What are the education benefits of this research for the school?
There are no educational benefits for the school. The community may benefit as the information collected from this study may aid in the design of more effective sun protection programmes aimed specifically at young people.

Is this research approved?
The research has been approved by the Human Ethics Committee at Edith Cowan University and has met the policy requirements of the Department of Education and Training as indicated in the attached letter.

Do all members of the research team who will be having contact with children have their Working with Children Check?
Yes. Under the Working with Children (Criminal Record Checking) Act 2004, people undertaking work in Western Australia that involves contact with children must undergo a Working with Children Check. The documents attached to this letter include a list of the research team who will be having contact with children through your school along with current evidence of their checks.

Who do I contact if I wish to discuss the project further?
If you would like to discuss any aspect of this study with a member of the research team, please contact me on the number provided below. If you wish to speak with an independent person about the conduct of the project, please contact Dr Justine Dandy (4th year Co-ordinator) on (08) 6304 5105.

How do I indicate my willingness for the school to be involved?
If you have had all questions about the project answered to your satisfaction, and are willing for the school to participate, please complete the **Consent Form** on the following page.

This information letter is for you to keep.

Kind Regards,

Geoffrey Carastathis

Edith Cowan University
Ph: (08) [redacted]
Mob: [redacted]
Email: gcarasta@student.ecu.edu.au

Consent Form

- I have read this document and understand the aims, procedures, and risks of this project, as described within it.
- For any questions I may have had, I have taken up the invitation to ask those questions, and I am satisfied with the answers I received.
- I am willing for (*SCHOOL NAME HERE*) to become involved in the research project, as described.
- I understand that participation in the project is entirely voluntarily.
- I understand that the (*SCHOOL NAME HERE*) is free to withdraw its participation at any time, without affecting the relationship with the research team or Edith Cowan University.
- I understand that data can be withdrawn from the study up to 2 months after participation within the study without incurring any consequences.
- I understand that this research may be published in a journal, provided that the participants or the school are not identified in any way.
- I understand that the school will be provided with a copy of the findings from this research upon its completion.

Name of Site Manager (printed): _____

Signature: _____ Date: / /

Appendix B

Teacher Information Letter and Consent Form

Sun Survey

Dear Teacher,

My name is Geoffrey Carastathis and I am writing to you on behalf of Edith Cowan University. I am conducting a research project that aims to identify the thoughts, attitudes and opinions of young people toward sun protection. The project is being conducted as part of an Honours degree at Edith Cowan University.

I would like to invite you to take part in the project. This is because I need your help handing out information letters, consent forms and the surveys to your students.

What does participating in the research involve?

You are invited to participate in the project by simply handing out information letters, consent forms and surveys. It is asked that you could you please encourage your students to fill out the survey and remind them to bring the completed survey back along with consent forms.

Do I have to take part?
No. Participating in this research project is entirely voluntary. This decision should always be made completely freely. All decisions made will be respected by members of the research team without question.

What if I wanted to change my initial decision?
If you wish to participate, the decision will need to be made by one week prior to the commencement of the study for you to be included in the project.

Once a decision is made to participate, you can change your mind at any time.

You can withdraw data from the study up to 2 months after your participation at no consequence.

There will be no consequences relating to any decision you make regarding participation, other than those already described in this letter. These decisions will not affect your relationship with your principal or the research team.

What will happen to the information I give, and is privacy and confidentiality assured?

Information that identifies anyone will be removed from the data collected. The data is then stored securely within a storage room located in the psychology building at Edith Cowan University. The data will be stored in a cabinet to which only the researcher and his supervisor will have access to. All electronic data will be password protected. The data will be stored for a minimum period of 5 years, after which it will be destroyed. This will be achieved by shredding all paper based data and deleting all electronic data.

Participant privacy, and the confidentiality of information disclosed by participants, is assured at all times, except in circumstances where the research team is legally required to disclose that information.

The data will be used only for this project, and will not be used in any extended or future research without first obtaining explicit written consent from you.

It is intended that the findings of this study will be printed and given to Edith Cowan University library and findings will be presented to post graduate psychology students studying at Edith Cowan University. The study may also be published within a journal. A summary of the research findings will also be made available upon completion of the project. A summary of findings will be presented to the principal of your school to which you may have access to. You can expect the findings to become available in June 2009.

