

Obesity or heart health warning labels on energy drinks? Comparing their relative effect on intentions to consume, and support for potential policy

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Abstract

The growing popularity of caffeinated energy drinks (EDs) parallels the increasing concern regarding their adverse health effects. There is evidence that warning labels on sugar-sweetened beverages (SSBs) may impact intentions to consume, however little research has focused on EDs which are distinct from SSBs given the additional health risks associated with their high caffeine and stimulant content. This online randomised trial investigated whether a cardiac or obesity warning label was more effective in reducing intentions to consume EDs, and if so, whether the relationship was explained by perceived health threat and self-efficacy, as per the health belief model. Perceived label effectiveness and support for policy involving warning labels were also explored. Australian ED consumers aged 18 to 39 years (N=435) were randomly allocated to one of two warning label conditions: obesity, or cardiac. Overall the warning labels were found to be similarly effective, however the cardiac label produced greater intentions to reduce consumption for some subgroups. There was moderate support for policy involving ED warning labels. This study provides preliminary insights for the development of ED warning labels and suggests how with future research they may be an effective component of a multifaceted approach to curb excess ED consumption.

Declaration

This thesis contains no material which has been accepted for the award of any other degree or diploma in any University, and, to the best of my knowledge, this thesis contains no material previously published except where due reference is made. I give permission for the digital version of this thesis to be made available on the web, via the University of Adelaide's digital thesis repository, the Library Search and through web search engines, unless permission has been granted by the School to restrict access for a period of time.

Giovanna Caruso

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1. Introduction

1.1 Emerging Public Health Problem: Energy Drink Consumption

Overconsumption of energy drinks (EDs) is a growing public health problem, explicitly impacting adolescents and young adults (De Sanctis et al., 2017). Energy drinks are a type of sugar-sweetened beverage (SSB) typically containing high levels of caffeine, sugar, B complex vitamins, amino acids, guarana, and taurine (Burrows, Pursey, Neve, & Stanwell, 2013). Marketed to improve energy, concentration, athletic performance and metabolism (Stout, Roberts, Dalbo, & Kerksick, 2008), EDs are the fastest-growing segment of the beverage market in Australia with global sales exceeding AUD\$30 billion (Heckman, Sherry, & De Mejia, 2010). Comparable to the United States, Australians are the highest consumers of EDs with those aged 18 to 24 years being the most frequent consumers (Pennay et al., 2015; Zest Health Strategies, 2012).

Parallel to the growing popularity of EDs is the increasing concern of adverse health effects associated with their consumption (Ali, Rehman, Babayan, Stapleton, & Joshi, 2015). The Australian Dietary Guidelines recommends that ED consumption is limited due to their lack of nutritional value, and increased risk of tooth decay, type 2 diabetes, weight gain, and various cardiovascular complications including increased heart rate, high blood pressure, arrhythmias, and in extreme cases, sudden cardiac death (Australian Government Department of Health, 2017; Higgins, Babu, Deuster, & Shearer, 2018). Excess consumption can also result in anxiety, headaches, sleep difficulties, and nausea from caffeine toxicity (Al-Shaar et al., 2017; Trapp et al., 2014; Visram, Cheetham, Riby, Crossley, & Lake, 2016). These adverse effects are largely preventable by reducing ED consumption. Thus, interventions and policies to reduce ED consumption are essential.

The sale of EDs in Australia is unrestricted, however the maximum caffeine level is 320 mg/L. Packaging must also contain an advisory statement that recommends a maximum

daily intake amount of 500mL and states that EDs are not recommended for children, pregnant or lactating women, or caffeine-sensitive persons (Food Regulation Standing Committee Caffeine Working Group, 2013). Nevertheless, there are no regulations on the location, size, and wording used for this statement. Subsequently, this statement has been described by consumers as poorly visible, confusing, and encouraging excess consumption (Costa, Hayley, & Miller, 2014; Lim et al., 2012). A recent cross-sectional study of 1,922 Australian ED consumers found that less than two-fifths were aware of the maximum daily intake guidelines (Peacock et al., 2016). Similarly, qualitative research with Australians aged 12-25 years identified low awareness of the advisory statement and poor knowledge of adverse health effects associated with ED consumption (Francis et al., 2017). This research added to the growing literature suggesting that changing ED packaging to incorporate more significant health warnings, similar to those on cigarette packaging, may be effective in reducing ED consumption (Reissig, Strain, & Griffiths, 2009; Striley & Swain, 2019).

1.2 Warning Labels to Reduce Energy Drink Consumption

There are a suite of potential policy options to reduce ED consumption, including public education, restricting advertising, taxation, and improved labelling (Köhler et al., 2016; Laverack, 2017). Research conducted by the Food and Drug Administration of the United States of America found that front-of-package (FOP) warning labels on food and beverage products have the ability to educate and assist consumers in making more nutritious choices, and subsequently preventing or reducing obesity and other diet-related chronic disease (Institute of Medicine [US] Committee on Examination of Front-of-Package Nutrition Rating Systems and Symbols, 2010). Through their use on tobacco products, warning labels have been effective in increasing consumers' knowledge of the harms caused by smoking and reducing tobacco consumption (Hammond, 2011).

Front-of-package nutrition labelling, such as the health star rating, is common on food and beverages, and although discussion of warning label systems is increasing, implementation is scarce. Chile was the first country to introduce a 'stop sign' nutrition warning label on foods that are high in sugar, sodium, saturated fat, or energy (Kanter, Vanderlee, & Vandevijvere, 2018). Israel has followed suit and will introduce similar FOP warning labels on all foods and beverages in 2020 (Israel Ministry of Health, 2019). However, it is too early to determine the effects of these nutrition warning labels. Legislation involving adverse health effect warning labels on SSB advertisements was passed in San Francisco, although sustained litigation from industry blocked its implementation (Falbe & Madsen, 2017). While there is limited evidence from real-world implementation, experimental studies, particularly related to SSBs, continue to demonstrate the potential impact of FOP warning labels on consumption (Acton & Hammond, 2018; Billich et al., 2018; Bollard, Maubach, Walker, & Ni Mhurchu, 2016; Donnelly, Zatz, Svirsky, & John, 2018; Roberto, Wong, Musicus, & Hammond, 2016; VanEpps & Roberto, 2016).

There is limited research involving FOP health effect warning labels on EDs. A literature search only detected one study that has investigated the impact of ED labelling on purchase intentions (Temple, Ziegler, & Epstein, 2016). This laboratory-based study with ($N = 36$) participants aged 15 to 30 years tested three ED warning labels conditions: no label (control); caffeine content (label conveying milligrams of caffeine), and health effects [label conveying possible adverse effects ("High levels of caffeine intake can cause headache, nausea, anxiety, irregular heartbeat, vomiting, and, in extreme cases, death. Use caution when consuming caffeine.")]. Both the caffeine content and health effect warning labels were similarly more effective than the control in reducing adolescents' selection of EDs. Yet, adults' intentions to reduce consumption did not differ by label condition. The study's authors speculated that these results may be due to caffeine consumption and associated

effects being more novel to adolescents, whereas adults may be desensitised to caffeine related messages, due to life-long consumption of other caffeinated beverages. While informative, this United States based study had a limited sample size and did not assess knowledge of health risks.

Although the evidence base for ED warning labels is limited, there has been a rapid increase in studies exploring warning labels on SSBs. This research indicates that warning labels can increase an individual's dietary control, decrease intentions to purchase and consume beverages, and thus promote healthier choices (Billich et al., 2018; Donnelly et al., 2018; Gray, Karnon, & Blackwell, 2011; Mantzari, Vasiljevic, Turney, Pilling, & Marteau, 2018; Roberto et al., 2016; VanEpps & Roberto, 2016). In an Australian online randomised controlled trial, four FOP warning labels on SSBs were tested: health effect graphic warning (tooth decay), health effect text warning (obesity, type 2 diabetes, and tooth decay), sugar information, and the health star rating. All labels resulted in young adults choosing an SSB less often than the control group, with the graphic and text health effect warning labels being the most effective in reducing intended SSB purchases (Billich et al., 2018).

Evidence also indicates that specific label content may be more motivating in encouraging behaviour change. A United Kingdom study involving ($N = 2,002$) parents of children aged 11 to 16 years found that warning labels which increased the perceived risks of SSB consumption were more effective in discouraging choosing an SSB for their child, compared to calorie and nutrient labelling which did not convey adverse health effects (Mantzari et al., 2018). Similarly, a postal survey ($N = 130$) identified that text warning labels communicating different health effects may differentially impact consumption intentions (Gray et al., 2011). The authors found that the diabetes health effects label was more effective in reducing purchase intentions of SSBs compared to an obesity health effects label. Although the authors did not provide an explanation for these findings, results from a

qualitative study are of relevance (Miller et al., 2018). Through 16 focus groups held with SSB consumers across Australia, young adults' perceptions of four text-based health warnings (obesity, diabetes, tooth decay, and a combined message) were obtained. Diabetes was perceived as a serious disease that would have life-long consequences on individuals' quality of life and was perceived as non-visible and not modifiable like obesity. Hence, obesity was perceived as a less severe disease to which individuals were less susceptible. Participants who perceived that they were more susceptible to tooth decay found this health message more effective than those who perceived they were not susceptible. Interestingly, the combined message with all three health effects appeared to have least impact as it was perceived as too general to be of concern. This research was among the first to compare individuals' perceived risk of different health conditions and how this impacts their perceptions of SSB FOP health warnings. It raises important considerations for developing effective warning labels to reduce consumption.

Collectively, these studies provide valuable insights into the complex interplay between the effectiveness of different health messages according to individuals' perceived severity of, and susceptibility to the conveyed health effect. Consumption of EDs is associated with additional adverse health effects to SSBs due to added stimulants and higher caffeine content. It is of interest to understand whether an ED-specific health message is more effective in reducing consumption intentions than a general obesity health message, which is being proposed for SSBs (Bollard et al., 2016; Gortmaker et al., 2011).

1.3 The Health Belief Model

The health belief model (HBM) (Janz & Becker, 1984; Rosenstock, 1974) is one of the most widely applied theories of health behaviour (Glanz & Bishop, 2010). It describes six constructs that modify a person's health behaviour. For behaviour change to occur an individual must perceive a health threat, believe that benefits of behaviour change are high

and that barriers to engaging in the health behaviour are low. Perceived threat involves perception that an individual is personally susceptible to the health problem (perceived susceptibility) and perception that the problem can cause them serious harm (perceived severity). Additionally, an individual's confidence in their ability to change their behaviour (self-efficacy), and an internal or external cue to action also predict engagement in a health behaviour (Glanz, Rimer, & Viswanath, 2008).

