

# Do health warnings on cigarette sticks dissuade smokers and non-smokers? A focus group and interview study of Australian university students

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**Introduction:** Young adults are a vulnerable population for experimentation with tobacco, which can lead to lifelong addiction. In an effort to ensure reductions in tobacco use through improved health promotion materials, we explored young adults' perceptions of current Australian packaging warnings, and novel health warnings on individual cigarette sticks.

**Methods:** Focus groups and interviews were conducted with smoking and non-smoking first-year undergraduate university students at a regional Australian university. Semi-structured questions were used to gather participant perceptions. Sixteen students participated across three focus groups, and eleven students participated in the phone interviews. Data were analyzed using thematic analysis in NVivo.

**Results:** Six emergent themes were identified. Current cigarette packaging warnings were seen as ineffective, being disregarded by current smokers (theme 1), and seen as irrelevant by young adult smokers and non-smokers (theme 2). Several cigarette stick warnings were perceived as engaging and effective, due to the novelty of the cigarette stick as a medium (theme 3), and the proximal nature of the warnings used (theme 4). The warning depicting the financial consequences of smoking was considered the most effective, followed by the impact of smoking on personal appearance, and the "minutes of life lost" warning. Social media (theme 5), and the use of more supportive messages to assist smokers (theme 6) were considered the best next steps as tobacco control interventions.

**Conclusions:** Supplementing packaging warnings which were seen as minimally effective in this study, using cigarette stick warnings and social media may lead to further reductions in tobacco use. New and relatable warnings such as the financial consequences of smoking and impact on personal appearance may be the most effective in dissuading young adults from smoking, particularly within the university environment.

**Keywords:** health promotion, health behavior, public health, tobacco control

## Introduction

Tobacco control measures such as educational campaigns and tobacco packaging health warnings have led to significant declines in tobacco use, and its attributable morbidity and mortality.<sup>1</sup> Adolescents and young adults are a key target group for these interventions, as the majority of adult smokers start using tobacco products and developed nicotine addiction during these formative years.<sup>2</sup> High-school finishers who enroll in college are presented with a unique set of challenges, stressors, and experiences, including exposure to the use of alcohol, tobacco, and other drugs.<sup>3</sup> Nearly 4,000 adolescents smoke their first cigarette each day in America,

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and 14% of 18–24 year olds smoke at least weekly in Australia. Therefore, ensuring that this vulnerable age group are dissuaded from tobacco products, and strengthening their health-promoting behaviors is essential in improving the health of future generations.<sup>4–6</sup>

Health-promoting behaviors are influenced by several factors, described within multiple theories, such as the Health Belief Model (HBM).<sup>7</sup> The HBM describes health-related behaviors as being influenced by six major elements, encompassing an individual's perceptions of a behavior and its relationship to good or poor health, modifying factors (including personal and social), and triggers for taking action.<sup>8</sup> Within the context of smoking, the HBM describes that a person's perceived susceptibility (element 1) and severity (element 2) of known smoking-related consequences contributes to their belief of how smoking can harm their own health. This belief and their subsequent behaviors are also influenced by their perceived benefits (element 3) (both for smoking and not smoking) and perceived barriers (element 4) (both in quitting smoking and actively smoking). These factors may lead to changes in health behavior through a combination of a person's cue to action (element 5) and perceived self-efficacy (element 6) in performing these actions.<sup>7,9–11</sup> The HBM was selected as a theoretical framework for this research due to its multi-faceted construction (six major elements), all of which are addressed to some degree in current tobacco control interventions.

Health warnings therefore play an essential role in ensuring the accurate portrayal of comprehensible negative consequences of tobacco use, and actionable messages to support quitting. In Australia, text and pictorial warnings cover the majority of the packaging surface and are rotated to prevent image wear-out, and are supplemented by plain (standardized) packaging. These interventions have demonstrated effectiveness in reducing tobacco use, through minimizing the appeal of tobacco packaging, increasing viewer awareness of the dangers associated with tobacco use, and increasing smoker quit attempts.<sup>12–15</sup> However, recent research has identified these warnings are subject to diminished effectiveness over time, due to repetition of viewing and a loss of shock value.<sup>12,16</sup> There are also issues with the vulnerable population of younger smokers not identifying with the fatal and debilitating diseases portrayed on cigarette packs in the same manner as older adults.<sup>17</sup> This lack of a connection between smoking and smoking-attributable diseases amongst this age group results in perceived

self-exemption from these consequences and allows rationalization for continued smoking.<sup>18,19</sup>

