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Testing an extended theory of planned behaviour to predict young people’s sun safety in a high risk area

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Abstract

Objectives

The present research examined the sun protection intentions and behaviours of young people in a high risk skin cancer area using an extended theory of planned behaviour (TPB) incorporating additional social influences of group norms and image norms.

Design

The study employed a prospective design to examine young people’s sun protection intentions and behaviour.

Method

Participants (N = 1134), aged 12 to 20 years, were students (school, university, TAFE) and young employees living in Queensland, Australia. Participants completed a questionnaire assessing the TPB predictors (attitude, subjective norm, perceived behavioural control) and additional social influences (group norm, image norm) of sun protection intentions. Two weeks later, participants (n = 734) reported their sun protection behaviour for the previous fortnight.

Results

Results revealed that the TPB variables of attitude, subjective norm and perceived behavioural control and the additional social influence variable of group norms, but not image norms, emerged as significant predictors of intentions to engage in sun protection. The extended TPB variables accounted for 36% of the variance in intentions. For behaviour, the extended TPB variables accounted for 27% of the variance with both intention and, unexpectedly, group norm as the significant direct predictors of sun protective behaviours.

Conclusions
Results of this study provide support for the application of the TPB in the sun safety context and highlight the importance of considering the influence of group norms in the development of future interventions to increase young people’s sun protection intentions and behaviour.
Testing an Extended Theory of Planned Behaviour to Predict Young People’s Sun Safety in a High Risk Area

Exposure of the skin to the sun is the most consistently implicated factor causing skin cancer. It remains an important concern for Australians, particularly in Queensland, which has the highest incidence rates of skin cancer (Balanda, Stanton, Lowe, & Purdie, 1999; Giles, Marks, & Foley, 1998) and the highest mortality rates for malignant melanoma in the world (Baade, Coory, & Ring, 2000). High sun exposure is especially of concern for people aged 20 years and younger given that an estimated 50% of lifetime skin damage occurs by the age of 20 years, that young people in general spend more time outdoors in the sun and they perform fewer sun protection behaviours (Castle, Skinner, & Hampson, 1999; Hill & Boulter, 2002; Mermelstein & Riesenber, 1992). The sun protection attitudes and behaviours of young people are particularly important given reported declines in sun protective behaviour during adolescence which occurs despite awareness of the dangers of high sun exposure and generally positive attitudes towards performing sun protection behaviours (Arthey & Clarke, 1995). This attitude-behaviour inconsistency may occur due to the likelihood that many of the factors determining sun protection behaviour are complex and psychologically based. One well known model that has been used to explain the attitude-behaviour relationship and accounts for the complexity of decision making by consideration of barriers (or facilitating factors) related to behavioural performance, as well as important social influences, is the theory of planned behaviour (TPB; Ajzen, 1991), an extension of the theory of reasoned action (TRA; Fishbein & Ajzen, 1975).

The TPB maintains that intentions are the most proximal determinant of behaviour. Intentions are influenced by attitudes (positive or negative evaluations of performing a behaviour), subjective norms (perceived social pressure to perform or not perform a behaviour), and perceived behavioural control (perceived ease or difficulty of performing a behaviour, also
believed to be a direct predictor of behaviour itself). Attitudes, subjective norms and perceived
behavioural control are determined by underlying behavioural, normative and control beliefs,
respectively.

Support for the TPB model has been demonstrated in a number of meta-analyses including
Armitage and Conner’s (2001) study which found that the TPB accounted for an average of 39%
of the variance in intentions and 27% of the variance in behaviour. In the context of health
behaviours only, Godin and Kok (1996) found that the TPB accounted for an average of 41% of
variance in intentions and 34% of the variance in behaviour. It should also be noted that, within
the TPB, the contribution of past behaviour to the prediction of intentions and behaviour is often
examined and provides a more stringent test of the TPB predictors once past behavioural
performance is accounted for (Ajzen, 1991). While past behaviour has been demonstrated as a
strong predictor in the TPB model, it is not considered as equivalent to the other TPB predictors
given that past behavioural performance cannot be used to predict or encourage future
behavioural performance (Conner & Sparks, 2005).

