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Brief Original Report

A randomised controlled trial of an online theory-based intervention to improve adult Australians' sun-protective behaviours

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ABSTRACT

Objective. To evaluate the effectiveness of a single-session online theory of planned behaviour (TPB)-based intervention to improve sun-protective attitudes and behaviour among Australian adults.

Methods. Australian adults ($N = 534$; 38.7% males; $M_{age} = 39.3$ years) from major cities (80.9%), regional (17.6%) and remote areas (1.5%) were recruited and randomly allocated to an intervention ($N = 265$) and information only group ($N = 267$). The online intervention focused on fostering positive attitudes, perceptions of normative support, and control perceptions for sun protection. Participants completed questionnaires assessing standard TPB measures (attitude, subjective norm, perceived behavioural control, intention, behaviour) and extended TPB constructs of group norm (friends, family), personal norm, and image norm, pre-intervention (Time 1) and one week (Time 2) and one month post-intervention (Time 3). Repeated Measures Multivariate Analysis of Variance tested intervention effects across time.

Results. Intervention participants reported more positive attitudes towards sun protection and used sun-protective measures more often in the subsequent month than participants receiving information only. The intervention effects on control perceptions and norms were non-significant.

Conclusions. A theory-based online intervention fostering more favourable attitudes towards sun safety can increase sun protection attitudes and self-reported behaviour among Australian adults in the short term.

Introduction

Australians are at high risk for developing skin cancers, demonstrated by alarmingly high national prevalence rates (Australian Institute of Health and Welfare, 2013; Australian Institute of Health and Welfare and Cancer Australia, 2008). After substantial public campaigning, Australians show awareness of the dangers of sun exposure (Stanton et al., 2005) although this awareness has not translated into sufficient sun-protective practices (Volkov et al., 2013). The development of effective interventions to increase Australians' sun safety targeting key determinants of sun-protective behaviour is, therefore, needed.

The theory of planned behaviour (TPB; Ajzen, 1991) is a well-validated model which can assist the development of health–behaviour interventions. In the TPB, behaviour is determined by intention which is underpinned by attitude (positive/negative evaluation), subjective norm (perceived social pressure), and perceived behavioural control (perceived ability/efficacy; PBC, also influencing behaviour), with these three latter constructs each with an underlying belief base (behavioural, normative, and control beliefs). The TPB has been used successfully to explain people's sun protection intentions and behaviour (e.g., Myers & Horswill, 2006). Support has also been demonstrated for augmented TPB models of sun-protective behaviour. For example, group members' use and approval of sun-protective measures (group norm), internalised values about whether one "should" be sun safe (personal norm), and media image norms of tanned and pale models (image norm) represent important determinants of sun-protective intentions (e.g., Jackson and Aiken, 2000; Parker et al., 1995; White et al., 2008, in press).

Based on the dearth of theory-based sun safety interventions in Australia and the potential for the economical and accessible delivery of online programmes (Cugelman et al., 2011), this brief report describes a randomised controlled trial testing the effectiveness of a single-session online TPB-based intervention. Intervention participants were expected to show significant improvements in their attitude, subjective norm, PBC, group norm (for friends and family), personal

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norm, image norm, intention, and self-reported behaviour from pre-intervention to follow-up (one week and one month) compared to adults receiving readily available information about sun safety.

Methods

Participants

Adults ($N = 532$; 38.7% men; 70.8% fair-skinned) aged 18–80 years ($M = 39.3 \pm 14.41$ years) were recruited via media releases, billboards, newsletters, email lists, and snowballing from major cities (80.9%), regional (17.6%) and remote (1.5%) areas of Australia between March and May 2013. Based on a priori power calculations, 130 participants per condition were needed to detect a medium effect (effect size [f] = 0.25, $\alpha = 0.05$, power = 95%).

Design and procedure

The University's Ethics Committee provided ethical approval. Participants (see Fig. 1 for a participant flow chart) completed a baseline questionnaire immediately before the experimental session (Time 1) after which they were randomly allocated (via a computer-generated random number sequence) to the intervention ($n = 265$; $M_{age} = 38.94$ years; 38% male; 69.8% fair-skinned) or information only ($n = 267$; $M_{age} = 39.64$ years; 39.3% male; 71.6% fair-skinned) condition. The intervention comprised an interactive 20–25 min online session incorporating animated scenarios, problem solving, goal setting, and quizzes, prompting participants to consider their attitudes towards, normative support for, and control over using sun protection (see Cleary et al., 2014). Information only participants viewed an 8-minute DVD and read fact sheets about sun protection, resources currently available on Cancer Council Queensland's website. The control session took about 20 min in total. Intervention participants' responses to the various interactive tasks indicated that participants had engaged with the material and control participants were asked specifically to confirm that they had read the fact sheets (see Supplementary Tables S1 and S2 for intervention and control group scripts). Participants completed a second questionnaire one week (Time 2) and one month (Time 3) post-intervention re-assessing the baseline measures. Participants received two AUD$20 store vouchers (at Times 1 and 3).

