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## Short Communication

# The relationship between skin checking and sun protection behaviours: implications for skin cancer prevention campaigns



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Skin cancer is one of the most prevalent types of cancer in the world.<sup>1</sup> In Australia, the context of the present study, it is the most common form of cancer and is estimated to cost the health system over \$840 million per year.<sup>2,3</sup> High incidence rates reflect the extreme ultraviolet radiation levels experienced on much of the Australian continent.<sup>4</sup>

Sun exposure can be intentional or incidental, and skin cancer risk increases incrementally with duration and intensity of exposure to ultraviolet radiation.<sup>5</sup> As such, it is important for those living in high ultraviolet radiation areas to check their skin regularly for signs of skin cancer to enable timely intervention.<sup>6</sup> While there is a growing body of evidence relating to the prevalence of sun protection behaviours,<sup>7–9</sup> much less is known about the extent to which individuals have their skin checked for signs of skin cancer and whether this behaviour is related to the enactment of skin cancer prevention behaviours.

Public health campaigns have long been in place to encourage Australians to engage in sun protection behaviours such as using sunscreen and wearing hats and long clothing to reduce their skin cancer risk. These campaigns have been successful in raising awareness of the dangers of sun exposure and encouraging the use of sun protection behaviours.<sup>9</sup> However, in more recent years, there has been a plateau in engagement in sun protection behaviours and further gains have proven difficult to achieve.<sup>7,8</sup> New health promotion approaches are thus needed to complement these campaigns to facilitate further advances in skin cancer prevention.

The way in which skin checking and sun protection behaviours are related is potentially important for skin cancer prevention campaigns. For example, an inverse relationship could indicate (i) a reliance on skin checking to compensate for a lack of sun protection or (ii) the belief that using sun protection eliminates the need to check one's skin. Alternatively, a positive relationship could indicate that those exhibiting one form of health-promoting behaviour are more likely to engage in multiple health-related behaviours within the same behavioural domain (i.e. skin cancer prevention). The nature of the relationship between skin checking and sun protection is thus an important consideration in skin cancer prevention campaigns to ensure that appropriate messages are delivered and to minimise any negative unintended consequences. Accordingly, the aim of the present study was to investigate the relationship between skin checking and sun protection behaviours to inform future public health campaigns designed to further reduce the incidence and prevalence of skin cancer.

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## Methods

In total, 698 Western Australian adults aged 18–45 years were surveyed via computer-assisted telephone interviewing using random digit dialling. Quotas were used to obtain a sample characterised by an equal gender split and roughly equal representation across the age brackets of 18–24, 25–35 and 36–45 years. The upper limit of 45 years reflects the critical importance of behaviours enacted in earlier life for reducing the lifetime risk of skin cancer and the resulting focus of sun protection campaigns on younger audiences.<sup>8</sup>

Survey items assessed (i) the frequency with which respondents engaged in three sun protection behaviours (wearing a hat, wearing protective clothing and using sunscreen) when in the sun for an hour or more in summer during the hours of 10 am and 3 pm (1 = never to 5 = always), (ii) whether respondents had checked or had someone else check their skin for signs of skin cancer in the last 12 months (1 = no, 2 = yes), (iii) respondents' confidence in their ability to spot the signs of skin cancer (1 = not at all confident to 4 = very confident) and (iv) respondents' skin colour (1 = very fair to 7 = black).

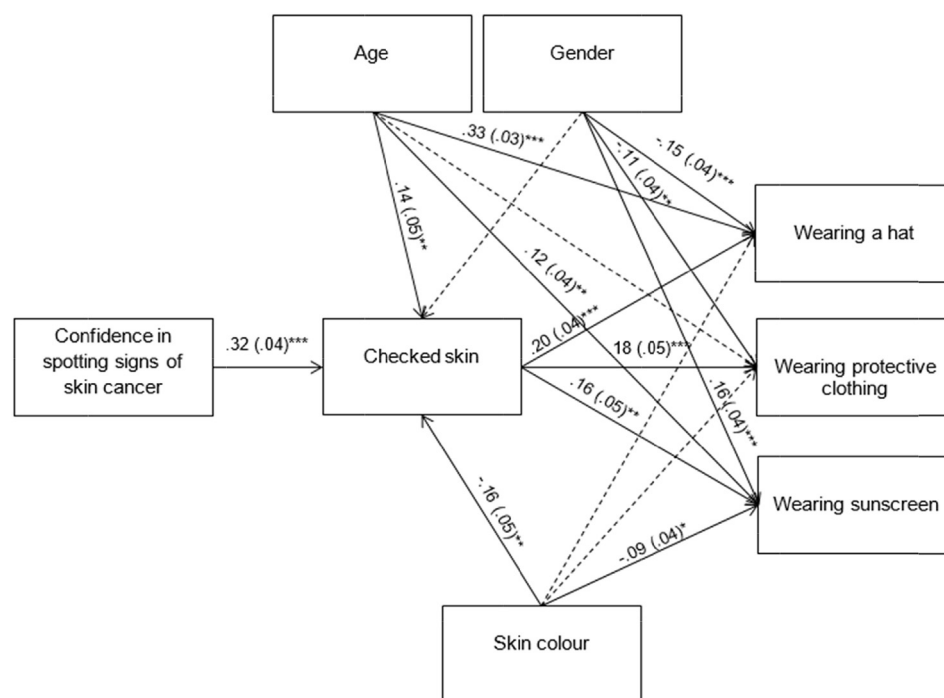
MPlus was used to conduct a path analysis assessing the association between skin cancer detection confidence, skin checking behaviour and sun protection behaviours. Age, gender and skin colour were included as covariates in the analysis. The weighted least squares mean- and variance-adjusted estimator was used to fit the model due to the presence of a categorical mediator (skin checking behaviour). Given that those who engage in one sun protection behaviour are likely to engage in other sun protection behaviours, all

three were allowed to covary in the tested model (as per Koch et al.<sup>7</sup>). Fit was assessed using the model Chi-squared test, comparative fit index (CFI), Tucker–Lewis Index (TLI), root-mean-square error of approximation (RMSEA), and weighted-root-mean-square residual (WRMR).

## Results

Among the survey respondents, 58% reported either checking their own skin or having someone else perform a check in the previous 12 months. Regular use of sunscreen when in the sun for extended periods was reported by 68% of the sample, whereas wearing a hat or long clothing was reported by 56% and 34%, respectively.

The model provided a good fit to the data ( $\chi^2(3) = 6.30$ ,  $P = 0.098$ ; CFI = 0.99, TLI = 0.92, RMSEA = 0.04 [0.00–0.08], and WRMR = 0.45). Standardised parameter estimates are presented in Fig. 1. Greater confidence in detecting skin cancer was found to be significantly associated with skin checking. Skin checking was in turn found to be significantly associated with more frequent engagement in each of the sun protection behaviours. The covariates of skin colour, gender, and age also emerged as significant. Those with lighter skin were more likely than those with darker skin to check their skin and use sunscreen. Males were more likely than females to wear a hat and protective clothing, whereas females were more likely than males to use sunscreen. Older adults were more likely than younger adults to check their skin, wear a hat, and use sunscreen. The identified relationships between skin checking efficacy, skin checking behaviour, and sun protection



**Fig. 1 – Standardised parameter estimates for a model linking confidence in spotting the signs of skin cancer with skin checking behaviours and sun protective behaviours. Solid lines present significant associations. Broken lines present non-significant associations (parameter estimates not presented). \* $P < 0.05$ ; \*\* $P < 0.01$ ; \*\*\* $P < 0.001$ .**

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