

UV arrows descend from above: lessons from a mass media campaign to improve sun protection behaviours among young adults

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Key points

- A mass-media campaign was delivered to 18–24-year-olds in New South Wales (NSW), Australia, to motivate them to protect their skin from UV radiation
- Guided by audience research, UV radiation was portrayed as arrows descending from the sky, transforming it into a visible and ever-present threat
- A mass-media campaign that aimed to elicit emotional (fear) and cognitive (perceived efficacy) responses and which drew upon social and heuristic cues was associated with greater self-reported sun protection among the target audience

Abstract

Objective: More than 95% of melanomas in Australia are caused by UV radiation from the sun. Young adults are particularly at risk, with 18–24-year-olds spending more time in the sun and protecting their skin less than older adults. A new mass media campaign was delivered in New South Wales, Australia, to motivate this hard-to-reach group to protect their skin from harmful UV radiation. This paper shares learnings from this campaign for public health educators working across diverse fields.

Program: Guided by audience research and testing, the campaign combined fear-based and self-efficacy messaging. UV radiation was portrayed as arrows descending from the sky, transforming it into a visible and ever-present threat. High-reach channels such as cinema, outdoor advertising, online videos, audio apps and social media were used to reach the audience.

Methods: The campaign was evaluated through an online tracking survey ($n = 750$, 18–24-year-olds) measuring prompted recognition, message take-out, key diagnostics, and self-reported sun protection intentions and behaviours.

Results: The evaluation found that 57% of survey participants recognised the campaign when prompted. Among those that recognised the campaign, 76% said they had used sun protection when outdoors over the summer campaign period (vs 64% of non-recognisers, $p < 0.05$), and 45% said they had adopted at least three of the five sun protection behaviours (Slip, Slop, Slap, Seek and Slide) 'always' or 'often' (vs. 36% of non-recognisers, $p < 0.05$).

Lessons learnt: A mass-media campaign that aimed to elicit emotional (fear) and cognitive (perceived efficacy) responses and which drew upon social and heuristic cues was associated with greater self-reported sun protection among the target audience. Delivering a combination of message strategies simultaneously within a campaign tailored to young adults may be more effective than adopting a more singular focus.

Background

More than 95% of melanomas in Australia are caused by ultraviolet radiation (UVR) from the sun.¹ In 2023, an estimated 5655 New South Wales (NSW) residents were diagnosed with melanoma, and an estimated 500 people died of the disease.²

Overexposure to UVR among young people is of particular concern, with 18–24-year-olds spending more time in the sun and protecting their skin less than older adults.³ While the risk of developing melanoma increases with age⁴, this risk is greatest among those with repeated UVR exposure and sunburns in childhood and young adulthood.⁵

Multiple skin cancer prevention initiatives in Australia spanning over 40 years are positively impacting people born from the 1980s onwards. Generational trend research indicates that, along with earlier detection and improved treatment, declining invasive melanoma rates among young Australians may be partly attributed to skin cancer prevention programs.^{6,7} Cost-benefit analysis also underscores the strong case for ongoing skin cancer prevention campaigns.⁸

This paper presents the development, implementation, and evaluation of a new skin cancer prevention campaign targeting young adults, offering learnings to public health educators working across diverse fields.

Research and development

In preparation for a new campaign, Cancer Institute NSW commissioned formative qualitative research with 13–24-year-olds to gain insights into their understanding of UVR and skin cancer, along with key barriers and motivators to sun protection ($n = 104$).⁹ Guided by these audience insights, the *Health Belief Model*¹⁰, *Theory of Planned Behaviour*¹¹, *Social Cognitive Theory*¹², and behavioural economics¹³ were drawn upon to develop four communication pillars (Figure 1). These four pillars provided a strategic framework within which new messages and creative content could be developed to engage and drive behaviour change among the audience.

The campaign

Informed by this behaviour change strategy, various messages and creative concepts were developed and tested with 13–24-year-olds through qualitative research ($n = 161$).¹⁴ The tone and approach of each concept varied from threat-based, real-life storytelling to humorous.

Following three rounds of concept testing, one creative approach demonstrated strong potential to improve sun protection behaviours among the audience. This approach highlighted the scale and danger of UVR by visualising it as arrows descending from the sky,

Figure 1. Campaign communication pillars to drive audience behaviour change

Campaign pillar	WARN & MOTIVATE	ENABLE & PREPARE	SUPPORT & INFLUENCE	REMIND & CUE
Audience Barriers	Lack of concern regarding the threat of UVR and skin cancer.	Lack of knowledge and confidence relating to the benefits, effectiveness, and proper use of sun protection.	Lack of perceived social expectations and support for sun protection.	Lack of reminders and cues before and during UVR exposure to make sun protection habitual.
Audience thoughts and feelings	'UV is harmless' 'Skin cancer won't happen to me, isn't that bad, and I'll worry about it later'	'Being tanned is worth it' 'Sun protection doesn't work' 'Being sun safe is a hassle'	'No one else is protecting their skin' 'I don't want to look dorky'	'I just forget to protect my skin from UV'
Behaviour change opportunity	Increase perceived personal susceptibility, immediacy and severity of UVR and skin cancer.	Increase perceived effectiveness and benefits of sun protection. Increase confidence in how, when and where to protect skin from UVR.	Utilise peers and social media figures to role-model sun protection behaviours and fashion.	Deliver heuristic cues and triggers for sun protection at the right time and place.