What are the benefits of this research for my role as a teacher?
There are no benefits for the teacher who participates within this study. The community may benefit as the information collected from this study may aid in the design of more effective sun protection programmes aimed specifically at young people.

Is this research approved?
The research has been approved by the Human Ethics Committee at Edith Cowan University and has met the policy requirements of the Department of Education and Training.

Who do I contact if I wish to discuss the project further?
If you would like to discuss any aspect of this study with a member of the research team, please contact me on the number provided below. If you wish to speak with an independent person about the conduct of the project, please contact Dr Justine Dandy (4th year Co-ordinator) on (08) 6304 5105.

How do I indicate my willingness for the school to be involved?
If you have had all questions about the project answered to your satisfaction, and are willing for the school to participate, please complete the **Consent Form** on the following page.

This information letter is for you to keep.

Kind Regards,

Geoffrey Carastathis

Edith Cowan University
Ph: [redacted]
Mob: [redacted]
[redacted]

Consent Form

- I have read this document, or have had this document explained to me in a language I understand, and I understand the aims, procedures, and any identified risks of this project, as described within it.
- I have taken up the invitation to ask any questions I may have had, and am satisfied with the answers I received.
- I understand that participation in the project is entirely voluntarily.
- I am willing to become involved in the project, as described.
- I understand I am free to withdraw that participation at any time without affecting my relationship with the principal or research team.
- I understand that data can be withdrawn from the study up to 2 months after participation within the study without incurring any consequences.
- I give permission for my contribution to this research to be published in a journal, provided that I or the school is not identified in any way.
- I understand that I can request a summary of findings once the research has been completed.

Name of Participant (printed): _____

Signature of Participant: _____ Date: / /

Appendix C

Parent Information Letter

SUN SURVEY

Dear Parent/Guardian,

My name is Geoff Carastathis and I am a fourth year Honours student in psychology at Edith Cowan University. I would like to invite your son/daughter to take part in my research project conducted as part of my Honours degree. The project involves giving a short survey that aims to explore young people's attitudes, thoughts and opinions toward sun protection. My study has been approved by the Human Research Ethics Committee at ECU.

If you agree to let your son/daughter participate in this study, please complete the Consent Form attached with this letter. Your child will also be asked to complete a Consent Form. Please note that all of the information gathered will be treated with the strictest confidence and no participants will be identified in the final report. Please be aware that your son/daughter may withdraw at anytime from the study, as participation is completely voluntary.

If you have any questions about my research and your child's participation please contact either **myself, Geoff Carastathis, on [redacted] or gcarasta@student.ecu.edu.au**, or my supervisor, **Dr Paul Chang on (08) 6304 5745**. If you would like to speak to someone who is independent of this study, you may contact **Dr Justine Dandy**, the 4th year psychology co-ordinator, on **(08) 6304 5105**.

The survey asks about attitudes to sun protection and has some questions about skin cancer. In the highly unlikely event that these questions make your son/daughter may feel uncomfortable, then they may speak to the school psychologist or they can contact the counselling services listed below.

Crisis Care: 9233 1199 (counselling service)
Lifeline: 13 11 14 (counselling service)

I am hoping to get as many students as possible to give me a clear picture of what teenagers think about sun protection. Your participation is greatly appreciated.

Kind Regards,

Geoff Carastathis

Appendix D

Parent Consent Form

SUN SURVEY
PARENT CONSENT FORM

I,_____, have read the information
(Parent's/Guardian's name)

provided with this consent form and any questions I have asked have been answered to my satisfaction.

I agree to allow my son/daughter to participate in the survey associated with this research and understand that I can withdraw consent at any time.

I agree that research data gathered in this study may be published providing that my son/daughter is not identified in any way.

I allow my child,_____, to participate in
(Your child's name)
the research.

Signature of Parent/Guardian_____

Date_____/_____/2009
(day) (month)

Appendix E

Student Information Letter

SUN SURVEY

Dear Student,

My name is Geoff Carastathis and I am a fourth year Honours student in psychology at Edith Cowan University. I would like to invite you to take part in my research project which is part of my Honours degree. The project involves a couple of short surveys that aim to explore young people's attitudes, thoughts and opinions toward sun protection. My study has been approved by the Human Research Ethics Committee at ECU. My study has been approved by the Ethics Committee at ECU.