1.3.1 Application of the Health Belief Model

The HBM may assist in explaining individuals' perceptions of different health effect warning labels and ultimately explain whether people would be differentially motivated to reduce ED consumption based on receiving different health effect information: that pertaining to stimulant and caffeine effects on heart, and that pertaining to obesity from consumption of sugar. Although measurement and modelling of all factors within the model would be of interest, it was not possible within the current study due to resource constraints. This study focuses on the following components of the HBM through a parallel mediation model described by Jones et al. (2015) (Figure 1): two external cues to actions (cardiac and obesity health messages), perceived severity of and susceptibility to cardiac complications, perceived severity of and susceptibility to obesity, and self-efficacy. Cardiac and obesity health effect warning labels may act as an external cue to action that have the potential to predict engagement in the health-promoting behaviour of reducing ED consumption, measured in this study as intentions to reduce ED consumption (Janz & Becker, 1984). In addition to this direct relationship between warning label type and intentions to reduce ED consumption, individuals may be more likely to have greater intentions to reduce ED consumption under certain conditions, that is, if they perceive the health effect depicted on the warning label as having more severe consequences, perceive that they are more susceptible to the condition, and have higher self-efficacy of initiating positive behaviour

change. The HBM also suggests that individual characteristics such as demographics, knowledge of adverse health effects associated with ED consumption, and current ED consumption may have an indirect relationship with behavioural intentions through their influence on perceived severity, perceived susceptibility, and self-efficacy. Therefore, these variables are included in the model as covariates.

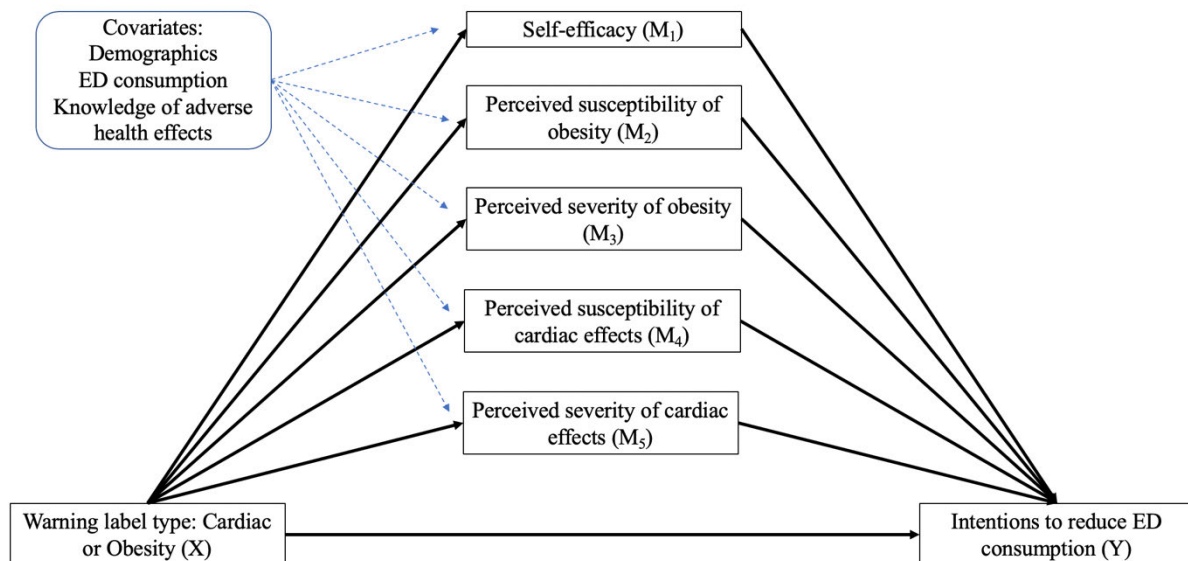


Figure 1. Adapted health belief model: Path diagram of parallel mediation.

1.4 Perceived message effectiveness as a precursor to intentions to change behaviour and behaviour change

Whilst the SSB literature has shown that warning labels have the potential to positively influence individuals' intentions to reduce consumption after one exposure (Billich et al., 2018; Bollard et al., 2016; Rosenblatt et al., 2018), there is evidence suggesting that frequent exposure to an intervention over time is required to combat the significant environmental factors that precipitate unhealthy habitual behaviour (Durkin & Wakefield, 2014; Hill & Wakefield, 2014; Wakefield, Loken, & Hornik, 2010). Initial perceived effectiveness of health campaigns and interventions has been found to be a preliminary predictor of cognitive and behavioural change (Davis, Nonnemaker, Duke, & Farrelly, 2013), and therefore 'perceived effectiveness' is also worthy of consideration in a study exploring the

potential effectiveness of health effect warnings. According to the functional attitude theory (Katz, 1960; Smith, Bruner, & White, 1956), perceived effectiveness is defined as whether an individual perceives an intervention to be relevant, believable, attention-grabbing, increases knowledge, and easy to understand. It is reported to precede attitude change which is essential for actual behaviour change to occur (Davis et al., 2017; Davis, Nonnemaker, Farrelly, & Niederdeppe, 2011; Gunther & Storey, 2003). Supporting this, perceived effectiveness of anti-tobacco campaigns has been found to predict intentions to quit, and actual quit smoking attempts (Davis et al., 2017). A more recent study identified that SSB FOP health effect warning labels were perceived as more effective than nutrient disclosures alone (Grummon, Hall, Taillie, & Brewer, 2019). Nonetheless, perceived effectiveness of different health messages in the context of EDs has not been compared and this may have important implications for designing effective ED health warnings. Therefore, this study will compare perceived effectiveness between the obesity and cardiac warning labels as a primary indicator of effectiveness.

1.5 Attitudes towards policy implementation

It is widely recognised that in addition to evidence on effectiveness, policy makers consider how potential policy initiatives are perceived by the community (Morrato, Elias, & Gericke, 2007; Oliver, Innvar, Lorenc, Woodman, & Thomas, 2014). Research has identified that individuals' knowledge of health issues may impact their level of support and perceptions of potential policy aiming to change behaviour (Martin et al., 2017; Reynolds, Pilling, & Marteau, 2018). Therefore, identifying public knowledge of potential adverse health effects, attitudes towards policy, and the characteristics of individuals who support policy is beneficial in developing effective health messages to encourage evidence-based policy change (Niederdeppe, Heley, & Barry, 2015; Niederdeppe, Shapiro, Kim, Bartolo, & Porticella, 2014).

Consistent with the limited literature involving the effectiveness of ED warning labels, there is limited published evidence surrounding public support for this policy initiative. However, EDs are often also SSBs, and interest in warning labels on SSBs is growing among policy makers and the community. A recent survey of Australian adults identified a very high level of support for text warning labels that convey health risks on SSBs (Miller et al., 2019). This research also identified that individuals with greater knowledge of SSB consumption health risks were more likely to support policy interventions aimed at reducing consumption, and furthermore, more frequent consumers were less receptive to these policy initiatives. Experimental SSB studies conducted internationally have also reported growing public support for SSB warning labels (Donnelly et al., 2018; Roberto et al., 2016; VanEpps & Roberto, 2016).

While EDs may be considered under the broader beverage category of SSBs, ED consumption involves additional potential health risks due to added stimulants and caffeine. Therefore, it is of interest to determine levels of public support for FOP warning label policy among ED consumers to help explore the viability of this potential policy.

1.6 Summary and hypotheses

Experimental SSB studies have shown that consumption behaviour and intentions to consume can be altered through health effect warning labels (Billich et al., 2018; Donnelly et al., 2018; Roberto et al., 2016; VanEpps & Roberto, 2016). Yet, no studies have focused explicitly on comparing the impact of two different health effect warning labels for EDs. As previously mentioned, EDs are distinct from SSBs given the additional health risks associated with their consumption (Ali et al., 2015; Higgins et al., 2018), and therefore, there may be opportunity reduce consumption by informing consumers of these additional risks via FOP warning labels. It is currently unknown whether consumers are differentially motivated to reduce consumption from exposure to an ED-specific FOP warning label that communicates

heart health effects from stimulants and additional caffeine or a general SSB warning label communicating risk of obesity. Generating evidence regarding what type of label is most effective can inform policy and interventions to change behaviour, and consequently, short and long-term health outcomes.

Findings of previous SSB studies (Gray et al., 2011; Mantzari et al., 2018; Miller et al., 2018), suggested that health effects with greater perceived threat may be more effective in changing behavioural intentions. Furthermore, as reported in the tobacco literature and a systematic literature review of successful behavioural interventions to reduce SSB intake, interventions are more effective for consumers with higher self-efficacy (Rahman, Jomaa, Kahale, Adair, & Pine, 2018; Romer, Peters, Strasser, & Langleben, 2013). As a result, the main aim of this study was to investigate whether warning label type impacts intentions to reduce ED consumption and, if so, whether this relationship is mediated by perceived severity, perceived susceptibility and self-efficacy.

Based on this aim, the following hypotheses were proposed.

Hypothesis 1: Participants who view the cardiac warning label will have greater intentions to reduce consumption compared to those who view the obesity label.

Hypothesis 2: Self-efficacy, perceived severity, and perceived susceptibility will be positively correlated with intentions to reduce ED consumption.

Hypothesis 3: The relationship between warning label type and intentions to reduce ED consumption will be mediated by perceived severity, perceived susceptibility, and self-efficacy, such that those with higher perceived severity, perceived susceptibility, and self-efficacy, will have greater intentions to reduce ED consumption.

As research suggests that perceived effectiveness is a predictor of increased behavioural intentions, a secondary aim of this study was to examine perceived effectiveness of each label.

Given the previous finding that knowledge of health risks associated with SSB consumption was associated with increased policy support (Miller et al., 2019), another secondary aim is to explore whether support for policy involving ED FOP warning labels differs by warning label type, and whether levels of support vary by sociodemographic characteristics, knowledge of health risks, knowledge of current advisory statements, and/or current ED consumption.

2. Method

2.1 Participants

This study was undertaken over a six-week period from May to July 2019. Individuals were eligible to participate if they were: residents of Australia, aged 18 to 39, fluent in English, not working in the beverage industry, and had consumed at least one ED within three months. This age range was chosen because the most frequent ED consumers, that were accessible, were young adults aged 18 to 24 and then those aged 25 to 39 (Pennay et al., 2015). The time period of three months was used to define an ED consumer based on a previous Australian study (Pennay et al., 2015). Non-consumers were not included as they are not likely to be the target of interventions reducing ED consumption.

Participants were recruited from Facebook advertising (Appendix A), the University of Adelaide School of Psychology Research Participation System, and flyers displayed at the University of Adelaide (Appendix B). Participation was incentivised with the chance to win one of three \$100 vouchers or course credit for University of Adelaide students ($n = 16$). Prior to study commencement, participants read an information sheet (Appendix C) and provided informed consent. The online survey (Appendix D), was programmed onto REDCap software (Harris et al., 2009), and could be completed on a smart phone, tablet or computer.

Of the 435 participants who participated in the study, 54.25% were male and 42.30% were female with 15 (3.45%) participants not declaring their gender. There was an almost equal proportion of participants from each consumer age group, with 52.41% aged 18 to 24 and 47.59% aged 25 to 39.

2.2 Study design

In this online randomised trial, two FOP warning labels were presented via an online questionnaire. Participants were blindly and randomly allocated to one of two label

conditions, obesity or cardiac, displayed in Figure 2. Random allocation was completed automatically by REDCap with participants randomised in a 1:1 ratio. As shown in Figure 3, 49.20% of participants viewed the obesity label and 50.80% viewed the cardiac effects label. Each warning label was presented on a mocked-up ED can, with the label enlarged above the ED can for ease of viewing. The labels were presented to participants within the survey on the same ED can, in the same position, using the same font size, font colour, and with as similar as possible wording. The only difference between the two warning labels was the health effect they communicated. The labels were developed from existing effective SSB FOP warning label literature to include cardiac health effects relevant to EDs (Billich et al., 2018; Donnelly et al., 2018; VanEpps & Roberto, 2016). As per the HBM, these warning labels formed the external cues to action to increase intentions to reduce ED consumption.

