



## Short Communication

# Intentions to reduce sugar-sweetened beverage consumption: the importance of perceived susceptibility to health risks

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### Abstract

**Objective:** There are numerous health effects associated with excess sugar-sweetened beverage (SSB) consumption. Interventions aimed at reducing population-level consumption require understanding of the relevant barriers and facilitators. This study aimed to identify the variables with the strongest relationship with intentions to reduce SSB consumption from a suite of variables derived from the literature.

**Design:** Random-digit dialling of landline and mobile phones was used to survey adults using computer-assisted telephone interviews. The outcome variable was 'likelihood of reducing SSB consumption in next 6 months', and the predictor variables were demographics, SSB attitudes and behaviour, health risk perceptions and social/environmental exposure.

**Setting:** Australia.

**Participants:** A subsample of 1630 regular SSB consumers from a nationally representative sample of 3430 Australian adults (38 % female, 51 % aged 18–45 years, 56 % overweight or obese).

**Results:** Respondents indicated that they were 'not at all' (30.1 %), 'somewhat' (43.9 %) and 'very likely' (25.3 %) to reduce SSB consumption. Multivariate nominal logistic regressions showed that perceiving future health to be 'very much' at risk was the strongest predictor of intention to reduce SSB consumption (OR = 8.1, 95 % CI 1.8, 37.0,  $P < 0.01$ ). Other significant predictors ( $P < 0.01$ ) included self-perceptions about too much consumption, habitual consumption, difficulty reducing consumption and likelihood of benefitting from reduced consumption.

**Conclusions:** Health risk perceptions had the strongest relationship with intentions to reduce consumption. Age and consumption perceptions were also predictors in the multivariate models, whereas social/environmental exposure variables were not. Interventions may seek to incorporate strategies to denormalise consumption practices and increase knowledge about perceived susceptibility to health risks.

**Keywords**  
Sugar-sweetened beverages  
Population survey  
Intentions to change  
Health risk perceptions

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The relationship between sugar-sweetened beverage (SSB) consumption and chronic disease is well established<sup>(1–10)</sup>, yet consumption is high in many jurisdictions<sup>(11)</sup>. Reducing population-level SSB consumption is necessary to improve health<sup>(12)</sup>. Barriers to behaviour change include widespread availability and promotion<sup>(13)</sup> and lack of clear and tangible advice about how much can be consumed<sup>(14)</sup>.

The Australian Dietary Guidelines recommend ‘limiting’ food and beverages considered unhealthy without quantifying a limit<sup>(15)</sup>. Moreover, consumers find nutrition information panels, which include sugar, difficult to interpret<sup>(16)</sup>. Health Star Ratings – Australia and New Zealand’s interpretive front-of-pack labelling scheme – is intended to facilitate consumer understanding; however, there has been low uptake of this voluntary system<sup>(17)</sup>. Other countries have overcome such limitations with mandatory warning labels or via policies such as taxes on SSBs<sup>(18,19)</sup>. However, many countries, including Australia, are yet to implement regulatory change despite the need for action to address high rates of overweight and obesity<sup>(20)</sup> and the known contributing factor of high SSB consumption.

To date, most population studies of adult SSB consumers have examined only demographic characteristics as correlates of current consumption, with higher consumption rates among males, younger adults and socioeconomically disadvantaged populations<sup>(21–31)</sup>. While these studies are informative, for behaviour change to occur, it is useful to identify modifiable predictors of SSB consumption that can be targeted through public health interventions. Behavioural intention is an important antecedent to behaviour change, with the intention–behaviour pathway described in multiple theories, including the Theory of Reasoned Action<sup>(32)</sup>, Theory of Planned Behaviour (TPB)<sup>(33)</sup> and the Integrated Model of Behavioural Prediction (IM)<sup>(34)</sup>. While research shows that intentions may be influenced by other cognitive influences and situational cues resulting in an intention–behaviour gap, intentions have been associated with corresponding behaviour in many contexts<sup>(35,36)</sup>.

Studies of adolescents/young people using the TPB have shown that attitudes, subjective norms and/or perceived behavioural control variables were associated with intentions to reduce consumption, which in turn were associated with lower rates of actual consumption<sup>(37–41)</sup>. These studies also showed that more distal variables such as parental discouragement, low availability in the home and opportunity to purchase water instead of SSBs when needed were also associated with change in SSB consumption<sup>(37,39–41)</sup>. Non-TPB variables (takeaway food consumption, availability of soda in home, depression diagnosis and heart disease) were also related to higher SSB consumption in an adult population, with type 2 diabetes related to lower consumption<sup>(31)</sup>. Using the IM, one study found that nutritional knowledge (the only non-demographic predictor) predicted consumption<sup>(42)</sup>. Another study among overweight and obese adults found that perceived behavioural control, environment and intentions had the largest influence on

SSB consumption<sup>(43)</sup>. These theories offer a useful framework to guide an understanding of key influences on behaviour, but the literature suggests that other modifiable factors may be important when targeting health behaviour change.