UVR = ultraviolet radiation

transforming it into a more tangible and ever-present threat. This depiction was based on the central message "If you could see UV radiation, you would protect your skin".

In the final developed video advertisement, the falling arrows took on a glassy appearance, violently piercing the unprotected skin of young people before dispersing visible UVR into their bodies. Using an animated metaphor approach, the ad aimed to deliver fear-evoking messages not only at a rational and cognitive level but also at a visceral, bodily and emotive level.

An animated sequence depicting the metastatic spread of melanoma in the body highlighted the severity of skin cancer. The effectiveness of proper sun protection was demonstrated by UV (ultraviolet) arrows deflecting off people protecting their skin.

Final online pre-testing of the developed video (Figure 2) among 18–24-year-olds ($n = 416$) found it was effective in motivating sun protection among this audience, with no significant risks or unintended consequences identified.¹⁵

To further drive home the existential threat of UVR, testimonial videos sharing the stories of young people affected by skin cancer were also developed (Figure 3). Designed to counter self-exempting beliefs¹⁶, these videos communicated that skin cancer can happen at a young age, be life-threatening, and severely disrupt one's plans for the future.

Research demonstrates that combining fear-based messaging with those focused on self-efficacy and social norming can be effective.^{17,18} Guided by this insight, the campaign included upbeat creative materials to role model and remind audiences how, when and where to protect their skin from UVR. This included social media influencers promoting the acceptability and fashion appeal of sun protection, advertising in outdoor areas to trigger sun protection action, and mobile phone reminders of the current UVR index (Figure 4).

The objectives of the campaign were to achieve prompted campaign recognition among the majority of 18–24-year-olds in NSW and to improve self-reported sun protection intentions and behaviours among those who recognised the campaign.

A total of A\$3.4 million was invested in the campaign by the NSW Government over several years, which included research and testing, creative development, production, media, and campaign evaluation. The campaign, which is intended for use across several summers, was first delivered between 14 November 2022 and 6 March 2023 across high-reach channels for the young target audience, including cinema, outdoor advertising, online videos, audio apps and social media platforms.

Evaluation methods

Design

The Skin Cancer Online Tracking Survey (SCOTS) was used to evaluate the campaign for awareness, impact and engagement. SCOTS comprises a cross-sectional tracking survey of NSW residents aged 13–54 years recruited from an opt-in research-only online panel operated by i-Link Research. Direct invitations were sent to 18–54-year-old panellists and 13–17-year-olds were recruited indirectly via their parents on the panel. The survey was conducted over 15 weeks, from 14 November 2022 to 5 March 2023. The sample size was $n = 100$ per week, with an additional boost sample of $n = 25$, 18–24-year-olds. The weekly sample was stratified by age (25% for each of 13–17 years, 18–24 years, 25–34 years and 35–54 years), location (60% Sydney, 40% regional/rural NSW) and gender (50% females and 50% males). The total sample size was $n = 1875$, including $n = 750$, 18–24-year-olds. Given that 18–24-year-

Figure 2. Image from *If You Could See UV* campaign video advertisement



Figure 3. Image from campaign testimonial videos



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Figure 4. Images from campaign promoting sun protection



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olds were the primary target audience for the campaign, the evaluation focuses on this age group.

Measures

SCOTS is conducted each year Cancer Institute NSW delivers campaign activity. The survey asks up to 62 questions and takes approximately 14 minutes to complete. The questionnaire covered questions about the following key evaluation outcomes: prompted campaign recognition, key message take-out, self-reported sun protection intentions, self-reported sun protection behaviours and sociodemographic characteristics (See details in Supplementary File 1, available from: https://figshare.com/articles/journal_contribution/Supplementary_File_1_-_Skin_Cancer_Online_Tracking_Survey_SCOTS_Measures_pdf/25621470). An external media agency provided further digital analytics regarding campaign impressions, reach and frequency across various online and offline channels.

Data analysis

Descriptive statistics for the evaluation were calculated using IBM SPSS Data Collection Reporter (Version 7.0.1).¹⁹ Statistically significant differences between subgroups were determined using Analysis of Variance (f-test) to test for differences between means and z-scores to test for differences between proportions. The level of statistical significance was set at $p < 0.05$. All survey estimates are weighted to population benchmarks (age, gender, region).