As a potential method for addressing these shortcomings, a novel method for communicating the risks of tobacco is the use of health warnings and messages on individual cigarette sticks. The small number of exploratory studies published in 2015 and 2016 primarily gathered the perceptions of adolescents and young adults.<sup>20–26</sup> A systematic review of these studies identified that health warnings such as “Smoking Kills” and the “Minutes of Life Lost” on cigarettes reduced cigarette appeal, affected viewer perceptions of the harm caused by cigarettes, increased quit intentions, and reduced the likelihood of smoking uptake.<sup>27</sup> An additional study that interviewed packaging and marketing experts also found that the cigarette-stick warnings were considered a powerful deterrent.<sup>28</sup> Two recent quantitative studies, one amongst school-aged students (aged 15–18 years) and one amongst university students, both found a trend of desensitization towards current packaging warnings, and a general acceptance towards cigarette-stick warnings, particularly those depicting novel and shorter-term warnings.<sup>29,30</sup>

However, these previous quantitative studies do not provide in-depth explanations as to why cigarette-stick warnings are perceived as they are. In the current study, we aimed to build upon recent findings, and identify which health warnings are perceived as the most effective by young adults, and why. To achieve reductions in smoking prevalence amongst young adults, they must understand their personal susceptibility to a sufficient range of attributable consequences, whilst also being confident in their ability to avoid smoking (non-smokers), and overcome barriers that prevent them from quitting (smokers). Therefore, developing new health promotion materials that address the elements of the HBM may increase awareness amongst this population, leading to behavioral changes and better health outcomes. We therefore aimed to answer the following research questions (RQ) using a qualitative approach, and relating the findings to the HBM and its six elements:

1. How do university students perceive current cigarette packaging warnings, and their effectiveness as a tobacco control intervention?
2. How do university students perceive the inclusion of health warnings and messages on cigarette sticks, and their potential strengths and weaknesses as a tobacco control intervention?

3. What forms of tobacco control interventions do university students believe as being the most effective in promoting public health into the future?

## Methods

A combination of focus groups and one-on-one phone interviews were utilized to gather the perceptions of university students towards the effectiveness of current Australian health warnings on cigarette packaging, and experimental health warnings and messages on individual cigarette sticks. First-year undergraduate university students at the James Cook University Townsville campus were initially invited via email by the principal investigator in April 2018 to participate either in a focus group discussion (FGD) or phone interview, with the email containing an information and consent form detailing the purpose of the research and the rights of the participants. A combination of FGDs and one-on-one phone interviews was utilized to accommodate student availabilities during the teaching semester. Students could respond to the principal investigator, indicating their willingness to participate, and propose suitable times and dates to participate. First-year undergraduate students were chosen to primarily recruit recent school-leavers who were within the desired age bracket of 18–22 years old, though no potential participants were excluded based on their age. Participants received a \$20 Bunnings (Australian retail chain which does not sell tobacco products) e-gift voucher for participating.

This research was approved by the James Cook University Human Research Ethics Committee. Protocols were the same in both the FGDs and phone interviews, which both utilized the same semi-structured questions, which are available in Supplementary material. Participants first viewed cigarette packaging (see Figure 1) and described their experiences and perceptions of the effectiveness of current packaging warnings. Participants were then prompted to open the cigarette packaging and take out the twelve cigarettes which included health warnings and messages (see Figure 1). Each cigarette stick had three lines of text down the shaft of the cigarette printed in red ink, with the entire content of the message read as the cigarette is rotated. The warnings used were evaluated throughout previous research on cigarette-stick warnings,<sup>20–26,29–31</sup> and were designed to align with the elements of the HBM, and current tobacco control techniques utilized within Australia, such as the description of specific diseases, directions to quit services, and regular increases in

taxation of tobacco products.<sup>32</sup> Participants were then asked to describe their perceptions of the cigarette-stick warnings and messages. Prior to the phone interviews, participants were emailed the interventional materials, and instructed to view the materials in a certain order in line with the relevant questions being asked. Finally, participants discussed their opinions of effective methods for tobacco control interventions which should be used in Australia to reduce tobacco use.