The constructs comprising the TPB have been used successfully by many researchers to
understand the motivations underlying sun tanning, sun bathing and sun protective behaviours
(Bränström, Ullén, & Brandberg, 2004; de Vries, Mesters, van’t Riet, Willems, & Reubsaet,
2006; Hillhouse, Adler, Drinon, & Turrisi, 1997; Jackson & Aiken, 2000, 2006; Jones,
Abraham, Harris, Schulz, & Chrispin, 2001; Myers & Horswill, 2006; Steen, Peay, & Owen,
1998; Terry & Hogg, 1996; Turrisi, Hillhouse, Gebert, & Grimes, 1999). The results of these
studies suggest that the TPB is a useful theoretical framework for examining the prediction of sun
protective intentions and behaviour. Despite support for the TPB in the sun safety context,
several studies have consistently reported the normative component as the weakest predictor of
sun protective intentions in the model (e.g., Hillhouse et al., 1997; Myers & Horswill, 2006;
Terry & Hogg, 1996). This trend is consistent with previous research demonstrating that, in general, subjective norm has less predictive power than attitude for intentions to perform most behaviours, as indicated by lower beta weights in multiple regression analyses (Armitage & Conner, 2001; Terry & Hogg, 1996; White, Terry, & Hogg, 1994). Researchers have argued that subjective norm’s lack of predictive power is due to the way it is conceptualised as it does not reflect definitions used in wider social psychological literature and have advocated a reconceptualisation of the normative component in the TPB model to include other normative influences (e.g., Terry & Hogg, 1996; Terry, Hogg & White, 1999). Alternative conceptualisations of norms in the sun safety context have included both referent group based norms (e.g., Terry & Hogg, 1996), a similar concept to descriptive norms (see Sheeran & Orbell, 1999), and broader media image norms (e.g., Jackson & Aiken, 2000, 2006).

Group Norms

The conceptualisation of group norms is based on a social identity (Tajfel & Turner, 1986) and self categorisation theory (Turner, Hogg, Oakes, Reicher, & Wetherell, 1987) perspective. Using this approach, behaviour has been demonstrated to be influenced by the norms of specific salient reference groups (referred to as group norm) because the group is behaviourally relevant (Johnston & White, 2003; Terry & Hogg, 1996; Terry et al., 1999; White et al., 1994). Group norms involve a consideration of whether important group members perform the behaviour (i.e., behavioural norm) and the evaluation of the behaviour by the group (i.e., group attitude).

Group norms differ from traditional measures of subjective norm (i.e., injunctive normative influences) in that norms are intrinsically tied to contextually salient membership in specific social groups, with norms prescribing the context specific attitudes and behaviour appropriate for group members rather than social pressure being additive across all referents and
referent groups that participants define as important to them. For group norms, it is the general perception that the group approves of performance of the behaviour, rather than the explicit approval of the specific group member’s actions. In addition, group norm differs from the concept of descriptive normative influences (reflecting what significant others are perceived to do with respect to the behaviour in question; see Conner & Sparks, 2005) in that the effects for group norm are not collapsed across a series of referents and referent groups (but is related to a contextually salient group membership) and that it specifies both group related attitudes and behaviour. In the case of sun protective behaviour, for example, young people consider their friends’ sun protection behaviour and whether their friends think that sun protection is a good thing to do to decide whether they themselves will use sun protection. Although usually measured in conjunction with group identification (e.g., Terry & Hogg, 1996), there is evidence of a direct influence of group norm on intentions (see Johnston & White, 2003). Thus, the present study includes a measure of group norms as a direct predictor of behavioural intentions.

The influence of group norms in the sun safety context has been demonstrated by Terry and Hogg (1996) who found that group norms (rather than subjective norms) directly predicted females’ sun protection intentions. In addition, Jackson and Aiken (2000) assessed the role of behavioural norms (a component of group norms) and found that having friends who sunbathe or friends who sun protect can be a powerful influence on whether one sunbathes or engages in sun protective behaviour. These findings lend support for the role of group norms, within the TPB, in predicting intentions to perform sun protective behaviour. Thus, the role of an important referent group for young people (i.e., friends) was examined in the present study in an effort to understand their impact on behavioural intentions in the sun safety context.