If you want to participate in the study, please fill out the Student Consent Form which is included with this letter. All of the information gathered will be treated with the strictest confidence and no participants will be identified in the final report. You do not have to do the survey and you can stop at anytime, as participation is completely up to you.

If you have any questions about my research or about your participation please contact either **myself on gcarasta@student.ecu.edu.au**, or my supervisor, Dr Paul Chang on **(08) 6304 5745**. If you would like to speak to someone who is independent of this study, you may contact Dr Justine Dandy, the 4th year psychology co-ordinator, on **(08) 6304 5105**.

The survey asks you about your attitude toward sun protection and there are some questions about skin cancer. In the highly unlikely event that you feel discomfort because of these questions, please see your school psychologist, talk to your parents or call one of these counselling services below.

Crisis Care: 9233 1199 (counselling service)
Lifeline: 13 11 14 (counselling service)

I am hoping to get as many students as possible to give me a clear picture of what teenagers think about sun protection. Your participation would be great!

Kind Regards,

Geoff Carastathis

Appendix F

Student Consent Form

SUN SURVEY
STUDENT CONSENT FORM

I,_____, have read the information
(Student's name)
provided with this consent form and any questions I have asked have been answered.

I would like to participate in the research and I understand that I can withdraw from the study at any time.

I agree that the research data gathered in this study may be published providing I am not identified in any way.

Your name/Signature:_____

Date_____/_____/2009
(day) (month)

Appendix G

Survey

SUN SURVEY

Name.....

(Your name is only asked that if you want to pull out of the study, the researcher can locate your survey. No identifying information will be used within the study.)

Year in school: ☐

Age in years: ☐

Gender (please circle): Male Female

Skin type:

- ☐ Burn only, never tan
- ☐ Burn first, then tan
- ☐ Don't burn, just tan
- ☐ Don't burn, naturally dark skin

EXAMPLE OF HOW TO FILL OUT THE SURVEY.

	Strongly agree	Agree	Slightly Agree	Neutral	Slightly disagree	Disagree	Strongly disagree
I think school is fun	1	(2)	3	4	5	6	7

By circling the number 2, you show that you Agree. Indicating that you 'Agree' that school is fun.
If you chose the number 7, you would show that you extremely disagree, and indicate that you think school is extremely NOT fun (i.e. boring)

OKAY, LET'S BEGIN!

IMPORTANT: This survey will refer to 'protect yourself from the sun' and it means if you used sunscreen, a hat, covered your skin from the sun using clothing (e.g. a rashie) and if you went in the shade to avoid direct sunlight.

1. Over the past 2 weeks, did you go in the sun for 10 minutes or more? (maybe at the beach, playing sports, in a swimming pool etc). **Please tick ONE answer only**.

   ☐ Yes (continue to question 2)
   ☐ No (you have finished the survey)

2. Over the past 2 weeks, when you were in the sun for 10 minutes or more, how often did you protect yourself from the sun? **(please tick ONE answer only).**

   ☐ Never (go to question 4)
   ☐ Some of the time (go to question 3)
   ☐ Most of the time (go to question 3)
   ☐ All of the time (go to question 3)

3. What was the main way you protected yourself from the sun? **(please tick ONE answer only)**

   ☐ Used sunscreen
   ☐ Wore a hat
   ☐ Went in the shade
   ☐ Wore long clothing to cover skin
   ☐ Combination of the above

4. Did you get sunburnt at all over the past 2 weeks? **(please tick ONE answer only)**

   ☐ No
   ☐ Yes
   If yes, how sunburnt were you?
   ☐ Very sunburnt
   ☐ Quite sunburnt
   ☐ A little sunburnt

Please respond to EACH of the following statements, by circling ONE of the numbers that corresponds to your answer.