It was expected that non-smokers and smokers would have significantly different viewpoints, as these forms of intervention are preventative for non-smokers, whereas for smokers they would act as deterrents from continued smoking, or as motivation for cessation attempts. Therefore, for the FGDs, students were grouped according to their smoking status, and each group involved between three (3) and seven (7) students. The FGDs were conducted by two of the researchers (AD and BMA) in classroom settings on campus, during working hours. They were audio recorded and ran for up to 60 mins. The phone interviews were conducted by one researcher (AD), took between 10 and 15 mins, and were audio recorded. After answering each phone interview question, primary themes identified during the FGDs were put forward to participants. They were prompted to discuss their viewpoint in comparison to what was described during the focus groups, with areas of consent and dissent of primary interest.

None of the participants had any prior relationship with the investigators, with each participant prompted to give their opinions in response to each question asked, and vocal participants controlled to allow for quieter participants to respond. Following transcription, participant responses were analyzed using a bottom-up, inductive thematic analysis (Braun & Clarke, 2006) using NVivo version 11 (QSR International Pty Ltd, Melbourne, Australia).<sup>33</sup> Two researchers (AD and BMA) independently read the transcripts, identified and confirmed the recurring themes for each RQ. A deductive approach was utilized to develop the emerging themes in relation to the six elements in the HBM. Individual and group-based perceptions (including points of participant consent and dissent) were both analyzed, with the researchers comparing and reaching consensus on the identified themes by checking them against the RQs, the HBM and wider literature. Primary themes were compared with each element of the HBM, to build a framework to visualize the strengths and limitations of both current packaging



Figure 1 The current Australian cigarette packaging and twelve cigarette-stick warnings utilized in the focus groups and phone interviews.

warnings and cigarette stick warnings across the six HBM elements. Quotes illustrating the primary themes were identified and reported verbatim.

## Results

Sixteen students participated in three focus groups, and an additional eleven participated in the phone interviews. Their characteristics and participation details are listed in Table 1. Twenty-one (78%) participants were female, with a mean age of 25.3 years (range 18–47 years), of whom 12 (44%) were non-smokers, 13 (48%) were smokers, and two (8%) were ex-smokers. There was an overlap of participants' views in the FGDs and phone interviews, with participants having similar views, and many of the issues raised at the FGDs resonated in the interview sessions. Overall, six major themes and three sub-themes were identified as described below and presented with verbatim illustrative quotes. The themes identified and their relevance to the elements of the HBM and perceived outcomes on health-behaviours are depicted in Figure 2.

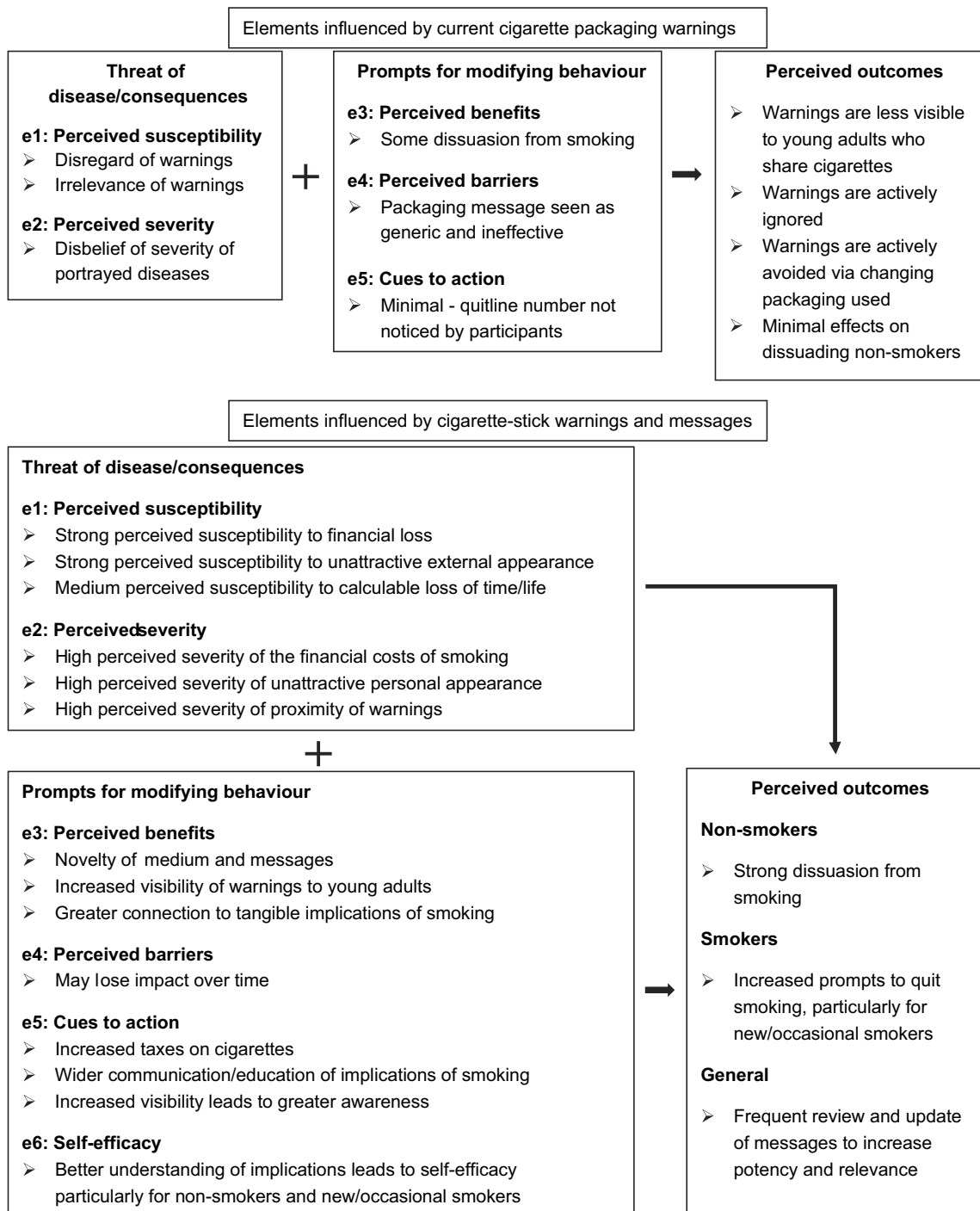
Data saturation was achieved by the ninth phone interview participant (participant #20), where no new data relating to perceptions of cigarette packaging warnings, cigarette stick warnings, or ideas for future tobacco control interventions were identified. Quotations which illustrate these themes are annotated with a numerical indicator to identify the participant, whose details are described in Table 1.