See Supplementary File 2, available from: https://figshare.com/articles/journal_contribution/Supplementary_File_2_-_Sample_summary_profile_pdf/25621419, for a summary of the sample profile.

Ethics approval

Ethics approval for campaign evaluation was obtained through the University of Sydney Human Research Ethics Committees (HREC). Reference 2019/647.

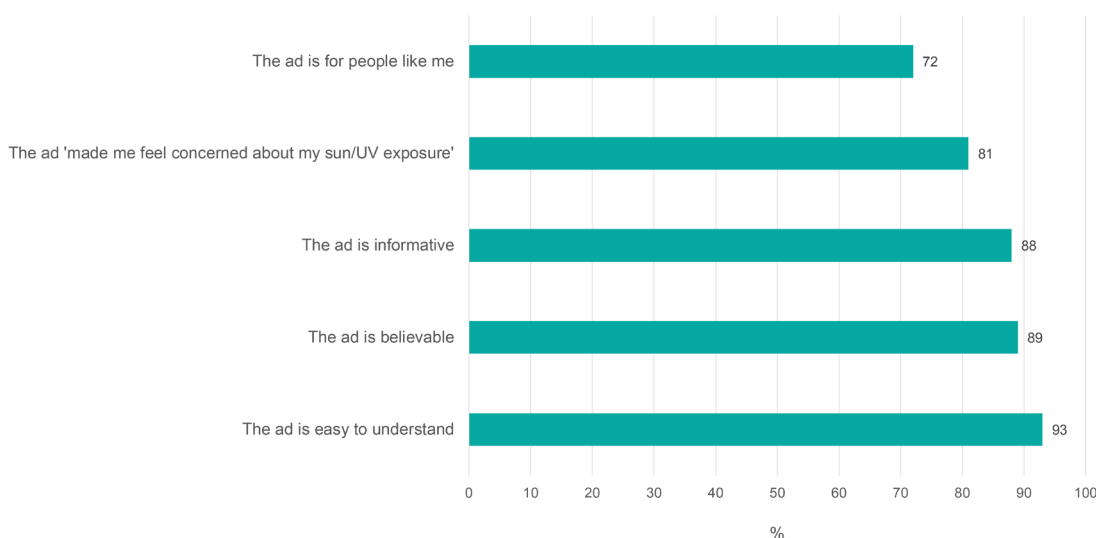
The NSW Population and Health Services Research Ethics Committee has advised that quality-improvement formative, concept testing and pre-testing research undertaken to support the 2022/23 Skin Cancer Prevention Campaign does not raise any ethical risks requiring submission to an ethical review body in accordance with NSW Health Policy GL2007_020.

Results

More than half (57%) of survey participants aged 18–24-years indicated they recognised at least one element of the campaign when prompted. A total of 57 568 151 impressions (number of times campaign advertising was delivered) were achieved across social media, online video, audio apps and digital display during the campaign period. An estimated 11% of the audience viewed the campaign cinema video at least once, while an estimated 96% saw the outdoor advertisement at least once.

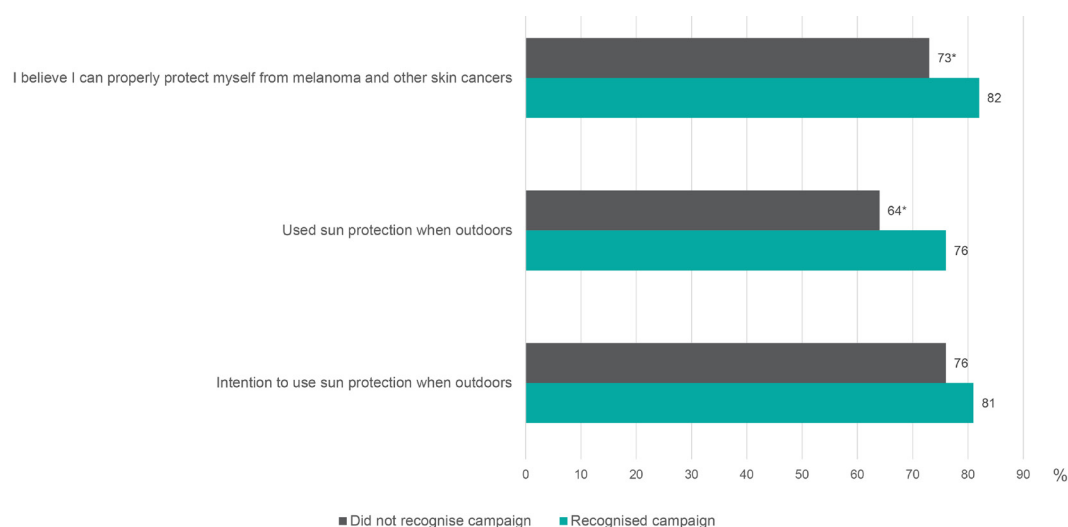
The majority of those who recognised the *If You Could See UV* video agreed it was easy to understand (93%), believable (89%), informative (88%), made them feel concerned about their sun/UV exposure (81%), and was for 'people like me' (72%) (Figure 5). In addition, 83% said the outdoor advertising reminded them to use sun protection when exposed to the sun, while 81% said the testimonial videos made them think someone their age could get melanoma.