*Image Norms*
Another source of normative influence relevant to the prediction of sun protective behaviour is image norms (Jackson & Aiken, 2000). Image norms are the cognitive representations of stereotypical members of particular groups (e.g., tanned people). Image norms are more distant from the individual than immediate referent norms (i.e., subjective or group norms) and are a general representation of the values of society as a whole. For example, many young adult females deliberately expose themselves to the sun with the sole purpose of developing a tan because it is perceived as more attractive, regardless of the awareness that this tanning is harmful to one’s health. Image norms relevant to the use of sun protective behaviour include the promotion of both extremes of pale and tanned images as fashionable ideals (Jackson & Aiken, 2000).

Recent studies in the attitude and behaviour change literature have demonstrated that image norms are likely to impact on individual’s decisions to perform sun protective behaviours. The results of Jackson and Aiken’s (2006) intervention focussing on changing normative perceptions about the attractiveness of being tanned, for example, suggest that increasing the attractiveness of pale image norms may be effective in producing sun protective behavioural change. In an earlier study, however, Jackson and Aiken (2000), found that inclusion of a measure of both image norms and group norms, within an extended TPB based model, revealed that it was the more proximal referents (i.e., friends) associated with group norms, rather than image norms, influencing sun protection intentions and behaviour. Thus, given the potential use of image norms to encourage sun protection within interventions, the current study sought to examine the influence of image norms, in addition to group norms, in determining young people’s sun protection intentions.

Overall, the current research aimed to examine the sun protection intentions and behaviours of young people using an extended theory of planned behaviour model, incorporating
the additional social influences of group norms and image norms. Prior research has provided some support for the utility of the TPB in the prediction of sun protection; there are few recent TPB studies, however, predicting sun safety behaviours amongst both male and female Australian youth. In addition, Jackson and Aiken’s (2000) findings for the role of both group and image norms in sun protection have not been established in other, especially high risk, contexts. From a theory of planned behaviour perspective, it was expected that young people would be more likely to intend to perform sun protective behaviours if they: had a positive attitude towards the behaviour, perceived social pressure to do so (subjective norm), and perceived that the behaviour was one that was within their control (perceived behavioural control). It was also expected that young people with stronger intentions to perform sun protective behaviour and who perceived the behaviour to be within their control (perceived behavioural control) would be more likely to engage in behavioural performance. For the additional social influences examined, it was expected that young people would intend to perform sun protective behaviours when they perceived normative support from a relevant referent group (group norms) and image norms were perceived as supporting paler role models.

Method

Participants and Procedure

Prior to conducting the study, ethical clearance was applied for and granted from the Queensland University of Technology’s Human Research Ethics Committee (QUT reference number 3925H), Education Queensland and Catholic Education. The sample was comprised of 693 female and 441 male ($N = 1134$) students (i.e., school, university and TAFE) and young employees aged 12 to 20 years ($M = 14.5$ years; $SD = 2.2$ years) living in Queensland, Australia. Most participants were Caucasian (85%) with the most common skin colour before tanning reported as fair/very fair (56.6%) followed by brown/olive (38.5%). During the period of March
to May 2006 (i.e., Australian Autumn with average daily mean temperature ranging from 18 to 27°C, Bureau of Meteorology, 2006), participants completed a questionnaire assessing the direct TPB predictors and the proposed additional social influences of sun protection behaviour. University and TAFE students and employees were offered either a monetary incentive or entry into a prize draw for participation. School students were offered no incentive to complete the questionnaire. Two weeks later, 734 of the participants who completed the first questionnaire reported their sun safety behaviour during the past fortnight. Questionnaires completed at both time points were matched via a code identifier.

Measures

Measures of the direct TPB predictors and additional social influences were obtained for the targeted behaviour of sun protection, defined as “using SPF30+ sunscreen, wearing protective clothing such as a hat, long sleeved shirt and sunglasses, or seeking shade during peak hours of the day (between 10am and 3pm)”. The target behaviour was framed in terms of the target, action, time and context, as stipulated by Fishbein and Ajzen (1975) (e.g., “Performing sun protective behaviours every time I go in the sun for more than 10 minutes during the next 2 weeks”). All items were measured on 7-point Likert scales unless otherwise specified and all value points in the scale were labelled. Table 1 presents the means, standard deviations, bivariate correlations, and Cronbach’s (1951) alpha coefficients (if applicable) for each of the predictor variables and the target behaviour.