One such factor is risk perception, acknowledged as a key determinant of behaviour by other well-known behavioural theories, e.g., Health Belief Model (HBM)<sup>(44–46)</sup>. Increasing awareness of health risks is a key strategy used in emerging policy approaches to reduce SSB consumption, with intervention studies showing a reduction in SSB selections following exposure to mass media campaigns<sup>(47–49)</sup> and on-package warning labels<sup>(50)</sup>. Cross-sectional population surveys have also established associations between current consumption and knowledge of health risks<sup>(51–54)</sup> or the healthiness of various beverage types<sup>(55–58)</sup>. However, SSB-related health risk perceptions have not been assessed in population studies in relation to intention to change behaviour. Intention may be overlooked as an intermediary variable in some theories that incorporate risk perceptions as a direct determinant of behaviour (e.g. HBM), and risk perception may be excluded from studies of SSB consumption among younger participants because the health risks are considered too distal to be a predictor<sup>(59)</sup>. Establishing the extent to which risk perception relates to intentions to reduce SSB consumption would add to the evidence of risk perception as a potentially modifiable factor for incorporation into SSB interventions.

In the absence of large longitudinal studies examining the relationship between predictors and behaviour change, examining the intention to change can offer insights into the modifiable factors to increase intentions and potentially assist in reducing the consumption of SSBs. We compiled a list of predictor variables from the literature to test which were more strongly associated with intentions to reduce SSB consumption in a subsample of regular SSB consumers drawn from a nationally representative population survey. Specifically, we tested four sets of variables: (1) demographics, (2) SSB attitudes and behaviour, (3) health risk perceptions and (4) social and environmental exposure.

## Methods

A nationally representative sample of Australian adults ( $\geq 18$  years;  $n$  3430; participant rate = 44 %) was surveyed in 2017 using a computer-assisted telephone interview lasting approximately 20 min. Participants were sourced through random-digit dialling of landline and mobile phones (35:65 split) in accordance with telecommunication use in Australia<sup>(60)</sup>. Full methodological details of the survey are reported elsewhere<sup>(61)</sup>. This study reports on a subsample of 1165 participants who met the following criteria: (1) regularly (at least weekly) consumed either soda, fruit drinks, sports drinks or energy drinks and (2) consumed at least one SSB in the past week.

The self-report questionnaire (see Supplementary Material) included intention to reduce consumption;

**Table 1** Coding of outcome variables from responses to questions about intentions to reduce sugary drink consumption

Question 1: To what extent would you like to reduce the quantity of sugary drinks that you drink? (Response options: 'not at all', 'a little', 'a lot' or 'a great deal')	Question 2: Are you considering drinking less sugary drinks in the next 6 months? (Response options: 'no' or 'yes')	Coded outcome variable: Intention to reduce SSB consumption in the next 6 months
'Not at all'	No	Not likely
'A little', 'a lot' or 'a great deal'	No	Somewhat likely
'A little'	Yes	Somewhat likely
'A lot' or 'a great deal'	Yes	Very likely

demographic and health characteristics (i.e. age, gender, area-level socioeconomic disadvantage (postcode matched to the Index of Relative Socioeconomic Disadvantage based on 2011 Census data<sup>(62)</sup>), BMI, ever received a diagnosis of type 2 diabetes, heart disease, arthritis, depression or lung condition); SSB consumption (i.e. past week and regular SSB consumption, perception of whether amount of SSB consumed is appropriate, habitual consumption and difficulty in reducing consumption); health risk perceptions (i.e. perception of BMI, likelihood of benefitting from reduced consumption and current and future health risks associated with SSB consumption); and social and environmental exposure (i.e. takeaway food consumption, availability of SSBs at home and at others' homes, perceptions of others' SSB consumption and perceived pressure to consume SSBs).

The outcome variable, 'intention to reduce SSB consumption in the next 6 months', was derived from responses to two questions: extent they would like to reduce SSB consumption, and considering drinking less sugary drinks in the next 6 months as described in Table 1. Four sets of predictor variables – (1) demographics, (2) SSB consumption, (3) health risk perceptions and (4) social and environmental exposure – were tested against the outcome variable using nominal logistic regressions. 'Somewhat likely' was used as the reference category (i.e. 'very' *v* 'somewhat' likely and 'not at all' *v* 'somewhat likely' (order reversed to 'somewhat' *v* 'not at all' likely to facilitate interpretation of categories relative to 'somewhat likely')). Each predictor was tested independently of other variables (unadjusted) and in combination with other variables in the same grouping while controlling for demographic characteristics (adjusted). Statistically significant associations were identified using a *P*-value <0.05.