RQ1: How do university students perceive current cigarette packaging warnings, and their effectiveness as a tobacco control intervention?

Health warnings currently implemented on cigarette packaging in Australia were generally perceived as minimally effective by all participants (males and females, smokers and non-smokers). Two underlying themes emerged describing the basis for these perceptions: the disregard of packaging warnings and warning irrelevance to readers. These themes were primarily related to how packaging warnings influence readers' perceived susceptibility and severity of tobacco-attributable consequences.

**Table 1** Participant characteristics for focus groups and phone interviews

ID no.	Method of participation	Gender	Age	Smoking status
1	Focus group #1	Female	18	Non-smoker
2	Focus group #1	Female	18	Non-smoker
3	Focus group #1	Female	18	Non-smoker
4	Focus group #1	Male	18	Non-smoker
5	Focus group #1	Male	31	Non-smoker
6	Focus group #1	Female	33	Non-smoker
7	Focus group #2	Male	21	Smoker
8	Focus group #2	Female	30	Smoker
9	Focus group #2	Female	22	Smoker
10	Focus group #3	Female	47	Non-smoker
11	Focus group #3	Female	31	Ex-smoker
12	Focus group #3	Female	18	Non-smoker
13	Focus group #3	Female	18	Non-smoker
14	Focus group #3	Female	18	Non-smoker
15	Focus group #3	Female	19	Non-smoker
16	Focus group #3	Female	41	Non-smoker
17	Phone interview	Female	45	Smoker
18	Phone interview	Female	19	Smoker
19	Phone interview	Female	30	Ex-smoker
20	Phone interview	Male	19	Smoker
21	Phone interview	Male	24	Smoker
22	Phone interview	Female	28	Smoker
23	Phone interview	Female	19	Smoker
24	Phone interview	Female	19	Smoker
25	Phone interview	Female	30	Smoker
26	Phone interview	Male	18	Smoker
27	Phone interview	Female	31	Smoker



**Figure 2** Elements (e1–e6) of the Health Belief Model influenced by health warnings on current Australian cigarette packaging, and individual cigarette sticks in this study, and perceived outcomes.

### Disregard of packaging warnings

There was a general consensus amongst participants that health warnings on cigarette packaging were now not noticed or internalized by the majority of smokers. “I think the packaging gets ignored actively, like put it in their pocket to make sure they don’t see it and no-one else does” (ID#4), “You see all the pictures on the packages

and you sort of get used to it. I feel like they never really had an impact on me” (ID#24). There was however belief that there may be some residual effect on non-smokers and young experimental smokers, due to their less frequent exposure to the warnings and retention of warning shock value. This also contributed to dissuading non-smokers from associating with smokers. “My dislike towards

tobacco products was already there but these packaging warnings have contributed more” (ID#6), “The pictures gross me out...it is a deterrent for me, and reinforces what I already know” (ID#10).