Insert Table 1 about here

Intention. Two items assessed the strength of intention to engage in sun protection behaviour (e.g., “It is likely that I will perform sun protective behaviours every time I go in the
sun for more than 10 minutes in the next 2 weeks” [1] strongly disagree to [7] strongly agree).

The two items were summed to create an intention scale which was reliable ($\alpha = .82$).

**Attitude.** A measure of attitude toward performing sun protective behaviours was obtained using six items in a 7-point semantic-differential format (e.g., Performing sun protective behaviour every time I go in the sun for more than 10 minutes during the next 2 weeks would be: pleasant-unpleasant, good-bad). The six items were summed to create an attitude scale which had a slightly low reliability coefficient ($\alpha = .67$).

**Subjective norm.** Two items were included to obtain a measure of subjective norm; “Most people who are important to me would want me to perform sun protective behaviours every time I go in the sun for more than 10 minutes in the next 2 weeks” and “Those people who are important to me would not want me to perform sun protective behaviours every time I go in the sun for more than 10 minutes in the next 2 weeks”, both scored [1] strongly disagree to [7] strongly agree). Due to poor inter-item reliability ($\alpha = .45$), however, only one item was used (the first item stated above).

**Perceived behavioural control.** Two items measured perceived behavioural control; “If I wanted to, it would be easy for me to perform sun protective behaviours every time I go in the sun for more than 10 minutes in the next 2 weeks” and “I have complete control over whether I perform sun protective behaviours every time I go in the sun for more than 10 minutes in the next 2 weeks” both scored [1] strongly disagree to [7] strongly agree. Due to poor inter-item reliability ($\alpha = .47$), however, only one item was used (the first item stated above).

**Past behaviour.** One item measured performance of sun protective behaviour in the previous fortnight (e.g., “Think about the past 2 weeks, how often did you perform sun protective behaviour every time you went in the sun for more than 10 minutes?” [1] never to [7] always).
Group norm. An elicitation study of a smaller number of the target population revealed that an appropriate reference group for sun safety was their friends. Participants responded to five items (Terry & Hogg, 1996; White, et al., 1994) assessing their perception of the reference group norms for performing sun protection behaviour. Two examples of these items are “Think about your friends. What percentage of them do you think would perform sun protective behaviours every time they are out in the sun for more than 10 minutes during the next fortnight?” [1] 0% to [7] 100% and “How many of your friends would think that performing sun protective behaviours every time you are out in the sun for more than 10 minutes during the next two weeks is a good thing to do?” [1] none to [7] all. The five items were summed to create a group norm scale which was reliable ($\alpha = .79$).

Image norm. Participants’ perception of the norm for tanned images was assessed using three items based on Jackson and Aiken (2000) (e.g., “Young celebrities and movie stars always seem to have a tan” [1] strongly disagree to [7] strongly agree). The three items were summed to create an image norm scale; however, this scale possessed low reliability ($\alpha = .59$)\(^1\).

Reported behaviour. Two weeks later, participants reported the extent to which they engaged in sun protective behaviours during the previous fortnight (e.g., “In the past two weeks, how often did you perform sun protective behaviour when you went out in the sun for more than 10 minutes?” [1] never to [7] always). An additional self description task aimed at increasing the reliability of the behavioural measure required participants to report the specific sun protection behaviours they had performed in the previous 2 weeks.

Results

To test the study’s main hypotheses, two hierarchical regression analyses were conducted predicting (1) behavioural intentions and (2) behaviour. To test the predictors of behavioural intentions, a regression analysis was performed on the data obtained from participants completing
the first questionnaire. For the prediction of behaviour, a regression analysis was performed on the data obtained from respondents at the 2 week follow up. Additional regression analyses predicting intentions and behaviour were also conducted controlling for the effects of past behaviour in the first step. Given the large sample size, we controlled for Type 1 error rate by adopting a more stringent alpha level of .001 to interpret significant results.