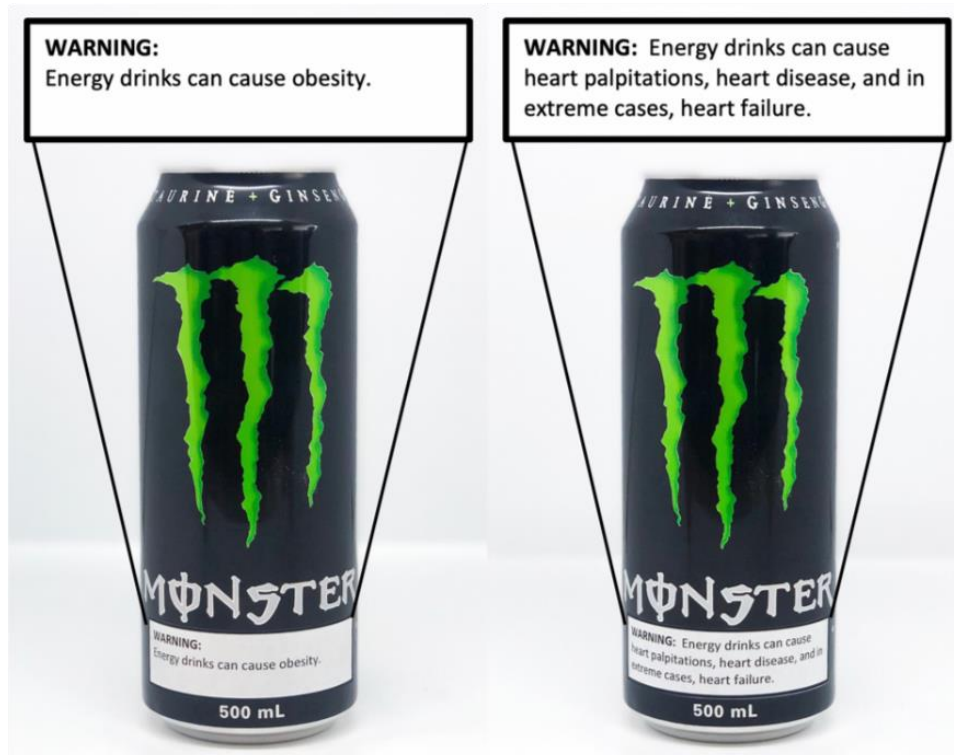


Figure 2. The two ED labels as shown in each respective survey.

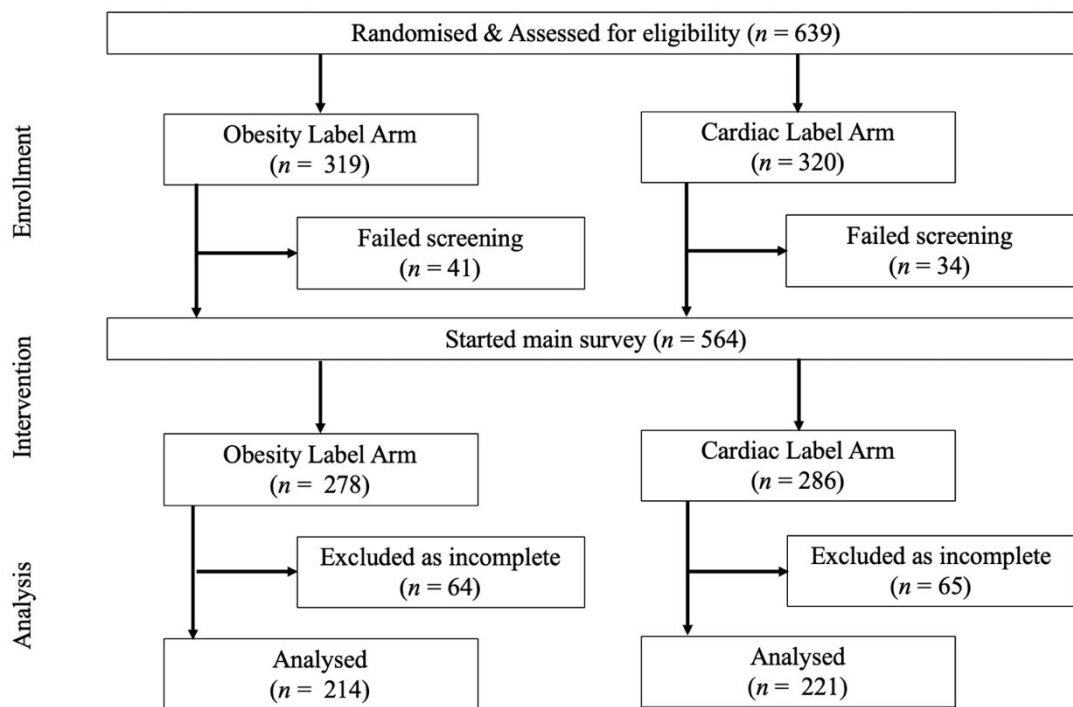


Figure 3. CONSORT experimental flow diagram.

The current design comparing two labels was selected over a design with three study conditions, including a ‘no label’ control, due to concern regarding recruiting enough participants. This design allowed for comparison between the two label conditions with the assumption that FOP warning labels have the potential the change behavioural intentions.

Energy drinks were defined as “beverages that claim to enhance mental alertness and physical performance. They contain caffeine and other stimulants. E.g. Red Bull, Monster, V, Mother and Rockstar. This does not include sports drinks such as Powerade or Gatorade.” (Galemore, 2011; Larsson, Akesson, & Wolk, 2014).

2.3 Survey procedure

After providing consent, participants completed screening questions for eligibility. The two experimental conditions consisted of the same survey questions but displayed different labels. The warning label image was shown to participants after they had completed survey questions regarding ED consumption, motivations for consuming EDs, knowledge of health risks, and knowledge of current advisory statements on ED packaging. To determine

impact of the warning label, participants completed the remaining measures (perceived effectiveness, perceived susceptibility and severity of obesity, perceived susceptibility and severity of cardiac effects, intentions to reduce ED consumption, self-efficacy, policy support, and demographics) after exposure to the respective ED warning label.

2.4 Measures

2.4.1 Intentions to reduce energy drink consumption

The primary outcome was intention to reduce ED consumption. This was assessed using three items previously adapted from the quit smoking literature to be used within SSB studies (Grummon et al., 2019; Klein, Zajac, & Monin, 2009). Participants were asked to rate the extent to which they are interested in, how much they plan to, and how likely they are to reduce their ED consumption in the next month, with available response options: (1) ‘Not at all’ to (5) ‘A great deal’. A mean intention score was calculated, with a range of 1 to 5, with higher scores indicating greater intentions to limit consumption of EDs. Internal consistency for this measure was very good in the current sample ($\alpha = 0.91$).

2.4.2 Energy drink consumption

As intentions to reduce consumption have been found to vary with current levels of consumption (Dono et al., 2019), this was assessed to describe the sample and for inclusion in the model as a covariate. Consistent with previous studies (Bollard et al., 2016; Chang, Peng, & Lan, 2017; Hedrick et al., 2012), frequency of ED consumption was determined through one item. Participants were asked “How often do you consume any energy drinks?” with five response options available: (1) ‘Less than once a month’, (2) ‘1-3 times per month’, (3) ‘Once a week’, (4) ‘More than once a week’, and (5) ‘Daily’. For ease of interpretation during analysis, responses were recoded to ‘Monthly or less’ (1-2), ‘Weekly’ (3-4), and ‘Daily’ (5).

To create a measure of whether participants regularly exceeded the recommended daily limit of 500mL, participants were asked “On days that you consume energy drinks, how much do you usually consume?”. Available responses were in the form of: number of 250mL cans, number of 500mL cans, or participants could provide the total millilitres. Participants’ responses were transformed to total millilitres and those who consumed over 500mL were considered to have exceeded the recommended daily limit.

Respondents’ perceptions of their own consumption was ascertained by asking whether they considered their average ED consumption to be ‘just right’, ‘too much’, ‘not enough’ or ‘don’t know’, based on French et al. (2013).

2.4.3 Motivations to consume energy drinks

To adequately describe the sample and their consumption behaviour, motivation for the consumption of EDs was assessed. This measure was developed from previous ED studies, where participants could select up to 13 prompted reasons that they have for consuming EDs (Attila & Çakir, 2011; Kelly & Prichard, 2016; McCrory et al., 2017; Reid et al., 2017; Reid et al., 2015), for example, ‘to stay awake or alert for study/work’, ‘to stay awake or alert for driving’, ‘to mix with alcohol’, ‘to improve sports performance or physical activity’, or ‘other’ which then prompted a text response.

2.4.4 Knowledge of potential adverse health effects associated with frequent energy drink consumption

Knowledge of potential health risks associated with drinking EDs was assessed due to its potential effect on intentions and policy support. Participants rated, from a prompted list, the potential health risks associated with ED consumption on a 5-point Likert scale from (1) ‘Not at all’ to (5) ‘A great deal’, with a midpoint of (3) ‘Somewhat’. Health effects included tooth decay, weight gain, type 2 diabetes, high blood pressure, heart or cardiovascular complications/disease, cancer, depression, and anxiety (Ali et al., 2015). Asthma was

included as a distractor variable to identify potential response bias. For clarity in analysis, responses were dichotomised so that scores of three and above represented an awareness/knowledge of health risk and scores of two and below represented lack of awareness/knowledge (Billich et al., 2018; Roberto et al., 2016).

2.4.5 Knowledge of current advisory statements

As this study investigated FOP ED warning labels, it was important to consider whether participants were aware of the existing current advisory statement on packaging. As previously mentioned, ED packaging must include an advisory statement recommending a daily limit and that consumption is not recommended by children, pregnant or lactating women, or caffeine-sensitive persons (Food Regulation Standing Committee Caffeine Working Group, 2013). Simple awareness of an advisory statement was assessed through the question “Are you aware of any warnings currently on energy drink cans?” with potential response options ‘yes’, ‘no’, and ‘don’t know’. Participants who answered ‘yes’ were then asked to recall the detail of these statements, and if they were unsure to write ‘don’t know’. Content analysis was used to determine the presence of correct key words in responses. Responses were allocated a ‘1’ if it contained at least one correct element of typical advisory statements and a ‘0’ if it was a completely incorrect recall or ‘don’t know’.

2.4.6 Health Belief Model variables

2.4.6.1 Perceived Susceptibility and Severity - Obesity

Perceived susceptibility and perceived severity of obesity were assessed by two subscales of the Health Belief Model Scale in Obesity (Ozden & Cicek, 2011). Each subscale consisted of four items with available responses ranging from (1) ‘strongly disagree to’ (5) ‘strongly agree’. Sample items included: “There is a high risk of developing health problems due to obesity” (susceptibility), and “Obesity is an important disease that leads to serious health effects” (severity). Responses for each subscale were standardised and mean scores

were calculated to give a total perceived susceptibility score and a total perceived severity score from 0 to 100. Higher scores indicated that participants perceived that they are highly susceptible to obesity and that obesity is a severe condition. Internal consistency was good for both subscales in this sample ($\alpha_{\text{susceptibility}} = 0.77$ and $\alpha_{\text{severity}} = 0.83$).