### Irrelevance of packaging warnings

There was also an underlying trend of disbelief, and perceptions that current packaging warnings are irrelevant, with younger participants in particular feeling disconnected from the threats of chronic diseases, which may develop after decades of tobacco use. “Since I have started buying my own [cigarettes], I have ignored the health warnings because I keep telling myself that it would never happen because I am young and am not going to smoke for long” (ID#26), “When talking to people about smoking and advertisements, they say they don’t really believe the smoke warnings” (ID#23).

As depicted in Figure 2, these findings highlight the shortcomings of current packaging warnings relative to the HBM, particularly in depicting an appropriate level of perceived susceptibility to tobacco-attributable consequences. Both non-smoking and smoking participants were also dismissive of the packaging mentioning the benefits of quitting, and the inclusion of the “Quitline” number on packaging, with the primary reason being a lack of addressing the barriers experienced when quitting. This indicates their minimal effectiveness in acting as a cue to take health-improving actions. The perceived severity of the health consequences portrayed was high however, with participants describing their beliefs of the severity of lung cancer and oral diseases on cigarette packaging.

RQ2: How do university students perceive the inclusion of health warnings and messages on cigarette sticks, and their potential strengths and weaknesses as a tobacco control intervention?

Two major themes emerged describing participants’ perceptions of the cigarette warnings and messages: novelty of the cigarette stick warnings, and the proximity of tangible warnings. Proximity of tangible warnings had three sub-themes, namely financial consequences, personal appearance, and calculable loss of time. These themes encompassed most of the elements of the HBM, most notably the increased susceptibility and severity of a wider range of consequences of smoking, including non-health consequences. As depicted in Figure 2, cigarette-stick warnings were also perceived as effective in better

outlining the benefits of quitting, and acting as an additional cue for changes in smoking behavior. The notable exception was the lack of addressing the perceived barriers of quitting, with neither the cigarette packaging nor cigarette stick warnings managing to address this element.

### Novelty of the cigarette stick

Most participants showed interest in the cigarette-stick warnings and messages, with non-smokers in particular finding them a novel and potentially effective medium for tobacco warnings and messages. Smokers also held this belief, though to a lesser extent, suggesting that these warnings would likely suffer the same shortcomings as current packaging warnings. They did however support the introduction of cigarette stick warnings, perceived as being likely to lead to some reductions in tobacco use. Utilizing the individual cigarette stick as a novel medium for communicating the consequences of smoking received positive comments from non-smokers, though mixed comments from smoking participants. Most could see the benefit of its use as a warning medium due to its visibility when smoking, and opposing the sought-after “coolness factor”. “Having warnings on the cigarettes will make them less attractive. Maybe the cool factor will be affected [others agreeing]” (ID#15), “I remember in high school other people would sell [you individual] cigarettes, and you just got the cigarette and not any of the warnings or anything else” (ID#11).

However, some were also concerned that it might experience the same shortfalls as packaging warnings with repetitive exposure, and be less likely to have an influence on certain sub-groups, such as long-established smokers. “In the beginning [they might be effective], but it might be the same thing as the pictures, and would just get to be part of the cigarette and you wouldn’t really see it anymore” (ID#9), “I see this as probably a waste, the only time they might be effective is if they don’t see the packaging warnings, because if those warnings don’t get to you, then these won’t” (ID#16), “For a continuing smoker it might work for them...if they want to change their life it might work, but not for other people and the addiction is too strong” (ID#1).

### Proximity of tangible warnings

Specific warnings and messages were also identified as particularly engaging over the others, with the warnings describing the more proximal (short-term) and tangible consequences of smoking perceived as the most likely to be influential on smoking behaviors, both amongst non-smokers and smokers. This included the cigarettes describing the

financial cost of smoking, the impact of smoking on personal appearance, and the calculable loss of time, which were perceived as the most relevant and effective.