*Regression Analysis Predicting Intentions*

To identify the important predictors of intentions to perform sun protective behaviour, the standard TPB constructs of attitudes, subjective norm and perceived behavioural control were entered into the first step of the regression equation with the additional social influence variables of group norm and image norm entered in the second step. As shown in Table 2, a significant proportion of variance (25%) was explained by the entry of the standard TPB variables in the first step of the analysis. Entry of the social influence variables in the second step also accounted for an additional 11% of variance in the prediction of intentions. Once all of the variables were entered into the equation, the significant predictors of sun protection intentions were, in order of magnitude, group norm, perceived behavioural control, subjective norm, and attitude (see Table 2 for both unstandardised and standardised regression coefficients). Image norm did not emerge as a significant predictor of intentions. Overall, the predictors accounted for 36% of the variance in sun protective intentions.

Additional regression analyses were conducted to account for the effects of past sun protective behavioural performance on sun protection intentions. Past behaviour was entered separately in the first step, followed by the standard TPB variables in the second step, and additional social influence variables in the third step. Overall, analyses revealed a similar pattern of results to those reported above. At the final step, while past behaviour was a significant predictor of intentions, group norm, perceived behavioural control, and subjective norm remained
significant predictors of sun protection intentions using a $p < .001$ cut-off value. Attitude, however, was no longer significant ($p = .006$) when the effects of past behaviour were controlled for and image norms remained a non-significant predictor of intentions.

**Regression Analysis Predicting Behaviour**

At the 2 week follow up, participants ($n = 564$) reported spending an average of 14.49 hours per week ($SD = 9.82$ hours; range = 30 minutes to 40 hours) in the sun during the previous fortnight and engaged in sun protective behaviour only some of the time ($M = 3.45; SD = 1.81$). An additional self description task aimed at increasing the reliability of sun protective behavioural reports required participants ($n = 419$ responding to this item) to report the specific sun protective behaviours they had performed in the previous 2 weeks. Results revealed that the sun protective behaviour performed most often was wearing a hat (74%) followed by using sunscreen (62%), wearing sunglasses (35%), seeking shade (33%), and wearing a form of sun protective clothing (e.g., long sleeved shirt) (18%). There were no significant differences on any of the demographic and TPB predictor measures for participants present at both waves of data collection and those who completed the first wave of data collection only.

To identify the predictors of sun protection behaviour, intentions and perceived behavioural control were entered into the first step of the regression equation. On step two, attitude and subjective norm, as well as group norm and image norm were entered into the equation. As shown in Table 2, a significant proportion of variance (25%) was explained by the entry of intention and perceived behavioural control in the first step of the analyses. An unexpected finding was that the entry of the step 2 predictors accounted for an additional 2% of variance in behaviour. Once all of the variables were entered into the equation, the significant predictor was intention to sun protect (but not perceived behavioural control). Contrary to expectations, group norm also significantly predicted sun protection behaviour. No other
variables emerged as significant predictors. In total, the predictors accounted for 27% of variance in sun protection behaviour.

Additional regression analyses were conducted to account for the effects of past sun protective behavioural performance on sun protection behaviour. Past behaviour was entered separately in the first step, followed by intention and perceived behavioural control in the second step, and attitude, subjective norm, group norm and image norm in the third step. The inclusion of past behaviour in the model revealed a similar pattern of results to those reported above. At the final step, while past behaviour was a significant predictor of sun protection behaviour, intentions remained a significant predictor of behaviour. Group norm, however no longer emerged as a significant predictor of sun protection behaviour after accounting for the effects due to past behaviour.

Discussion

Using an extended theory of planned behaviour, incorporating the additional social influences of group norm and image norm, the current research examined the sun protection intentions and behaviours of young people in a high risk area (Queensland, Australia). Results of the research provide further support for the utility of the TPB model in the sun safety context as the standard TPB predictors (attitudes, subjective norm, PBC) significantly predicted young people’s intentions to perform sun protective behaviour and intentions predicted sun protective behavioural performance. The only exception is that PBC did not directly predict sun protective behaviour. For the additional social influence variables, group norm, but not image norm, emerged as a significant predictor of behavioural intentions. Further, in addition to intentions,
group norm also unexpectedly emerged as a significant predictor of young people’s sun protective behaviour.