1. Over the next 2 weeks, when I am in the sun for 10 minutes or more, <u>I intend</u> to protect myself

Strongly Agree	Agree	Somewhat Agree	Neutral	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

2. Over the next 2 weeks, when I am in the sun for 10 minutes or more, <u>I want</u> to protect myself.

Strongly Agree	Agree	Somewhat Agree	Neutral	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

3. Over the next 2 weeks, when I am in the sun for 10 minutes or more, <u>I expect</u> to protect myself.

Strongly Agree	Agree	Somewhat Agree	Neutral	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

4. If I am in the sun for 10 minutes or more, people who are important to me (family/friends) think that I should use some form of sun protection.

Strongly Agree	Agree	Somewhat Agree	Neutral	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

5. In regards to protecting myself from the sun, it is important to me to do what my family and friends think I should do.

Strongly Agree	Agree	Somewhat Agree	Neutral	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

6. In the next 2 weeks, it is expected of me to protect myself when I am in the sun for 10 minutes or more.

Strongly Agree	Agree	Somewhat Agree	Neutral	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

7. Important people in my life (family/friends) whose opinions I value, approve of me protecting myself if I was in the sun for 10 minutes or more during the next 2 weeks.

Strongly Agree	Agree	Somewhat Agree	Neutral	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

8. The decision to protect myself, when in the sun for 10 minutes or more over the next 2 weeks, is beyond my control.

Strongly Agree	Agree	Somewhat Agree	Neutral	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

9. Whether I protect myself, when I am in the sun for 10 minutes or more over the next 2 weeks, is entirely up to me.

Strongly Agree	Agree	Somewhat Agree	Neutral	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

10. Many people my age, protect themselves when they are in the sun for 10 minutes or more.

Strongly Agree	Agree	Somewhat Agree	Neutral	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

11. The people in my life whose opinions I value, protect themselves when in the sun for 10 minutes or more.

Strongly Agree	Agree	Somewhat Agree	Neutral	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

12. I am confident that in the next 2 weeks, when I am in the sun for 10 minutes or more, I can protect myself.

Strongly Agree	Agree	Somewhat Agree	Neutral	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

13. Most people who are important to me (family/friends) protect themselves when in the sun for 10 minutes or more.

Strongly Agree	Agree	Somewhat Agree	Neutral	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

14. What is the chance that the typical person (your age and sex) will develop skin cancer in his/her lifetime?

Very Likely	Quite Likely	Somewhat Likely	No More Likely than Unlikely	Somewhat Unlikely	Quite Unlikely	Very Unlikely
1	2	3	4	5	6	7

15. What do you think is the likelihood that you will develop skin cancer in your lifetime?

Very Likely	Quite Likely	Somewhat Likely	No More Likely than Unlikely	Somewhat Unlikely	Quite Unlikely	Very Unlikely
1	2	3	4	5	6	7

16. For me to protect myself in the next 2 weeks, when I am in the sun for 10 minutes or more is:

Very Easy	Quite Easy	Somewhat Easy	Neutral	Somewhat Difficult	Quite Difficult	Very Difficult
1	2	3	4	5	6	7

The following question applies to the next 7 sets of responses. Please respond to EACH by circling ONE number that corresponds to your answer.

17. Performing sun protective behaviour every time I go in the sun for 10 minutes or more is:

a:

Very Right	Right	Somewhat Right	Neutral	Somewhat Wrong	Wrong	Very Wrong
1	2	3	4	5	6	7

b:

Very Good	Good	Somewhat good	Neutral	Somewhat Bad	Bad	Very Bad
1	2	3	4	5	6	7

c.

Very Healthy	Quite Healthy	Somewhat Healthy	Neutral	Somewhat Unhealthy	Unhealthy	Very Unhealthy
1	2	3	4	5	6	7

d.

Very Useful	Useful	Somewhat Useful	Neutral	Somewhat Useless	Useless	Very Useless
1	2	3	4	5	6	7

e.

Very Desirable	Desirable	Somewhat Desirable	Neutral	Somewhat Undesirable	Undesirable	Very Undesirable
1	2	3	4	5	6	7

f.

Very Pleasant	Pleasant	Somewhat Pleasant	Neutral	Somewhat Unpleasant	Unpleasant	Very Unpleasant
1	2	3	4	5	6	7

g.

Very Valuable	Valuable	Somewhat Valuable	Neutral	Somewhat Worthless	Worthless	Very Worthless
1	2	3	4	5	6	7

END OF SURVEY. THANK-YOU FOR YOUR TIME

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