#### Financial consequences as the most effective dissuader

The cigarette depicting the financial burden of smoking was the most notably described message by participants as being both novel and universally relatable to the wider population of any age and smoking status. “If you are a new smoker, you don’t want to be spending that much per year. I could buy a car with that, or pay for this year’s university fees” (ID#4), “A lot of adults in Australia worry about their finances, so saying that smoking a pack a day costs so much is a good prompter for people to start worrying about their wallet” (ID#26), “I think the cost of smoking message would hit smokers hard, because cigarettes are really expensive now, and for me with a young family, spending that money is better spent elsewhere” (ID#19). This message addresses many of the elements within the HBM. It clearly depicts an accurate susceptibility and severity of smoking from a financial standpoint, clearly outlines the benefits of both not starting to smoke, and the benefits of quitting, and serves as a cue to action for current smokers, who value their real-time financial stability over future health stability.

#### Importance of personal appearance for young adults

Personal appearance was similarly highly regarded, and considered as a strong motivating factor for young adults to avoid smoking, though believed to be less so for older, long-established smokers. “A lot of people smoke to keep their weight down...so saying all of those consequences counters the idea that if you smoke, it can help you be beautiful” (ID#4). The proximal threat of yellow teeth, bad breath, and stained fingers in particular for young women was seen as a strong deterrent, and directly opposed the “coolness” often sought when smoking. “The fingers and bad breath one especially for teenage girls, it is very important about how they look” (ID#9). Conversely, the distal threats of chronic diseases were seen as disconnected from the act of smoking and unlikely to modify smoking behaviors in young smokers. “I think the stats and cancers are just too far off into the future for younger people, you have a different timeline in perspective in how life is going to be lived” (ID#21), “People will think ‘that won’t happen to me, I won’t get mouth cancer or emphysema’” (ID#13). Similar to the financial consequences of smoking, the novelty of this form of warning and its relevance to younger participants increased their perceived susceptibility and severity of smoking, and outlined further benefits of not smoking.

#### Calculable loss of time

Apart from the financial and appearance-related consequences, the proximal and calculable loss of time (minutes of life) per cigarette was also viewed as a shocking and thought-provoking message with a strong potential to incite behavioral change. “The minutes of life lost I found interesting, because it is serious but not overly dramatic, which some of the pictures can be...I thought it just jumped out at me” (ID#21). However, some participants believed that describing the loss of such short time-intervals to young people may have the opposite effect, as they feel like they expect to yet live for such a long time compared to older smokers. “Though teenagers might not care about their minutes of life lost, like ‘who cares I am young and I got years to worry about that’” (ID#8).

RQ3: What forms of tobacco control interventions do university students believe as being the most effective in promoting public health in the future?

Two major themes emerged describing participants’ perceptions of effective ways in promoting further reductions in tobacco use in Australia: an increased proportion of messages which are supportive in nature, to guide smokers in how to quit, and social media as a delivery medium for tobacco warning interventions. These suggestions by participants support the RQ2 findings, where the elements of the HBM relating to self-efficacy and cues to change behavior were minimally influenced by both the current cigarette packaging, and the cigarette stick warnings and messages utilized in this study.

#### Supportive messages for smokers

Smoking participants in particular also believed that using more positive and supportive messages which guide smokers on how to quit would be more beneficial than the current tobacco warning climate, which is dominated by negative-framed messages. This identified that smokers desire more cues to action for quitting, and need greater self-efficacy in doing so, which they perceive as not being significantly supported by current tobacco packaging interventions. Both smokers and non-smokers believed that the current dominance of negative messages were having minimal (and sometimes the opposite) effect, and smokers were becoming more defensive towards this method of tobacco control intervention. “You can’t always shame smokers for smoking, because it is addictive...so you have to balance ‘this is really bad’ but we also need to support them as well” (ID#3), “I think using



positive messages might be effective, because then it is not being harped on again, rather strategies and options so you feel supported” (ID#17).

## Social media as a delivery medium

Whilst most participants agreed that the cigarette stick as a medium for warnings may lead to reductions in tobacco use, they also believed that an increased presence of tobacco warnings in social media would reach a greater proportion of young adults. The importance of dissuading young adults from tobacco products combined with their propensity for regular social media use led to its suggestion as a tobacco control platform. “Social media is a big platform that everybody is using...the younger generation is being exposed to smoking and it is important to limit that and [influence] the choices they make” (ID#20). Some participants described the difficulty in making effective social media-based warnings and messages, and the likelihood for poorer message uptake amongst older persons. “A lot of middle aged and older people aren’t really interested in social media, they might check it once a week... but they don’t use it several times a day to see what is going on” (ID#11), “Social media messages might still come off as being negative, and will either be ignored or avoided” (ID#5). Whilst not directly linked to any specific element of the HBM, social media platforms as a delivery tool would increase exposure to health warnings and messages, particularly amongst the younger generations, who use this technology frequently. The warnings and messages for implementation within these platforms would then themselves be designed to address specific elements of the HBM according to the needs of the community.