2.4.6.2 Perceived Susceptibility and Severity – Cardiac Effects

Perceived susceptibility and perceived severity of cardiac effects was assessed by two subscales of the Health Beliefs Related to Cardiovascular Disease Scale (Tovar, Rayens, Clark, & Nguyen, 2010). Each subscale consisted of five items and the wording of items was adapted to be consistent with the health effects described on the label used in this study. Sample items included: “It is likely that I will suffer from heart palpitations or heart disease in the future” (susceptibility), “I am concerned about the likelihood of having heart palpitations or heart disease in the future” (susceptibility), and “My whole life would change if I had heart palpitations or heart disease” (severity). Response options ranged from (1) ‘strongly disagree’ to (5) ‘strongly agree’. For each subscale, responses were standardised from 0 to 100 and mean scores were calculated, with higher scores indicating higher perceived susceptibility and severity. Cronbach’s alphas for the perceived susceptibility and perceived severity subscales in this sample were excellent and good, 0.91 and 0.81, respectively.

2.4.6.3 Self-Efficacy

Individual’s belief in their ability to reduce ED consumption was assessed using three items adapted from Brewer et al. (2018) and Wright, Adams, Laforge, Berry, and Friedman (2014). Participants indicated the extent to which they thought it would be difficult to consume fewer EDs, how confident they were that they could drink fewer EDs, and how confident they were that they could choose healthier alternatives (e.g. water) instead of EDs if they wanted to. Responses were reversed where required (Item 1). A mean self-efficacy

score was calculated, with a range of 1 to 5, with higher scores indicating greater self-efficacy. Internal consistency was excellent for the current sample ($\alpha = .98$).

2.4.7 Perceived label effectiveness

Participants' perceived effectiveness of the labels was assessed as such perceptions can predict health-related behaviour change (Davis et al., 2011). Responses were recorded on a scale of (1) 'strongly disagree' to (5) 'strongly agree' for six items: 'grabs my attention', 'is easy to understand', 'is believable', 'makes me stop and think', 'taught me something new', and 'is relevant to me'. For analysis, responses were dichotomised to 'Agree' (strongly or somewhat agree) or 'Not agree' (neither, strongly or somewhat disagree).

2.4.8 Policy support

Support for potential policy involving ED warning labels was assessed using one item frequently used in SSB warning label experimental studies, "Would you favour or oppose a government policy requiring the above warning label to be placed on energy drinks?" with response options from (1) 'Strongly in favour' to (5) 'Strongly oppose' (Donnelly et al., 2018; Mantzari et al., 2018; VanEpps & Roberto, 2016). For analysis, responses were categorised to be 'in favour' (strongly or somewhat), 'neither in favour or oppose', or 'oppose' (strongly or somewhat).

2.4.9 Demographics

Participants reported information regarding their age, gender, postcode, country of birth, highest qualification, employment, and height and weight [to enable a calculation of body mass index (BMI) (World Health Organisation, n.d)]. Age in years was dichotomised per frequent consumer groups, 18 to 24 years and 25 to 39 years (Pennay et al., 2015). Postcodes enabled calculation of level of disadvantage scores according to the Australian Bureau of Statistics' Socio-Economic Indexes for Areas (Australian Bureau of Statistics, 2018b), which were dichotomised to form 'more disadvantaged' (deciles 1-5) and 'less

disadvantaged' (deciles 6-10) categories for ease of interpretation during analysis. Postcode also enabled determination of remoteness according to the Australian Statistical Geography Standard Remoteness Structure (Australian Bureau of Statistics, 2018a), with 'metropolitan' (major cities) or 'regional/remote' (inner and outer regional, remote and very remote Australia) categorisation. BMI was calculated for each respondent by dividing their self-reported weight (in kilograms) by the square of their height (in metres), and dichotomised according to the international classification of adult BMI cut points: overweight/obese (BMI ≥ 25) or healthy/underweight (BMI < 25) (World Health Organisation, n.d).

2.5 Ethical considerations

Ethical clearance was obtained from the University of Adelaide School of Psychology Human Research Ethics Subcommittee (reference 19/49). Participation in the study was voluntary, participants were free to withdraw at any time, and the data was not linked to any identifying information to maintain anonymity.

2.6 Power analysis

A priori power analysis was conducted using G*Power 3.1 (Erdfelder, Faul, & Buchner, 1996). Previous SSB warning labels studies measuring intentions to consume report medium effect sizes (Roberto et al., 2016; VanEpps & Roberto, 2016). To allow for detection of small-to-moderate difference in mean intention to consume EDs between groups, assuming a Type I error rate of $\alpha = .05$, Type II error rate of $\beta = .80$, and a two-tailed test of mean difference, we aimed to recruit $N = 300$ participants, in a 1:1 ratio for the two experimental groups ($n = 150$ per group).

2.7 Statistical analyses

Statistical analyses were conducted in SPSS version 25 (IBM Corp, 2017). A Type I error rate of .05 was adopted.

A Welch independent samples *t*-test was used to test for differences in mean consumption intentions between experimental groups. Pearson's correlation coefficients investigated relationships between HBM variables and the main outcome of interest, intentions to reduce ED consumption. To explore whether the relationship between warning label type and intentions was mediated by HBM variables, a mediation model was tested using the PROCESS macro for SPSS (version 3.0; model 4; 5,000 iterations; 95 percentile bootstrap confidence intervals; interaction variables mean-centred) (Hayes, 2017). The predictor variable was warning label type (cardiac or obesity), the parallel mediators were self-efficacy, perceived severity and perceived susceptibility (for both cardiac and obesity health effects), and intentions to reduce ED consumption was the outcome (Figure 1). Demographic variables (age, sex, socioeconomic status, remoteness, country of birth, and BMI), knowledge (of adverse health effects and current advisory statements), and ED consumption were included as covariates.

A series of chi-square tests of independence were used to explore whether perceived label effectiveness and support for policy differed by warning label type. Cumulative odds ordinal logistic regression analyses were conducted to identify characteristics associated with support for ED warning label policy, controlling for all other variables.

3. Results

3.1 Inspection of data

3.1.1 Randomisation check

Table 1 reports participant characteristics for the total sample, and according to experimental condition. Of the 435 participants who completed the survey, 49.20% ($n = 214$) were randomly allocated to the obesity label and 50.80% ($n = 221$) to the cardiac effects label (Figure 3). There were no significant differences in participant characteristics between the two label conditions.

3.1.2 Characteristics of energy drink consumption

Consumption of EDs was varied in this sample, with 37.47% consuming monthly, 35.40% consuming weekly, and 27.13% consuming daily. Over one quarter (27.13%) of participants reported that on an average day, they exceed the recommended daily ED consumption limit (>500mL). Participants consumed EDs for a variety of reasons, as demonstrated in Table 2. The highest ranked responses for consuming EDs was to stay awake or to help concentrate for work/study. There was a high level of knowledge of health risks associated with ED consumption. As can be expected, knowledge was lower for health effects with weaker evidence of association (anxiety, depression, and cancer). Over 90% of participants were aware of an advisory statement currently on ED packaging, with a very high proportion able to free recall at least one element of this advisory statement. Elements recalled by participants are reported in Table 2.

Table 1

Participant demographics for the total sample, and by experimental condition (N = 435)

Variable	Label Type				Total		χ^2
	Cardiac		Obesity		no.	%	
	no.	%	no.	%			
Gender ^{1,2}							
Male	119	53.85	117	54.67	236	54.25	0.14
Female	97	43.89	87	40.65	184	42.30	$p = .713$
Age group ²							
18-24	119	53.85	109	50.93	228	52.41	0.26
25-39	102	46.15	105	49.07	207	47.59	$p = .609$
SES Quintile ²							
More disadvantaged	92	42.40	91	42.92	183	42.66	0.00
Less disadvantaged	125	57.60	121	57.08	246	57.34	$p = .990$
Country of Birth ²							
Australia	199	90.05	189	88.32	388	89.20	0.181
Other	22	9.95	25	11.68	47	10.80	$p = .670$
BMI ²							
Normal/underweight	101	47.40	111	51.90	212	50.00	0.943
Overweight/obese	112	52.60	100	46.70	212	50.00	$p = .285$
Highest qualification							
Some tertiary/ completed vocational training	121	55.00	113	52.80	234	53.90	
Finished university (bachelor degree or higher)	47	21.40	54	25.20	101	23.30	0.864
Secondary school or less	51	23.20	47	22.00	98	22.60	$p = .649$
Employment ²							
Employed full or part time	141	63.80	142	66.20	283	65.10	0.21
Student/ Not employed ³	80	36.20	72	33.60	152	34.90	$p = .647$

Note. ¹ 3.45% of participants (cardiac $n = 5$, obesity $n = 10$) did not declare their gender, and are not included in this comparison.

² Yates' Correction for Continuity used to compensate for the overestimate of chi-square when a 2x2 table.

³ 11.30% of participants (cardiac $n = 23$, obesity $n = 11$) not employed

Table 2

Motivations for ED use, knowledge of health risks associated with ED consumption, and awareness of current advisory statements (N = 435)

	No.	%
Motivations for using energy drinks¹		
To stay awake or help concentrate for work/study	395	90.80
To feel awake in general (not for a specific activity)	334	76.78
Taste	268	61.61
To mix with alcohol	267	61.38
To stay awake or alert for driving	244	56.09
For going out/partying	239	54.94
Curious/try something new	162	37.24
To cope with a hangover	124	28.51
To improve sports performance or physical activity	104	23.91
To sober up after drinking alcohol	80	18.39
My friends drink them	66	15.17
To help lose weight or help keep weight off	47	10.80
Energy drinks are cool	39	8.97
Knowledge of health effects		
Tooth decay	406	93.33
Heart or cardiovascular complications/disease	378	86.90
Type 2 diabetes	372	85.52
High blood pressure (hypertension)	370	85.06
Weight gain	360	82.76
Anxiety	320	73.56
Depression	194	44.60
Cancer	173	39.77
Asthma ²	98	22.53
Awareness of current advisory statement		
Don't know	47	10.80
No	80	18.39
Yes	308	70.80
Advisory statement recall³		
Correct recall (includes partially correct)	281	91.23
Incorrect recall/don't know	27	8.77
Free recall of advisory statement themes		
<i>Correct recall of advisory statement content</i>		
Daily limit	224	51.49
Not recommended for pregnant or lactating women	182	41.84
Not recommended for children	54	12.41
Not recommended for individuals sensitive to caffeine	45	10.34
Contains caffeine	28	6.44
Consume responsibly	2	0.50
<i>Incorrect recall of advisory statement content</i>		
Heart effects	39	8.97

Don't know	18	4.14
Other ⁴	12	2.76
Don't consume with alcohol	9	2.07

Note .¹ Participants could select multiple items from a list.

² Distractor variable

³ Only participants who were aware of a warning statement on ED cans (70.80%) were asked to recall the statement.