Figure 5 Perceived effectiveness and impact of the *If You Could See UV* video



Base: 18–24 year-olds who recognised the *If You Could See UV* video ($n = 212$) during the campaign period

Figure 6. Attitudes, intentions and behaviours relating to sun protection and skin cancer prevention



Base: 18–24 year-olds during the campaign period ($n = 750$): recognised campaign ($n = 425$); did not recognise campaign ($n = 325$).

* Indicates result is significantly different to respondents who recognised the campaign ($p < 0.05$).

Self-reported intention to use sun protection was similar between those who recognised the campaign and those who did not (Figure 6). However, those who recognised the campaign were more likely to report they 'used sun protection when outdoors' (76% vs 64%, $p < 0.05$) and to believe that they can 'properly protect myself from melanoma and other skin cancers' (82% vs 73%, $p < 0.05$).

Overall, 41% of all 18–24-year-old participants said they regularly (i.e. 'always' or 'often') adopted three of the five recommended sun protection behaviours when outdoors: Slip on protective clothing, Slop on SPF50+ sunscreen, Slap on a wide-brim hat, Seek shade and Slide on sunglasses. Only 9% said they were regularly adopting all five (Table 1). Campaign recognisers were more likely to report adopting at least three of the five sun protection behaviours regularly when outdoors (45% vs 36%, $p < 0.05$).

Table 1. Adoption of core sun protection behaviours, 18–24-year-olds

	Recognised campaign %	Did not recognise campaign %	Total %
One behaviour	90	85 ^a	88
Three behaviours	45	36 ^a	41
Five behaviours	11	7	9

Base: 18–24 years during the campaign period ($n = 750$): recognised campaign ($n = 425$); did not recognise campaign ($n = 325$).

^a Indicates result is significantly different to respondents who recognised the campaign ($p < 0.05$)

Limitations

The qualitative nature of the formative and concept-testing research limits the findings being reliably extrapolated to the broader population of the target audience. Due to the cross-sectional design of SCOTS, it is not possible to attribute causality to the observed associations. The ability to draw conclusions about the broader population from SCOTS estimates is limited due to the non-probability, opt-in nature of online panels and the limited coverage they offer (approximately 1% of the Australian population). The results may also be subject to bias in that those more likely to adopt sun protection behaviours may be more receptive to messaging about sun protection and, thereby, more likely to recognise the campaign.

Discussion and learnings

Evaluation results indicate the campaign successfully reached and resonated with the audience, performed well within its four communication pillars, and was associated with greater self-reported sun protection behaviours. While these results are largely positive, the importance of further work in this area is evident by the relatively low proportion of 18–24-year-olds regularly adopting three of the five sun protection behaviours and the even lower proportion adopting all five.

There remains debate regarding the use and effectiveness of fear-based approaches within public health campaigns.^{20–22} Even so, a campaign's strategic direction and messaging should, where possible, be anchored to bespoke research with the target audience.

Communicating health messages to young people remains challenging for public health educators.^{23–25} Delivering a combination of message strategies

simultaneously for this audience may be more effective than adopting a more singular focus. For this campaign, a highly visual approach that sought to elicit emotional (fear) and cognitive (perceived efficacy) responses and which drew upon social and heuristic cues offered an effective approach for the young audience.

The *If You Could See UV* campaign was delivered in NSW again in the summer of 2023/24. In addition to boosting knowledge, a focus of this repeat campaign was to convert high behavioural intentions to actual behaviour change through enhancing prompts and triggers for sun protection at the right time and place, making sun protection more appealing and rewarding, and further addressing sun protection barriers. A robust approach to evaluation ensures strategic and effective optimisations can be made as campaigns evolve and inform similar public education initiatives.

Given the considerable upfront investment to research, develop and produce a new mass media campaign, public educators could consider licensing existing campaigns – adapting and testing them as needed with specific audiences prior to delivery in other settings.

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Peer review and provenance

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Competing interests

None declared.

Author contributions

CS and SD were responsible for the design and editing of the manuscript. SD, PM and NS contributed to the design, implementation and analysis of research and evaluation results. All authors contributed to several revisions of the manuscript and agreed on the final version.

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