From these findings it is apparent that within the HBM, that participants desire an increase in the range of tobacco control interventions which act as cues to action, and improve smoker self-efficacy to quit. These elements within the HBM were perceived as being poorly addressed by current packaging warnings, and also not sufficiently addressed by the proposed cigarette stick warnings and messages.

## Discussion

In this study, the Health Belief Model was utilized to gain insights into how health warnings and messages on tobacco products can instigate behavioral change amongst young adult smokers and non-smokers. We found that both smoking and non-smoking university students perceived current cigarette packaging warnings in Australia as having lost much of their effectiveness as tobacco control interventions.

We also found that they consider health warnings and messages on cigarette sticks as a novel and potentially effective method for reducing tobacco use, especially when used to convey tangible and engaging messages, such as the financial and appearance-related consequences of smoking. They also identified social media as an additional potentially effective medium for communicating the dangers of tobacco use to young adults. Based on these findings, future health promotion materials could be developed to align with the HBM, with explicit messages that address each of the six key elements, to ensure persons of any smoking status are adequately targeted.

In this study, we found that smokers and non-smokers had significantly different perceptions of cigarette packaging and cigarette stick warnings, which aligned with previous research.<sup>29–31</sup> In particular was the increased negativity and perceptions of ineffectiveness of smokers towards tobacco-control interventions compared to non-smokers. For non-smokers, these interventions were preventative and generally were seen to further contribute to their pre-existing awareness of the dangers of smoking. Smokers however were more pessimistic, though saw the value in novel messages that were as yet not openly portrayed in current tobacco control interventions. This trend has also been seen in younger compared to older persons.<sup>29–31</sup>

Despite being generally aware of the severity of smoking-related consequences portrayed on cigarette packaging,<sup>15,34,35</sup> ensuring young adults accurately perceive their personal susceptibility to these consequences has historically been difficult.<sup>36,37</sup> A perception of disease irrelevance to oneself, and personal invulnerability to becoming addicted to smoking are well documented amongst this population.<sup>17,38</sup> This is further compounded with the relative lack of advertising of the wider range of smoking-related consequences.<sup>39,40</sup> Young adults’ perceptions may also be blurred as a result of the wide range of alternative tobacco products which have become recently more popular.<sup>41</sup> It is therefore essential that the perceived severity of the consequences of smoking remains high, alongside new measures which increase perceived personal susceptibility to the wider range of consequences of tobacco use.<sup>42</sup>

Our findings highlight some of the shortcomings of current packaging warnings in depicting an appropriate level of perceived susceptibility to tobacco-attributable consequences. As found in this study and in recent literature, calling attention to the non-chronic and non-health-related but tangible and proximal consequences of tobacco

use may be more effective in dissuading younger adults from smoking.<sup>43,44</sup> Such warnings include the financial consequences of smoking, impact of smoking on personal appearance, and the calculable loss of time. The novelty of these messages within the current tobacco climate alongside their countering of the desired persona sought after by younger persons have been found as effective aspects of tobacco control interventions.<sup>43,45,46</sup>

Key aspects of these desired personas, such as glamour, individuality, and rebelliousness, can be directly opposed through inciting powerful reactions, such as disgust, and a reduced social acceptability of smoking, through illustrating the effects of smoking on personal appearance.<sup>43,47,48</sup> Utilising novel or unavoidable media (such as social media and cigarette sticks) might be effective in portraying these novel messages, and may “undermine young adults’ perceived social and psychological benefits they hope to access by smoking”.<sup>49</sup> It is expected that these messages would cause increased perceptions of susceptibility and severity of smoking as well as the benefits of quitting amongst younger smokers, who would resonate more with these consequences as opposed to chronic health consequences portrayed on cigarette packaging.<sup>17</sup> Our findings suggest that cigarette stick warnings may act as additional cue to take action alongside the current packaging warnings. However, additional messages that increase self-efficacy and adequately address the barriers associated with quitting need to be further explored and incorporated into future intervention strategies.