⁴ Other responses included anxiety, asthma, may affect medications, high sugar content, contains artificial sweeteners.

3.1.3 Descriptive statistics

Table 3 reports means and standard deviations for intentions, self-efficacy, perceived susceptibility – obesity, perceived severity – obesity, perceived susceptibility – cardiac, and perceived severity – cardiac, for the entire sample and by label condition. Overall, participants reported moderate levels of intentions to reduce ED consumption and moderate self-efficacy. As indicated by a one sample *t* test, participants perceived that they were more susceptible to obesity than adverse cardiac effects ($M_{obesity} = 56.24$, $M_{cardiac} = 45.76$, 95% CI [8.01 to 12.95], Cohen's $d = 0.39$), and they perceived obesity as the health outcome with more severe consequences ($M_{obesity} = 79.02$, $M_{cardiac} = 42.28$, 95% CI [34.73 to 38.75], Cohen's $d = 1.66$).

Table 3

Means and Standard Deviations for Scores on Intentions, Self-efficacy, Perceived Susceptibility – Obesity, Perceived Severity – Obesity, Perceived Susceptibility – Cardiac, and Perceived Severity – Cardiac for the total sample and by experimental condition (N = 435)

Variable	Label Type				Total	
	Cardiac		Obesity		M	SD
	M	SD	M	SD		
1. Intentions to reduce ED consumption	2.64	1.28	2.48	1.26	2.56	1.27
2. Self-efficacy	2.74	0.51	2.66	0.55	2.70	0.53
3. Perceived susceptibility – obesity	58.23	26.63	54.18	25.66	56.24	26.20
4. Perceived severity – obesity	79.72	20.14	78.3	22.48	79.02	21.31
5. Perceived susceptibility – cardiac	46.58	26.42	44.91	29.10	45.76	27.75
6. Perceived severity – cardiac	41.76	22.46	42.80	23.54	42.28	22.98

Note. Range of scores: intentions to reduce ED consumption (1-5), self-efficacy (1-5), perceived susceptibility – obesity (0-100), perceived severity – obesity (0-100), perceived susceptibility – cardiac (0-100), perceived severity – cardiac (0-100)

3.2 Simple effects of warning label type on intentions to reduce energy drink consumption

It was hypothesised that intentions to reduce ED consumption would be higher among participants in the cardiac compared to the obesity condition. Intention scores for each label were approximately normally distributed, as assessed by visual inspection of Normal Q-Q Plots, and there was homogeneity of variances, as assessed by Levene's test for equality of variances ($F(1,434) = .622, p = .431$). There were no outliers in the data, as assessed by inspection of a boxplot.

There was no significant differences in intention scores for those who viewed the cardiac label ($M = 2.64, SD = 1.28$) and the obesity label ($M = 2.48, SD = 1.26; t(435) = 1.29, p = .20$). Accordingly, the magnitude of the difference in means was very small (Cohen's $d = 0.12, 95\% CI [-0.08 \text{ to } 1.87]$). Therefore, neither label was more effective than the other in yielding greater intentions to reduce ED consumption rejecting hypothesis 1.

3.3 Associations between HBM variables and mean intentions to reduce energy drink consumption

Hypothesis 2 stated that self-efficacy, perceived severity, and perceived susceptibility (for both health effects) would be positively correlated with intentions to reduce ED consumption. As shown in Table 4, there were statistically significant, small positive correlations between intentions to reduce ED and: self-efficacy; perceived susceptibility – obesity; perceived susceptibility – cardiac; and perceived severity – cardiac. However, there was no significant correlation between perceived severity of obesity and intentions.

As the measures of perceived severity and perceived susceptibility specifically relate to each warning label type, the intercorrelations for each warning label are presented in Tables 5 and 6. For participants who viewed the cardiac label, there was a small association between perceived susceptibility and perceived severity of cardiac effects with intentions to

reduce ED consumption (Table 5). There was no association between self-efficacy and intentions. For participants who viewed the obesity label, perceived susceptibility and perceived severity of obesity were not associated with intentions to reduce ED consumption (Table 6). There was a small negative correlation between self-efficacy and intentions. Due to the small effects and inconsistent associations found, there was partial support for hypothesis 2.

Table 4

Whole sample: Summary of Intercorrelations for Scores on Intentions, Self-efficacy, Perceived Susceptibility – Obesity, Perceived Severity – Obesity, Perceived Susceptibility – Cardiac, and Perceived Severity – Cardiac (N = 435)

	1	2	3	4	5	6
1. Intentions	-					
2. Self-efficacy	-.12*	-				
3. Perceived susceptibility – obesity	.11*	-.05	-			
4. Perceived severity – obesity	.08	-.081	.26**	-		
5. Perceived susceptibility – cardiac	.14**	.07	.19**	-.01	-	
6. Perceived severity – cardiac	.26**	-.07	.16**	.18**	.08	-

* $p < .05$ (2-tailed). ** $p < .01$ (2-tailed).

Table 5

Cardiac label: Summary of Intercorrelations for Scores on Intentions, Self-efficacy, Perceived Susceptibility – Obesity, Perceived Severity – Obesity, Perceived Susceptibility – Cardiac, and Perceived Severity – Cardiac (N = 221)

	1	2	3	4	5	6
1. Intentions	-					
2. Self-efficacy	-.09	-				
3. Perceived susceptibility – obesity	.16*	.09	-			
4. Perceived severity – obesity	.20**	-.05	.07	-		
5. Perceived susceptibility – cardiac	.16*	-.10	.26**	.13	-	
6. Perceived severity – cardiac	.10	-.13*	.02	.17*	.25**	-

* $p < .05$ (2-tailed). ** $p < .01$ (2-tailed).

Table 6

Obesity label: Summary of Intercorrelation for Scores on Intentions, Self-efficacy, Perceived Susceptibility – Obesity, Perceived Severity – Obesity, Perceived Susceptibility – Cardiac, and Perceived Severity – Cardiac (N = 214)

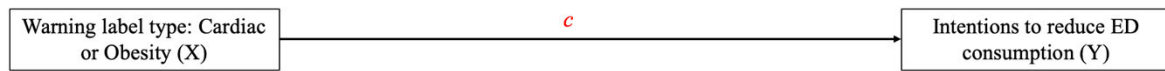
	1	2	3	4	5	6
1. Intentions	-					
2. Self-efficacy	-.17*	-				
3. Perceived susceptibility – obesity	.11	.04	-			
4. Perceived severity – obesity	.32**	-.08	.09	-		
5. Perceived susceptibility – cardiac	.04	-.02	.13	.20**	-	
6. Perceived severity – cardiac	.06	-.04	-.04	.19**	.27**	-

* $p < .05$ (2-tailed). ** $p < .01$ (2-tailed).

3.4 Parallel Mediation

In the present study, it was hypothesised that the relationship between warning label type and intentions to reduce ED consumption would be mediated by perceived severity, perceived susceptibility, and self-efficacy (Figure 4). Under Hayes and Rockwood (2017), there does not need to be a statistically significant relationship between X and Y to progress with the mediation analysis. Results presented in Table 7 indicated that warning label type did not predict intention scores (paths c) in Model I. In Model II, examination of the ab coefficients found no statistically significant mediation effects. Hence, hypothesis 3 was not supported.

Model I



Model II

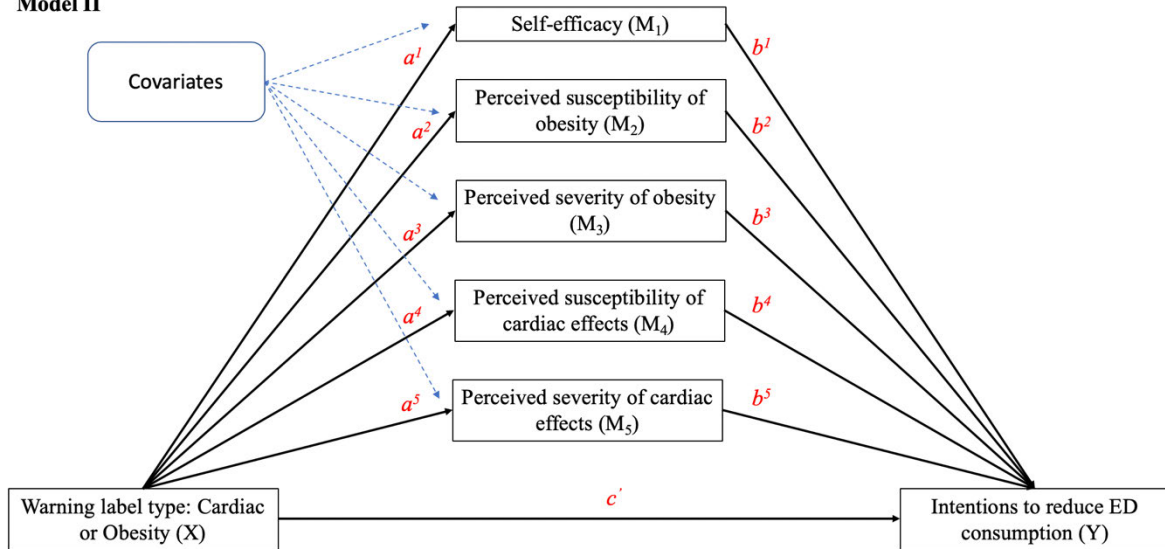


Figure 4. Path diagram of the preliminary mediation specification model, with demographics, ED consumption, and knowledge of adverse health effects included as covariates. Model I provides direct effects before the mediators are entered; Model II is the mediation model; warning label type is dichotomous (0, cardiac label; 1, obesity label)

Table 7

Mediation parameter estimates for unstandardised direct (Model I) and indirect (Model II) effects (N = 403)

Model	β	SE	95% CI
I			
c	-0.09	0.12	[-0.33, 0.15]
II			
a^1	-0.07	0.05	[-0.17, 0.03]
a^2	-3.38	2.50	[-8.30, 1.55]
a^3	-0.84	2.14	[-5.04, 3.36]
a^4	-1.84	2.72	[-7.19, 3.51]
a^5	1.13	2.29	[-3.36, 5.62]
b^1	-0.37	0.12	[-0.59, -0.14]
b^2	0.00	0.00	[0.00, 0.01]
b^3	0.00	0.00	[0.00, 0.01]
b^4	0.00	0.00	[0.00, 0.01]
b^5	0.01	0.00	[0.01, 0.02]
c'	-0.11	0.12	[-0.34, 0.11]
ab^1	0.03	0.02	[-0.01, 0.07]
ab^2	-0.01	0.01	[-0.04, 0.01]
ab^3	0.00	0.01	[-0.03, 0.02]
ab^4	-0.01	0.01	[-0.03, 0.01]
ab^5	0.01	0.03	[-0.04, 0.07]

Note. Bold indicates $p < .05$

The dichotomous independent variable in each model is (0, cardiac label; 1, obesity label)

3.5 Exploratory subgroup analyses

While no main effect of warning label type on intentions to reduce consumption was found for the total sample, previous research by Temple et al. (2016) identified that intentions to reduce ED consumption may differ by consumer profile. Identifying any differences in intentions among different population subgroups has important implications for designing and disseminating targeted interventions. Exploratory analyses were conducted using *t*-tests and ANOVAs to further explain differences in mean intentions by subgroups. The analysis was stratified according to demographic and consumption variables. As presented in Table 8, a significant difference in intentions (according to label type) was observed among specific age, gender and highest qualification subgroups. Females, participants aged 25 to 39, and those with a bachelor's degree or higher had significantly higher intentions to reduce

consumption when exposed to the cardiac label compared to participants exposed to the obesity label.