Overall, support for the TPB model suggests that young people who have more favourable attitudes towards performing sun protective behaviour, perceive that important others approve of them performing sun protective behaviour, and perceive they have control over performing sun protective behaviour will have stronger intentions to perform sun protective behaviour. Strong intentions to perform sun protective behaviour, in turn, predict actual sun protective behavioural performance. These results were evident even after controlling for the effects of past sun protective behavioural performance.

Support for the TPB model is in line with previous research demonstrating the utility of the model in general (Armitage & Conner, 2001), for health behaviours (Godin and Kok, 1996) and in the sun safety context (Hillhouse et al., 1997; Terry & Hogg, 1996). The proportion of variance accounted for by the standard TPB predictors in the present study in the prediction of behaviour is within range of the results of Armitage and Conner’s (2001) meta-analysis. In the case of intentions, however, the percentage of explained variance is lower than the average amount reported by Armitage and Conner, but similar to the other known TRA/TPB example predicting sun safety intentions in an Australian adolescent sample (see Steen et al., 1998). It should be noted also that PBC did not emerge as a significant predictor of behaviour. The PBC item in the current study reflected a measure of self efficacy due to low inter-item reliability. Previous research has demonstrated that the self efficacy component alone is not the optimal predictor for behaviour as is a measure reflecting perceived controllability (Terry & O’Leary, 1995).

Group norms accounted for a substantial proportion of additional variance in intentions (i.e., 11%), considerably larger than the average amount of variance reported for descriptive
norms in TPB studies (see Rivis & Sheeran, 2003). The importance of group norm in the current study lends further support to previous research suggesting that the more sun safety is accepted within a friendship group, the stronger intentions that individual group members will have to sun protect (e.g., Terry & Hogg, 1996). These results support a reconceptualisation of the role of norms in the TPB model according to a social identity theory/self categorisation theory perspective (Tajfel & Turner, 1986; Turner et al., 1987) to incorporate broader social influence factors (Terry & Hogg, 1996). An unexpected finding was the impact of group norms on sun protective behaviour, especially given that group norms rarely predict behaviour directly instead of the usual mediated effect via intentions (although group norms often predict behaviour directly in an experimental context; see White, Hogg, & Terry, 2002). The direct impact of group norm on sun safety behaviour suggests that, if young people perceive widespread acceptance of sun protective behaviours amongst their friends, then they are more likely to use sun protection themselves. It should be noted, however, that the effects for group norm on behaviour were no longer present after the effects for past behaviour were taken into account. The impact of group norms for both intentions and behaviour is likely to be substantial within this context given that sample comprised younger participants, who are more vulnerable to the influence of friendship groups, and the often social nature of performing sun safety behaviours within a group context (e.g., friends at the beach, sports matches).

The finding that, for the additional social influence variables, group norms, but not image norms, significantly predicted sun protective intentions for adolescents and young adults further confirms the previous research of Jackson and Aiken (2000) who also found that the more proximal referents such as friends (group norms) influenced sun protection intentions rather than the influence of the media in general (image norms). The emergence of group norm and subjective norm as the strongest predictors of adolescents’ and young adults’ intentions to
perform sun protective behaviour suggests that it is the general approval and actions of the more immediate (close) referents in one’s life (i.e., friends) and the personal approval of important close referents in one’s life (i.e., Mum, Dad), rather than the more general representation of tanned images in the media, that strengthen young people’s sun protective intentions. In contrast to previous research (e.g., Hillhouse et al., 1997; Jones et al., 2001; Myers & Horswill, 2006; Terry & Hogg, 1996) reporting subjective norm as the weakest predictor in the TPB model of sun protective intentions, the current research revealed subjective norm to be a fairly strong predictor, with attitudes emerging as the weakest predictor of the TPB components. The emergence of subjective norm as a relatively strong predictor in this study may be a result of the inclusion of participants as young as 12 years of age. These younger participants are likely to view their parents as important sources of normative influence for sun protection. Other studies, finding a weaker effect for subjective norm, have focussed largely on older, university student populations (e.g., Myers & Horswill, 2006; Terry & Hogg, 1996).