An effective and unique message within this study not currently utilized on cigarette packaging is the financial costs of smoking, particularly relevant within Australia due to regular increases of taxation of tobacco products.<sup>32</sup> Emphasizing “financial health” as a component of the tobacco control repertoire is expected to act as a strong cue to action for current smokers, and reinforce the benefits of not smoking for non-smokers, given the effectiveness of using voucher-based incentives in smoking cessation.<sup>50</sup> Aligning the wording of this message to describe a shorter-term effect, such as the fortnightly or monthly cost of smoking, may elicit even stronger reactions amongst young adults, due to their familiarity with being paid and paying bills at these shorter intervals.

The “minutes of life lost” warning has also been perceived as powerful and capable of eliciting strong emotional reactions both in this and other studies due in part to its perceived immediate impact on smoker, who can “literally see their life ticking away”.<sup>20,21</sup> Whilst the HBM does not explicitly discuss proximity as an element influencing

health behaviors, it is likely to be an influencing factor within most of the elements when making health-related decisions, particularly perceived susceptibility and severity. Similar to the development of nicotine addiction itself, the closer the link between an activity and its consequence (either positive or negative), the more quickly and strongly an association will form, influencing behavior.<sup>51</sup> Other theories, such as Construal Level Theory (which is not strictly a health-related theory) describe the importance of “psychological distance”, and less abstract and more concrete thoughts being as a result of reduced temporal distance.<sup>52</sup> Given the perceived lack of relevance demonstrated by young adults towards current packaging warnings, and their converse perceptions towards short-term effects, challenging self-exemption strategies used by young adults to rationalize and support continued tobacco use may lead to reductions in experimentation amongst this population.<sup>18,19</sup>

Limitations to consider when interpreting these results include the single exposure of participants to the interventional materials, and an inability to longitudinally track message salience over multiple exposures, as it would occur in real-world settings. This may have led to responses which are exaggerated in this controlled setting as opposed to those that would occur within the community over time. We also only recruited participants from a single site of university students, with the majority being female, making generalization of the results to different age groups, males, and students from other universities difficult. Also, despite reaching data saturation, only three focus groups were conducted with a relatively small overall sample size. Therefore, further research is needed to corroborate and expand upon these findings, including evaluating the perceptions of a wider range of participants, to cigarette stick warnings and messages. Lastly, the HBM has its own limitations as a theoretical framework, notably a lack in specifying how the individual elements might interact with each other, and taking into account other factors that influence health behaviors (such as habitual factors). Therefore, despite being a recognized theoretical framework for smoking behaviors, care must be taken when interpreting and applying these findings.

## Conclusion

Despite having afforded significant improvements to public health since their introduction, current cigarette packaging warnings have shortcomings as identified by young adults in this study. The wear-out of warning effectiveness, particularly on current smokers highlights the need for an

expansion of the current repertoire of tobacco control interventions, to ensure continued reductions in tobacco use. Based on the HBM, novel health promotion materials, such as cigarette-stick warnings describing the financial and personal-appearance consequences of tobacco use, are potentially effective future methods for reducing tobacco use. Further research from a larger participant cohort into the perceptions of a wider range of novel and short-term health and non-health warnings is needed to facilitate the implementation of the most effective messages.

## Abbreviations list

FGD, focus group discussion; HBM, Health Belief Model; RQ, research question.

## Ethical standards

This research was approved by the James Cook University Human Research Ethics Committee (H7194).

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## Author contributions

All authors contributed toward data analysis, drafting and critically revising the paper, gave final approval of the version to be published, and agree to be accountable for all aspects of the work.

## Disclosure

The authors have no conflicts of interest to report for this manuscript.

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## Supplementary material

### Focus group and interview semi-structured questions

Main questions:

1. (Phone interviews only) Can you first describe your personal smoking history, such as how long you have been smoking for, quitting attempts, cigarettes per day, etc.?
2. What do you believe are the main drivers that cause people to start smoking? What negative consequences related to smoking do you find smokers struggle the most with?
3. Have the warnings on tobacco products affected or influenced your likelihood of using (or not using) them? Do you think that other people are affected by these warnings?
4. What are your initial thoughts about the use of health warnings on individual cigarette sticks if they could be implemented cheaply and safely?
5. Of the warnings presented, which do you think would be the most effective in encouraging or prompting current smokers to quit? Which would have no effect?
6. Of the warnings presented, which do you think would be the most effective in preventing non-smokers (especially adolescents) from starting to smoke?
7. What do you believe is the most important message to convey to the public to reduce tobacco use?
8. How should anti-tobacco interventions progress and improve over the next few years?

Wrap-up questions:

1. Are there any questions asked here that you want to discuss further?
2. Is there any further information on health warnings on tobacco products that you wish to discuss?

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