Table 8

Results of exploratory subgroup analyses in differences in intentions according to label type among demographic subgroups (N = 435)

	Label Type		<i>t</i>	<i>p</i>	<i>d</i>
	Cardiac (<i>n</i> = 221)	Obesity (<i>n</i> = 214)			
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)			
Gender ¹					
Male	2.55 (1.19)	2.59 (1.30)	-0.27	.789	0.03
Female	2.75 (1.38)	2.34 (1.22)	2.10	.037	0.31
Age					
18-24	2.52 (1.27)	2.60 (1.33)	-0.46	.649	0.06
25-39	2.77 (1.29)	2.35 (1.18)	2.42	.016	0.34
Highest qualification ²					
Finished high school	2.38 (1.25)	2.62 (1.33)	-0.94	.349	0.19
Some tertiary education	2.72 (1.26)	2.68 (1.23)	0.27	.791	0.03
Completed university (bachelor degree or higher)	2.68 (1.39)	1.93 (1.13)	2.94	.004 ³	0.59

Note. ¹ 3.45% of participants (cardiac *n* = 5, obesity *n* = 10) did not declare their gender, and are not included in this comparison.

² *n* = 2 participants (cardiac condition) prefer not to say

³ Equal variances not assumed due to unequal sample sizes.

3.7 Perceived effectiveness of warning labels

A secondary aim of this study was to examine which type of warning label was perceived as more effective among ED consumers. As shown in Table 9, there was a statistically significant difference between warning label type and perceptions of the label as ‘believable’ and ‘relevant to me’, with the cardiac label perceived as more effective. These associations were both small (Cohen, 1988). There were no other differences in ratings by label type.

Table 9

Crosstabulation of Warning Label Type and Perceived Label Effectiveness items (N = 435)

This warning label...	Experimental Condition		χ^2	<i>p</i>	<i>Phi</i>	
	Cardiac Label	Obesity label				
Grabs my attention						
	Agree	63.35	58.41	0.92	0.339	-0.05
	Not agree	36.65	41.59			
Is easy to understand						
	Agree	95.48	92.52	1.2	0.273	-0.06
	Not agree	4.52	7.48			
Is believable						
	Agree	71.04	56.07	9.89	0.002	-0.16
	Not agree	28.96	43.93			
Makes me stop and think						
	Agree	37.56	31.78	1.36	0.244	-0.06
	Not agree	62.44	68.22			
Taught me something new						
	Agree	17.65	18.22	0.001	0.975	0.01
	Not agree	82.35	81.78			
Is relevant to me						
	Agree	42.53	29.44	7.53	0.006	-0.14
	Not agree	57.47	70.56			

Note. All expected cell frequencies were greater than five.

Yates' Correction for Continuity was used to compensate for the overestimate of chi-square when a 2x2 table was calculated.

3.8 Support for potential energy drink front-of-pack warning label policy

A secondary aim of this study was to explore whether support for policy relating to ED warning labels differed according to warning label type. Subsequently we aimed to identify whether levels of support varied by sociodemographic characteristics, knowledge of health risks, knowledge of current advisory statements, and current ED consumption.

3.8.1 Support for Policy by Warning Label Type

Overall, there was moderate support for policy regarding warning labels on EDs with 49.66% of the sample strongly/somewhat in favour, 31.26% neither in favour or opposed, and

19.08% strongly/somewhat opposed. Policy support significantly differed according to experimental condition, with participants more likely to be in favour of the cardiac label (55.66%) than the obesity label (43.46%) ($\chi^2(2, n = 435) = 6.47, p = .039$, Cramer's $V = .122$).

3.8.2 Sociodemographic Predictors of support for Policy

Participants' current ED consumption had a statistically significant association with higher policy support (Wald $\chi^2(2) = 7.11, p = .029$). Lower (monthly or less, or weekly) ED consumers had significantly greater odds of supporting policy (Monthly: $OR=2.25, 95\% CI [1.22, 4.13], p=.009^1$; Weekly: $OR = 1.74, 95\% CI [1.02, 2.97], p = .043^2$) than that of daily ED consumers. Awareness of anxiety as a potential health effect associated with ED consumption was also a significant predictor of policy support ($OR = 1.83, 95\% CI [1.09, 3.05]$), Wald $\chi^2(1) = 5.31, p = .021$. No other variables significantly contributed to the model.

¹ Wald $\chi^2(1) = 6.77, p = .009$

² Wald $\chi^2(1) = 4.11, p = .043$

4. Discussion

While there is no clear best practice intervention for reducing ED consumption, FOP health warning labels are a promising policy option that can be implemented amongst a suite of interventions (Striley & Swain, 2019). Despite this, little is known about whether different health messages are more effective in increasing intentions to reduce ED consumption. This was a novel study to experimentally compare the impact of a FOP ED-specific health message communicating cardiac effects with a more general SSB warning label communicating risk of obesity, on intentions to reduce ED consumption among an Australian sample of ED consumers.

4.1 Relationship between warning label type and intentions to reduce energy drink consumption explained by perceived threat and self-efficacy

The primary aim of this study was to investigate whether warning label type differentially affected intentions to reduce ED consumption, and if so, whether this relationship was mediated by perceived severity, perceived susceptibility, and self-efficacy. The results of this study indicated that viewing the cardiac or obesity label resulted in similar immediate levels of intentions to reduce ED consumption for the total sample. This finding suggested that neither label was more effective or ineffective than the other, and therefore, there was no direct relationship between warning label type and mean intentions to reduce ED consumption. Hence, hypothesis 1, that the cardiac health effects label would be more effective, was not supported. These results contradict findings from previous SSB studies that suggest different health messages may differentially impact consumption intentions (Gray et al., 2011; Mantzari et al., 2018; Miller et al., 2018).

The absence of a difference in mean intentions due to warning label type can be partially explained by participants' perceptions of threat with respect to each health effect. For the overall sample, obesity was perceived to be the more severe health effect and

participants also perceived that they were more susceptible to obesity than cardiovascular health effects. While no previous studies have assessed perceptions of ED health effect warning labels, the SSB literature has identified that obesity is typically perceived as a lesser health threat than conditions that have non-visible symptoms, such as diabetes (Gray et al., 2011; Miller et al., 2018). The results of this study do not support the previous research as obesity was perceived as a greater threat than cardiac health effects. However, these perceptions of threat did not translate to significant differences in mean intentions to reduce ED consumption. Although cardiac health effects are non-visible like diabetes, cardiac symptoms are immediate whereas diabetes is typically slow occurring (Diabetes Australia, n.d.). Thus, ED consumers may self-exempt from heart health messages perhaps because they already consume EDs with no instant cardiac symptoms and subsequently felt that they were not at risk. In contrast, obesity occurs over time and participants perceived that they were potentially at risk.

Another possible explanation for these results may be the inconsistent associations found between HBM variables and intentions in this study. Guided by the HBM, it was hypothesised that self-efficacy and perceived threat would be positively correlated with intentions to reduce ED consumption. This second hypothesis was partially supported, as individuals who perceived cardiac health effects as more severe and perceived themselves to be more susceptible to it were more likely to report significantly greater intentions to engage in the health promoting behaviour of reducing ED consumption. However, these associations were very small and there was no association between self-efficacy and intentions for those who viewed the cardiac label. Conversely, for participants who viewed the obesity label, perceived threat of obesity was not associated with intentions to reduce ED consumption and, unexpectedly, participants who reported higher self-efficacy reported lower intentions to reduce their ED consumption. These results fail to provide complete support for the HBMs

ability to explain one's intentions to engage in the desired health behaviour, ED consumption reduction. The few small significant associations observed do not adequately support the previous findings that greater perceived threat of a communicated health effect increases an individual's intentions to reduce consumption (Gray et al., 2011; Miller et al., 2018).

As expected from these findings, hypothesis 3 that the relationship between warning label type and intentions to reduce ED consumption would be mediated by perceived threat and self-efficacy was not supported as warning label type was not directly or indirectly related to intentions to reduce ED consumption. There is a range of research indicating the usefulness of the HBM (Glanz & Bishop, 2010). However, our findings were more in agreement with research identifying that use of the HBM as an explanatory framework can be limited due to its lack of specified variable ordering and ambiguity in relationships between constructs (Glanz et al., 2008; Jones et al., 2015).

4.2 Cardiac label more effective for females, older and more highly qualified participants

Previous research by Temple et al. (2016) identified that intentions to reduce ED consumption can differ by consumer profile, and our results partially supported these findings. When analysed separately, females, participants in the older age group (25 to 39 years), and those with higher qualifications (bachelor degree or higher) who viewed the cardiac label had higher intentions to reduce ED consumption. This finding supports previous research that females and older participants were more likely to engage in health promoting behaviours for cardiovascular disease (Deeks, Lombard, Michelmore, & Teede, 2009). However, this contrasts the results of Temple et al. (2016) who found that the ED health warning label conveying caffeine health effects was effective in reducing younger participants intentions but not older participants. They concluded that the adverse health effects of excess caffeine consumption were more novel to younger participants and thus

more likely to impact their behaviour; an effect possibly not found in our sample as we did not include adolescents.

4.4 Perceived effectiveness of warning labels

A secondary aim of this study was to explore the perceived effectiveness of each warning label, as such perceptions have been successful in predicting intentions to quit and actual quit smoking attempts (Davis et al., 2017). Participants' perceived effectiveness of the warning labels provides further explanation regarding possible underlying reasons why the warning labels did not differentially motivate individuals to reduce ED consumption. For both experimental conditions, the majority of participants agreed that the label grabbed their attention and was easy to understand. Conversely, both labels were perceived as less effective for the remaining items, only one third of participants agreed that the label made them 'stop and think' and less than one fifth of participants reported that the label taught them 'something new'. This may be due to participants' existing high level of knowledge of adverse health effects associated with frequent ED consumption. However, the cardiac label was perceived as more believable and more relevant to the consumer than the obesity label. This is consistent with Canadian research that found cardiovascular symptoms were more frequently identified as an adverse health concern of ED consumption than weight gain (McCrory et al., 2017). Similarly, qualitative SSB research identified individuals as more likely to engage in self-exemption from obesity messages, a potential explanation for why the obesity label was perceived as less relevant (Miller et al., 2018). Overall, as both labels were perceived similarly this explains why intentions to reduce ED consumption did not differ as a result of label type. Also, this was a gauge of initial reactions hence the potential label effectiveness cannot be underestimated due to a lack of finding in intentions after one exposure.

4.5 Support for potential energy drink front-of-pack warning label policy

Support for potential policy is essential for policy implementation and this study identified approximately half of all study participants supported potential ED FOP warning label policy. Compared to a recent nationally representative survey of Australians, the level of support for text warning labels on SSBs was substantially lower in this sample of ED consumers (50% vs. 88%) (Miller et al., 2019). A potential explanation for this difference is that the current study did not include non-consumers and non-consumers are more likely to express greater policy support as they are not impacted through the introduction of the potential policy (Miller et al., 2019). Also, this study specifically compared policy support for two different health effect warning labels. Whereas, the Miller et al. (2019) study assessed overall support for an SSB-label warning of health effects with no specific example provided to participants.