On the basis of the predictive analyses which revealed that the strongest predictors of sun protective intentions were group norms, subjective norms and perceived behavioural control, two main targets for future interventions or strategies to increase sun protective intentions and behaviour can be suggested. First, the emergence of perceived behavioural control suggests that young people who perceive sun protective behaviour as easy to perform were more likely to intend to use sun protection. Thus, future interventions could target perceptions of control by focussing on the idea that performing sun protection behaviour is not an overly effortful practice and promoting the message that is easy to sun protect. Second, findings from the research indicated the important role of normative influences (subjective norms and group norms, but not image norms), particularly those of friendship groups, in the prediction of sun protective intentions and behaviour. Efforts to encourage greater sun protective intentions and behaviour
amongst young people should concentrate on the perception that friends would want them to perform sun protective behaviour. Sun safety campaigns could incorporate the influence of friends via slogans such as “friends don’t let their friends sunburn” and use images or messages that portray groups of friends engaging in sun protective behaviours so that sun protection is perceived as normative. Similar messages highlighting the approval of other important referents, such as family members, could also be incorporated to strengthen sun safety intentions.

The research has strengths such as the prospective design which is often lacking in previous research (e.g., Myers & Horswill, 2006) and recruitment of a relatively diverse group of participants including younger and older school and university students (rather than university students only) and employees. There are also some limitations requiring consideration. While the study included both male and female participants in the study, a higher proportion of participants were female. Thus, the results may be more representative of the predictors of sun protective intentions and behaviours of females. The use of one-item scales for subjective norm and perceived behavioural control is problematic; however, the nature of some of the data collection (especially in classroom-based testing within high schools) is likely to have led to less reliable responses than in more controlled testing environments. Although attempts were made in the present research to ensure the inclusion of clear and age appropriate wording of items based on pilot testing, future research of this kind in school settings should continue to focus on the optimal selection of items likely to increase scale reliability. A related point is that the measure of behaviour was one item only and more comprehensive behavioural indices would be useful to increase confidence in the reported findings. In addition to the problems associated with one item scales, the measurement of (and subsequent conclusions about) image norms was affected by a low scale reliability. Future research should aim to replicate the present findings utilising more reliable measures of the study’s constructs, particularly image norms. The construct of image
norms possesses some similarities to that of prototypes (see e.g., Gibbons, Gerrard, Blanton, & Russell, 1998) although does not include a consideration of a person’s similarity and favourability towards the social image. The concept of prototypes has garnered considerable support within the prediction of health behaviours, and future TPB studies should compare these two constructs within sun safety, both conceptually and methodologically (see Risis, Sheeran & Armitage, 2006).

Another limitation of the research was the reliance on self-report data to gauge levels of sun protection behaviour (although qualitative measures were employed to increase the reliability of the self report data). In addition to replicating the current research in similarly high skin cancer risk areas, future research could use other measures of sun protection behaviour, such as reports of participants’ sun protection behaviour by parents, teachers and friends, to increase the reliability of the data. Recent research comparing self-report (via a sun safety diary) with UV monitors, however, suggests that self-report data is reliable (Yaroch, Reynolds, Buller, Maloy, & Geno, 2006). Data collection was conducted during one season only; a comparison with findings conducted throughout other seasons of the year would be useful. Finally, only some of the participants were offered incentives. While it is difficult to determine the full impact that a difference in incentives offered may have had on participation in the survey, the experience of completing the questionnaire was sufficiently similar for all participants.

Overall, the current study tested the utility of an extended theory of planned behaviour model, incorporating group norms and image norms, in the prediction of young people’s sun protection intentions and behaviour. Analyses revealed that young people’s attitudes about sun protective behaviour, their perceptions of approval or disapproval by important individuals and groups, their perceived level of control over performing sun protective behaviour, and perceived support from their friendship group influenced their sun protection intentions. Young people’s
intentions to perform sun protective behaviours and the perception that adopting sun protective behaviours is normative of their friendship group were the most important indicators of actual sun protection behaviour. The importance of friendship group norms as a key factor influencing both sun protective intentions and behaviour suggests that future research should examine the role of these social networks and connections to these groups in the sun safety context in an effort to increase sun protective behaviour amongst young people.
Footnotes

1 The regression analyses were also conducted using a 1-item image norm scale (representing the perception of tanned images of celebrities and TV stars, “I think that to be a successful movie star or TV star you should have a tan” [1] strongly disagree to [7] strongly agree) with a similar pattern of results.