Measures

Consistent with TPB recommendations (Ajzen, 1991), the target behaviour was: "Performing sun-protective behaviours (using SPF 30+ sunscreen, wearing protective clothing such as a hat, long-sleeved shirt and sunglasses, and seeking shade between 10 am and 3 pm) every time you go in the sun for more than 10 min during the next week". Items and item reliabilities for all study variables are presented in Table 1.

Results

A 2 (intervention, information only) by 3 (pre-intervention, one week and one month post-intervention) Repeated Measures Analysis of Variance was performed with the standard and extended TPB constructs serving as dependent variables. Table 2 shows descriptives for all dependent variables and p values and effect sizes for univariate interactions. Alpha adjustments were used for follow-up simple effects of Time ($p = .01$) and pairwise comparisons ($p = .001$) to control for Type 1 errors.

Results revealed a significant multivariate Time effect, Pillai's Trace = .38, $F(18, 256) = 8.52$, $p < .001$, $\eta^2 = .38$, with univariate effects found for attitude, $F(1.94, 530.26) = 29.80$, $p < .001$, group norm friends, $F(1.88, 512.24) = 6.63$, $p = .002$, image norm, $F(1.98, 539.15) = 20.77$, $p < .001$, intention, $F(1.80, 490.51) = 11.61$, $p < .001$, and self-reported behaviour, $F(1.96, 533.92) = 15.04$, $p < .001$. Pairwise

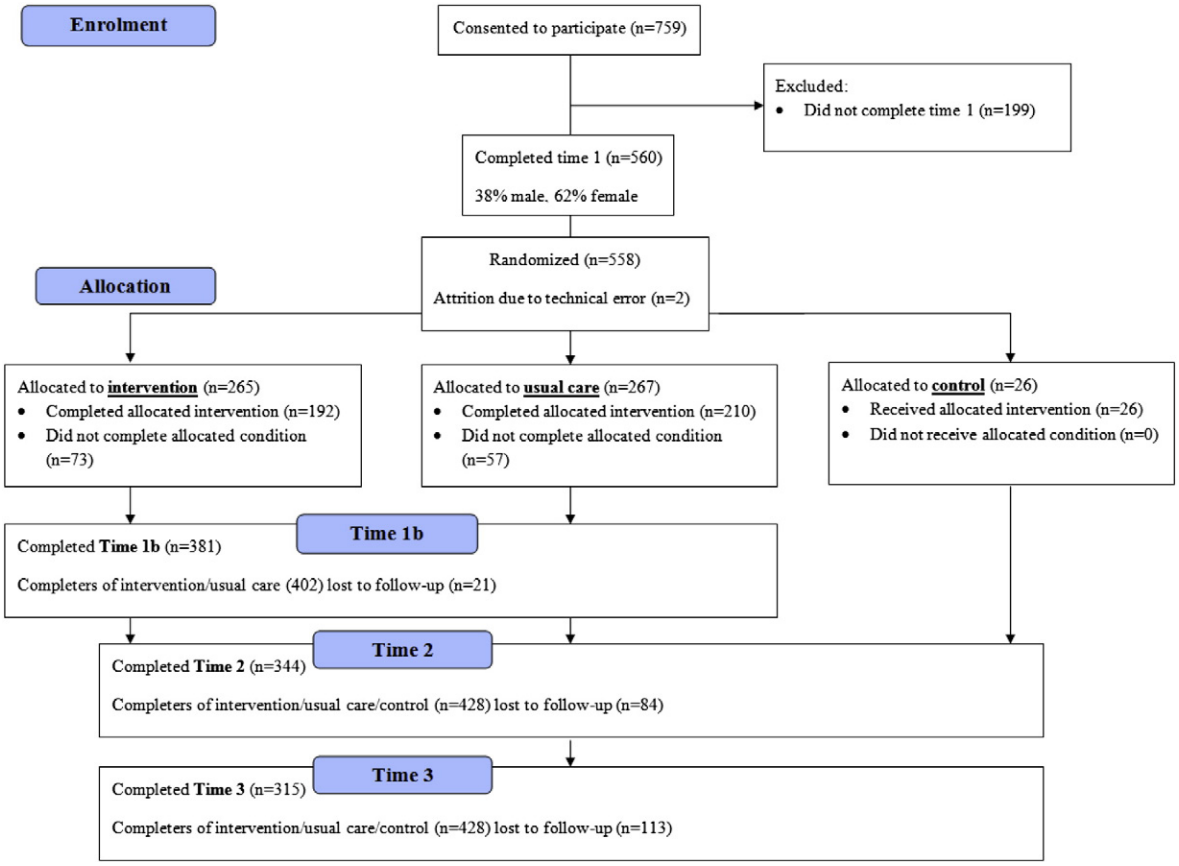

Fig. 1. Participant flow chart. Participants completing the intervention and usual care and relevant measures at Time 1, Time 2, and Time 3 were included in the final analysis ($N = 275$). There were no significant differences between participants who completed all time points and those who completed Time 1 only on any of the baseline measures. Attrition was greater among men (50.2%) than women (40.7%) between Time 1 and Time 3, $\chi^2(1) = 4.61$, $p = .03$.