Confirming patterns of support found in previous research (Miller et al., 2019; Roberto et al., 2016), more frequent ED consumers were less likely to support policy than less frequent consumers. Previous research has also identified that individuals with greater knowledge of the health risks associated with SSB consumption were more likely to support policy (Miller et al., 2019). Knowledge of potential health risks associated with ED consumption was very high in this sample, even for health effects where the evidence of association is weaker (depression, anxiety and cancer) (Ali et al., 2015). Therefore, there was little variation in support according to knowledge of health effects. However, participants who were aware that anxiety is a potential health effect associated with ED consumption were more likely to show greater policy support.

Policy support was also greater among participants who viewed the cardiac label compared to the obesity label. A possible explanation for this difference is that the obesity label could be perceived as unintentionally stigmatising overweight individuals as found in

other studies (Puhl, Peterson, & Luedicke, 2013), although policy support did not differ by obesity status in this sample. Similarly, qualitative research has identified that individuals are more sensitive to the term ‘obesity’ on FOP SSB warning labels and there was concern that this type of warning label could encourage unhealthy body image attitudes (Miller et al., 2018). To overcome this potential stigmatisation, and ultimately increase support for this label type, the term ‘obesity’ could be replaced with ‘weight gain’. Research comparing the use of these terms on SSB FOP warning labels found that there were no differences in parents perceptions that SSBs are healthy, perceptions of risk of weight gain, heart disease, and diabetes, and hypothetical SSB selection for their child between each label type (VanEpps & Roberto, 2016). Hence, using ‘weight gain’ instead of ‘obesity’ may improve policy support without impacting label effectiveness.

Research has indicated that increasing community awareness of health effects of frequent SSB consumption has the potential to increase public support for policy (Boles, Adams, Gredler, & Manhas, 2014; Martin et al., 2017). However, knowledge of potential health risks associated with frequent ED consumption is already high in this sample, thus communicating the labels effectiveness in reducing consumption may also increase consumer’s support (Donnelly et al., 2018). Public support may be much higher in the general population given that ED consumers are such a small minority of the population (Australian Bureau of Statistics, 2014).

4.6 Strengths and limitations of the study

There were a number of methodological limitations of this study to consider when interpreting the results. Firstly, there was no control group and as a result, the degree to which labels impacted intentions to reduce consumption compared to a ‘no-label’ condition could not be determined, only their comparative effectiveness. While the sample size achieved could have accommodated a control group, the sample size exceeded expectation. As this

study was experimental and the warning labels were viewed digitally in a controlled environment, the results may not translate to the real world. However, this is a commonly used method in preliminary studies (Billich et al., 2018; Donnelly et al., 2018). Whilst based on previously tested SSB FOP warning label experimental studies, the warning labels were not pilot-tested in any other studies. A significant design strength was the randomisation of participants to each label arm which allowed for comparisons between experimental conditions.

This sample of consumers was collected through convenience and not nationally representative, therefore the results may not be generalisable to the broader population. However, the sample was balanced by sex, age, ED consumption patterns, and other important demographic characteristics increasing the reliability of the results and allowing for subgroup analyses. In addition, we do not know how our study sample differs from ED consumers who opted not to complete the survey or who did not have the opportunity to participate. Overall, the sample achieved was large for the time constraints of the study, and that ED consumers only comprise 3% of the population (Australian Bureau of Statistics, 2014).

A notable strength and limitation of this study was that only ED consumers were eligible to participate. Including non-consumers was a limitation of a previous ED labelling study as these individuals do not consume EDs, and thus the intervention was not effective in this group as it was not aiming to change their behaviour (Temple et al., 2016). Hence, it was more beneficial to focus on ED consumers as they would be more sensitive to interventions. Conversely, excluding non-consumers did not allow for assessment of their support for potential ED policy.

Self-report measures are prone to social desirability bias, however, as the study was completed anonymously online this likely reduced the desire for participants to respond in a

manner that they thought would please the researchers. In addition, a strength of this study was the blind randomisation of participants to each experimental condition, and as the study was a between subjects design, participants were not aware that we were testing two different warning labels. Thus, any response bias should be similar in each experimental condition and ultimately not impact comparisons between warning label types.

Lastly, the main outcome was self-reported intentions to reduce ED consumption and true behaviour was not measured. It is unclear therefore whether intentions would translate to real world behaviour change. Nonetheless, as this was one of the first studies to compare different health effect messages on EDs, it provides important insight into the potential effect of the labels prior to real world evaluation, and intentions are often used in health research when long-term follow-up is not possible (Billich et al., 2018; Donnelly et al., 2018).

4.7 Practical implications

This study has implications for formative work in developing effective interventions that aim to discourage ED consumption. The results of this study suggest that overall ED consumers are not differentially impacted by the communication of an obesity or cardiac health effect on FOP warning labels. Yet, for some groups of individuals the cardiac label had a greater impact on their intentions to consume EDs. Similarly, the warning labels differed in some perceived effectiveness indicators. Policy makers often employ multiple warnings in campaigns as it limits individual's opportunity to self-exempt, and accordingly, the results of this study support this approach. However, perceived effectiveness of the warning labels indicated that they both failed to teach participants something new. This may be a result of individuals' initial high levels of knowledge of cardiac and obesity health effects associated with ED consumption, and supports previous literature that public education alone is not enough to instigate behaviour change (Corace & Garber, 2014; Nichols, 1994; Somerford, 2019). This is why a multifaceted approach combining a number of coordinated interventions

that reinforce and support behavioural change such as, sustained exposure to health messages via campaigns, labelling or taxes, are required to effectively change behaviour (Hill & Wakefield, 2014; Wakefield et al., 2010).

4.8 Directions for future research

The results of this study provide preliminary evidence of the differential impact of health messages on different consumer subgroups. It is therefore important not to undervalue the impact of different health warnings in changing attitudes and behaviour. Future research including a control group is required to determine whether these ED warning labels increase intentions to reduce consumption over a 'no-label' control. It would also be interesting to compare the effect of nutrient labelling on consumption intentions similar to other SSB studies and to test how participants intentions vary with repeated exposures. As adolescents are also among the highest consumers of SSBs and EDs, it is important to test this intervention with this age group. Further research should also test components of the HBM not assessed in the present study to explore the potential benefits of and barriers to reducing ED consumption, as this may further explain the underlying psychological mechanisms that influence individual's ED consumption behaviour.

4.9 Concluding Remarks

This online randomised trial is among the first to examine the relative effectiveness of a cardiac and obesity health effect ED warning label on intentions to reduce consumption. With 435 Australian young adult ED consumers it was demonstrated that, while overall, neither label was more effective or ineffective than the other in producing intentions to reduce consumption, they were differentially effective for different population subgroups. Although females, older, and higher qualified participants are commonly less frequent consumers (Pennay et al., 2015), hence further research is required to develop interventions that target the most frequent ED consumers who are at risk of the most harm from

consumption. There was moderate support for potential FOP ED warning label policy among ED consumers. Ultimately, this study provided insight into the fact that both an obesity and cardiac warning label does not appear to have a differential effect for most ED consumers. It was also demonstrated that there is a moderate degree of public receptivity to FOP ED warning labels. This study contributed to the developing evidence base which is essential for policy makers to develop effective evidence-based policy.

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Appendix A: Facebook advertisement for recruitment




SAHMRI

Sponsored · 

Energy drinks often provide an extra boost in the day of many people across Australia, but how much do we know about the real impact they're having on our bodies and our lifestyles?

We're looking for people aged between 18-39 who've consumed energy drinks in the past three months to participate in our survey on attitudes, knowledge and behaviour surrounding these caffeinated beverages.


By sharing your experience, you'll be in the running to win 1 of 3 \$100 Coles Myer gift vouchers.




SAHMRI.ORG

Help us understand the buzz behind energy drinks


Learn More



Like



Comment



Share

Appendix B: Physical flyer for recruitment

SURVEY PARTICIPANTS REQUIRED







Are you aged between 18 and 39 years?
Have you consumed any energy drinks in the last 3 months?

Take our 15 minute online survey and go in the draw to WIN 1 of 3 \$100 Coles/Myer gift cards!

You're invited to take part in our study on attitudes, knowledge and behaviour in relation to consuming energy drinks.

The study is anonymous has been approved by the Human Research Ethics Committee at the University of Adelaide (approval number [REDACTED]).

For more information please email energydrinksstudy2019@gmail.com

Scan QR code to take survey or visit:

[REDACTED]





Appendix C: Participant information sheet

PARTICIPANT INFORMATION SHEET

PROJECT TITLE: Knowledge, attitudes and behaviour in relation to energy drinks**HUMAN RESEARCH ETHICS COMMITTEE APPROVAL NUMBER:** [REDACTED]**PRINCIPAL INVESTIGATOR: Professor Caroline Miller****STUDENT RESEARCHER: Joanna Caruso****STUDENT'S DEGREE: Honours in Psychology**

Dear Participant,

You are invited to participate in the research project described below.

Researchers from the South Australian Health & Medical Research Institute (SAHMRI) and the University of Adelaide are conducting a survey to gather information on people's attitudes, knowledge and behaviour in relation to consuming energy drinks and responses to a warning label. This research will form the basis for the degree of Psychology (Honours) at the University of Adelaide under the supervision of Professor Caroline Miller, Dr Kerry Ettridge and Professor Deborah Turnbull. The information collected may also be used to guide the development of future food and health research and interventions such as national health policies.

You are being invited to participate as you are between the ages of 18 and 39. Participation will involve completing an online survey, where you will be asked to answer a series of questions by selecting the appropriate answer from a list of options. Some questions allow you to provide more detailed responses if you wish. The questionnaire will take approximately 15 to 20 minutes. Participation in this project is completely voluntary. If you agree to participate, you can withdraw from the study at any time prior to the submission of the survey.

The questionnaire is anonymous, meaning that no personally identifying information is collected or recorded, and responses to questions will be collated into a dataset for analysis. Any reports produced from the data will contain only aggregated data and may be reported and publicised through journal articles, news articles, conference presentations, websites or reports. Data will be stored securely in a locked facility until they are no longer required. Participants will be given the option of receiving a copy of a report which summarises the key findings at the conclusion of the study. Additional data analysis may be undertaken by researchers who have been granted access to the data by the lead researcher.

This project will help to develop a better understanding on adults' knowledge, attitudes and behaviour in relation to energy drinks. There are no foreseeable risks from participating in this study. Your information will only be used as described in this participant information sheet and it will only be disclosed according to the consent provided, except as required by law. If you have questions or problems associated with the practical aspects of your participation in the project, or wish to raise a concern or complaint about the project, then you should consult:

Lead researcher in charge of the study
<i>Professor Caroline Miller</i>
Phone: [REDACTED]

The study has been approved by the Human Research Ethics Committee at the University of Adelaide (approval number [REDACTED]). This research project will be conducted according to the NHMRC National Statement on Ethical Conduct in Human Research 2007 (Updated 2018). If you have questions or problems associated with the practical aspects of your participation in the project, or wish to raise a concern or complaint about the project, then you should consult the Principal

Investigator. If you wish to speak with an independent person regarding concerns or a complaint, the University's policy on research involving human participants, or your rights as a participant, please contact the Human Research Ethics Committee's Secretariat on:

[REDACTED]

[REDACTED]

[REDACTED]

Any complaint or concern will be treated in confidence and fully investigated. You will be informed of the outcome.