2 Please note that the percentages do not add up to 100% across all behaviours as participants reported multiple sun protective behaviours.
References


Table 1

*Means, Standard Deviations, Bi-variate Correlations and Alpha Co-efficients for the Predictor Variables and Target Behaviour*

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
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<tbody>
<tr>
<td>1. Attitude</td>
<td>4.83</td>
<td>1.01</td>
<td>(.67)</td>
<td></td>
<td></td>
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<tr>
<td>2. Subj. norm</td>
<td>5.82</td>
<td>1.28</td>
<td>.24***</td>
<td>a</td>
<td></td>
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<td></td>
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<tr>
<td>3. PBC</td>
<td>5.51</td>
<td>1.35</td>
<td>.28***</td>
<td>.34***</td>
<td>a</td>
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<td></td>
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<tr>
<td>4. Past behaviour</td>
<td>3.44</td>
<td>1.81</td>
<td>.24***</td>
<td>.23***</td>
<td>.17***</td>
<td>a</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Group norm</td>
<td>3.96</td>
<td>1.18</td>
<td>.28***</td>
<td>.28***</td>
<td>.27***</td>
<td>.47***</td>
<td>(.79)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>6. Image norm</td>
<td>4.06</td>
<td>1.25</td>
<td>-.00</td>
<td>.04</td>
<td>-.01</td>
<td>-.08</td>
<td>-.12***</td>
<td>(.59)</td>
<td></td>
<td></td>
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<tr>
<td>7. Intention</td>
<td>4.29</td>
<td>1.45</td>
<td>.30***</td>
<td>.36***</td>
<td>.37***</td>
<td>.53***</td>
<td>.48***</td>
<td>-.01</td>
<td>(.82)</td>
<td></td>
</tr>
<tr>
<td>8. Behaviour</td>
<td>3.40</td>
<td>1.80</td>
<td>.20***</td>
<td>.17***</td>
<td>.20***</td>
<td>.55***</td>
<td>.36***</td>
<td>-.10</td>
<td>.48***</td>
<td>a</td>
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</tbody>
</table>

*** p < .001

*a one item only*
Table 2

Hierarchical Regression Analyses Testing the Predictors of Sun-protective Intentions and Behaviour

<table>
<thead>
<tr>
<th>Variable</th>
<th>$R^2$</th>
<th>$\Delta R^2$</th>
<th>$p$</th>
<th>$B$</th>
<th>$\beta$</th>
<th>$p$</th>
<th>CI 95% for B</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
</table>
| Prediction of Intentions
| 1. Attitude            | .25   | .25           | .000 | .24   | .17     | .000 | .164         | .324        |
|                        | Subjective norm     | .30   | .26           | .000 | .234   | .366  |               |             |
|                        | PBC                 | .27   | .25           | .000 | .204   | .328  |               |             |
| 2. Attitude            | .36   | .11           | .000 | .15   | .11     | .000 | .077         | .228        |
|                        | Subjective norm     | .21   | .19           | .000 | .152   | .276  |               |             |
|                        | PBC                 | .20   | .19           | .000 | .145   | .260  |               |             |
|                        | Group norm          | .44   | .36           | .000 | .377   | .509  |               |             |
|                        | Image norm          | .04   | .04           | .161 | -.016  | .099  |               |             |
| Prediction of Behaviour
| 1. Intention           | .25   | .25           | .000 | .62   | .49     | .000 | .529         | .707        |
|                        | PBC                 | .02   | .02           | .662 | -.075  | .119  |               |             |
| 2. Intention           | .27   | .02           | .000 | .54   | .43     | .000 | .436         | .638        |
|                        | PBC                 | -.00  | -.00          | .908 | -.106  | .094  |               |             |
|                        | Attitude            | .08   | .04           | .231 | -.051  | .211  |               |             |
|                        | Subjective norm     | -.06  | -.04          | .289 | -.175  | .052  |               |             |
|                        | Group norm          | .23   | .14           | .000 | .106   | .352  |               |             |
|                        | Image norm          | -.07  | -.05          | .142 | -.171  | .025  |               |             |