If you would like to participate in the study simply access the web-link provided, complete the screening and consent questions, and then complete the full survey online.

Yours sincerely,
Professor Caroline Miller
Dr Kerry Ettridge
Professor Deborah Turnbull
Joanna Caruso

Appendix D: Online survey

Screening questions

1. What is your age?
 - Under 18
 - 18 - 24 years
 - 25 - 39 years
 - 40+ years
2. Do you currently live in Australia?
 - Yes
 - No
3. Are you fluent in English?
 - Yes
 - No
4. Do you, or any one in your family, work in the beverage industry?
 - Yes
 - No

Energy drinks are beverages that claim to enhance mental alertness and physical performance. They contain caffeine and other stimulants. E.g. Red Bull, Monster, V, Mother and Rockstar. Does not include sports drinks such as Powerade or Gatorade.



4. Have you consumed any energy drinks in the past three months?
 - Yes
 - No

[END PAGE]

You are eligible to complete the main survey. All questions require a response to proceed to the next section.

If taking this survey on a mobile or tablet device, please view in landscape for ease of viewing.

Drink Consumption

1. How often do you consume any energy drinks?

- Less than once a month
- 1-3 times per month
- Once a week
- More than once a week
- Daily

2. On days that you consume energy drinks, how much do you usually consume?

Please record the number of cans and the can size (e.g. 3x 250mL cans, or 2x 500mL cans) or total millilitres consumed.

3. What is the most number of energy drinks you have ever had in one day? Include any energy drinks mixed with alcohol.

Please record the number of cans and the can size (e.g. 3x 250mL cans, or 2x 500mL cans) or total millilitres consumed.

4. How often do you usually drink the following packaged drinks:

	Daily	Weekly	Monthly	Less than monthly	Never
Soft drink (e.g. cola, lemonade)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sports drinks (e.g. Gatorade, Powderade)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flavoured Mineral water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Artificially sweetened (diet) soft drink	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coffee (includes iced coffee)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flavoured milk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
100% fruit juice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bottled water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9. Have you ever used energy drinks for the following reasons? (Select all that apply)

- To stay awake or help concentrate for studying/work
- To stay awake or alert for driving
- To feel awake in general (not for a specific activity)
- For going out/partying
- To mix with alcohol
- To cope with a hangover
- To sober up after drinking alcohol
- Curious/try something new
- For the taste
- My friends drink them
- To improve sports performance or physical activity
- Energy drinks are cool
- To help lose weight or help keep weight off
- Other _____

[END PAGE]

10. To what extent are the following health effects associated with drinking energy drinks?
[randomise statements]

	Not at all				A great deal
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tooth decay	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Weight gain/obesity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Type 2 Diabetes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Heart or cardiovascular complications/disease	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cancer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Depression	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Anxiety	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
High blood pressure (hypertension)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Asthma	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

11. Are you aware of any warnings currently on energy drink cans?

- Yes
- No
- Don't know

[SKIP Q11a if respondent answered 'No' or 'Don't know' to Q11]

11a. Can you recall what these statements say? Record below in as much detail as you can remember. If you are unsure please write "don't know".

12. Do you refer to the nutrition panel when selecting beverages to consume?

- Never
- Seldom

- Sometimes
- Almost Always
- Always

[END PAGE]

You will now be shown a warning label that may be placed on energy drinks and asked some questions about the label.

[Participants will only see one label]

Group 1 [odd record name]: Cardiac Label

Group 2 [even record name]: Obesity Label



13. This warning label...[statements randomised]

	Strongly disagree	Somewhat disagree	Neither	Somewhat agree	Strongly Agree
...grabs my attention	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...is easy to understand	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...is believable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...makes me stop and think	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...taught me something new	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...is relevant to me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

14. This warning label makes me feel...[statements randomised]

	Not at all				A great deal
anxious	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ashamed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
disgusted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
fearful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
guilty	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

15. In your opinion, how effective would this warning label be in each of the following ways?

	Not at all effective				Very effective
Making people think about the health effects of energy drinks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Discouraging people from wanting to drink energy drinks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Overall, how effective is this warning?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

16. Do you have any comments about this warning label?

[END PAGE]

	Strongly disagree				Strongly Agree			
Having heart palpitations or heart disease is always fatal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Having heart palpitations or heart disease will threaten my relationship with a significant other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My whole life would change if I had heart palpitations or heart disease	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Having heart palpitations or heart disease will have a very bad effect on my sex life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If I have heart palpitations or heart disease I will die within 10 years	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

[END PAGE]

	Not at all			Neutral			A great deal	
How interested are you in reducing your energy drink consumption in the next month?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
How much do you plan to reduce your energy drink consumption in the next month?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
How likely are you to reduce your energy drink consumption in the next month?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

25. How difficult do you think it would be to drink fewer energy drinks in the next month?

- Very difficult
- Fairly difficult
- Not at all difficult
- Not interested
- Don't know

26. How confident are you that you could drink fewer energy drinks in the next month?

- Very confident
- Fairly confident
- Not at all confident
- Not interested
- Don't know

27. How confident are you that you could choose healthier alternatives (e.g. water) instead of consuming energy drinks in the next month, if you wanted to?

- Very confident
- Fairly confident
- Not at all confident
- Not interested
- Don't know

28. Would you favour or oppose a government policy requiring the above warning label to be placed on energy drinks?

- Strongly in favour
- Somewhat in favour
- Neither in favour or oppose
- Somewhat oppose
- Strongly oppose

29. If this government warning label were on energy drinks, would the label encourage you to drink fewer of those beverages?

- Definitely yes
- Maybe yes
- Neither
- Maybe no
- Definitely no

[END PAGE]

30. What is your age in years? *Please enter a whole number*

31. What is your gender?

- Male
- Female
- Other
- Prefer not to say

32. What is the postcode where you live?

33. What is your country of birth?

[drop down list of all countries]

34. What is the main language you speak at home?

- English
- Other _____ (specify)

35. Are you of Aboriginal or Torres Strait Islander origin?

- No
- Yes, Aboriginal
- Yes, Torres Strait Islander
- Yes, both Aboriginal and Torres Strait Islander
- Don't know

36. What is your current living situation?

- Live with parents or other family
- Live in shared private accommodation (not with family)
- Live in student accommodation
- Live in own home (rented or owned)
- Other _____ (specify)

37. What is your height without shoes (if unsure, please indicate your best guess)?

38. What is your weight (undressed) in the morning (if unsure, please indicate your best guess)?

39. Do you consider yourself to be...?

- An acceptable weight
- Underweight
- Overweight
- Don't know
- Prefer not to say

40. What is the **highest** qualification you have obtained?

- Some primary school
- Finished primary school
- Some secondary school
- Finished secondary school
- Some tertiary education (e.g. university, TAFE, college)
- Finished vocational training/received qualification (apprenticeship, certificate or diploma)
- Finished university training/received qualification (bachelor degree)
- Finished higher degree university training/received qualification (PhD, masters, graduate diploma)
- Don't know
- Prefer not to say

41. Which of the following best describes your work status?

- Work full time
- Work part time
- Home duties
- Not in paid employment
- Retired
- Student
- Not working because of work related injury or disability

[Skip Q42 if respondent did not answer "Work full time" or "Work part time"]

42. Does your work currently include evening or night shifts at least some of the time?

- Yes
- No

43. Have you ever been told by a doctor or other health professional that you have the following:

	YES	NO
Type 2 diabetes	<input type="checkbox"/>	<input type="checkbox"/>
Heart disease	<input type="checkbox"/>	<input type="checkbox"/>
Arthritis or gout	<input type="checkbox"/>	<input type="checkbox"/>
Depression	<input type="checkbox"/>	<input type="checkbox"/>
Anxiety	<input type="checkbox"/>	<input type="checkbox"/>
Lung conditions such as Asthma or COPD (Chronic Obstructive Pulmonary Disease)	<input type="checkbox"/>	<input type="checkbox"/>
Tooth decay	<input type="checkbox"/>	<input type="checkbox"/>
Sleep conditions such as insomnia, snoring or sleep apnoea	<input type="checkbox"/>	<input type="checkbox"/>

[SKIP Q44-47 if respondent answered "No" to related health condition in Q43]

44. You answered yes for Type 2 Diabetes: are you currently taking prescription medication for this condition?

- Yes
- No

45. You answered yes for Depression: are you currently taking prescription medication for this condition?

- Yes
- No

46. You answered yes for Anxiety: are you currently taking prescription medication for this condition?

- Yes
- No

47. You answered yes for Sleep conditions: do you use a CPAP (Continuous positive airway pressure) machine?

- Yes
- No

If you are a University of Adelaide Psychology 1A student and would like to receive course credit for completing this study please enter your unique 5 digit participant ID code here (you cannot receive course credit and go in the draw to win one of three \$100 Coles/Myer gift cards): _____

END SURVEY

Thank you for helping with this research involving people's attitudes, knowledge, behaviour in relation to consuming energy drinks and responses to a warning label. In this survey you would have viewed and evaluated either an obesity or a cardiac health effect warning label. We are specifically interested in whether exposure to a particular warning label results in greater intentions to reduce energy drink consumption.

To ensure your identity remains anonymous, if you would like to go in the draw to win one of three \$100 Coles/Myer gift cards or to receive a summary report of the study results please [click here to enter your contact details](#)

This research is carried out in compliance with the Privacy Act and the Australian Privacy Principles, and the information you have provided will only be used for research purposes only. SAHMRI's Privacy Policy is available via their website (www.sahmriresearch.org/privacy-policy) which contains details about how to access or correct your information, how to make a complaint and how that complaint will be handled.

The study also has ethics approval from the University of Adelaide's Human Research Ethics Committee. If you wish to speak with an independent person regarding a concern or complaint, the University's policy on research involving human participants, or your rights as a participant, please contact the Human Research Ethics Committee's Secretariat on 08 8313 6028.

Separate survey to collect otherwise identifiable data

Thank you again for helping with this research.

If you would like to go in the draw to win one of three \$100 Coles/Myer gift cards or to receive a summary report of the study results please enter your details in the relevant sections below. Note that your details collected below are collected separately and not linked to your survey responses in any way, and are only used for the purpose of contacting winners, and/or providing summary report.

Go in the draw to win 1 of 3 \$100 Coles/Myer gift cards

First name: _____

Last name: _____

Email address: _____

Receive a summary report of the study results

First name: _____

Last name: _____

Email address: _____

This research is carried out in compliance with the Privacy Act and the Australian Privacy Principles, and the information you have provided will only be used for research purposes only. SAHMRI's Privacy Policy is available via their website (www.sahmriresearch.org/privacy-policy) which contains details about how to access or correct your information, how to make a complaint and how that complaint will be handled.

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[Link](#) to participant information sheet.