## Results

Demographic characteristics of the participants who were regular SSB consumers are reported in Table 2. Age was evenly distributed, but there were more males than females, and fewer participants in the most socioeconomic disadvantaged deciles than the mid- and least disadvantaged deciles. About one-fifth of participants had ever received a diagnosis of arthritis/gout, depression or a lung condition, but very few had type 2 diabetes or heart disease. These variables were controlled for in the adjusted logistic regression analyses. Regarding the likelihood of reducing

SSB consumption in the next 6 months, 30.1% indicated it was 'not at all' likely, 43.9% indicated it was 'somewhat' likely and 25.2% indicated it was 'very' likely. As shown in Table 2, the variables with the strongest relationship with the likelihood of reducing consumption in bivariate analyses were perceptions about benefitting from reduced consumption, future health risks and current consumption (Cramer's  $V > 0.4$ ).

The nominal logistic regression results are reported in Table 3. The most consistent predictors of intending to reduce consumption (across both unadjusted and adjusted results) were variables relating to the perceptions of SSB consumption and health risks. Specifically, greater intentions to reduce consumption were more likely among those who perceived themselves as consuming too much; that their consumption was habitual; that it would be fairly difficult to reduce consumption; that they would likely benefit from reduced consumption; and that their future health was very much at risk. Furthermore, those who perceived that their future health was very much at risk were 8.07 (95% CI 1.76, 36.95) times more likely to indicate 'somewhat' compared to 'not at all' likely, and 4.06 (95% CI 1.84, 8.95) times more likely to indicate 'very' compared to 'somewhat' likely to reduce consumption.

There were some additional statistically significant associations for predicting the likelihood of reducing consumption, but there was a different set of predictors for indicating moderate *v* high likelihood of change. Based on adjusted ORs, moderate likelihood of change (i.e. 'somewhat' rather than 'not at all') was more common among younger participants, those classified as obese, those consuming 3–6 SSBs in the past week, those consuming soft drinks or fruit juice weekly and those perceiving their future health to be at risk. Conversely, a high likelihood of change (i.e. 'very' rather than 'somewhat') was more common among those without a lung condition diagnosis, classified as obese, perceiving self as overweight and perceiving current health to be at risk. Social and environmental exposure variables had significant bivariate associations with moderate likelihood of change, whereby increased exposure reduced intentions. However, these associations were non-significant in the multivariate analysis.

## Discussion

An intention to drink lesser SSBs was more likely among those who perceived themselves as consuming too much

**Table 2** Sample characteristics by the likelihood of reducing sugary drink consumption in the next 6 months

	Likelihood of reducing sugary drink consumption in the next 6 months				Test of association	
	Overall	Not at all	Somewhat	Very	$\chi^2$	Cramers V†
	%	%	%	%		
Gender					2.65	0.048
Male	61.9	58.4	63.2	63.8		
Female	38.1	41.6	36.8	36.2		
Age					68.92***	0.245
18–30	25.8	15.5	33.0	27.1		
31–45	25.2	24.1	24.3	29.2		
46–60	24.1	22.6	23.3	27.8		
>61	24.1	37.8	19.4	15.8		
Socioeconomic disadvantage					1.34	0.034
Most (decile 1–3)	24.7	26.4	25.1	22.5		
Mid (decile 4–7)	39.1	38.1	39.3	40.3		
Least (decile 8–10)	35.8	35.5	35.6	37.2		
BMI					23.01**	0.100
Don't know	3.9	4.3	3.7	3.1		
Overweight (25.1–29.9)	33.4	35.1	34.8	29.5		
Obese (30–75)	22.3	17.1	20.4	32.2		
Underweight/healthy (up to 25)	40.1	43.4	41.1	35.3		
Ever received a diagnosis of . . .						
Type 2 diabetes	4.8	5.4	3.7	5.8	2.26	0.044
Heart disease	6.9	9.4	5.3	6.1	5.84	0.071
Arthritis or gout	19.4	24.5	15.7	19.8	10.46**	0.095
Depression	20.3	19.7	17.4	26.3	9.17*	0.089
Lung condition (e.g. asthma, COPD)	19.1	17.1	21.7	17.1	3.97	0.059
Sugary drink quantity in the past week					57.02***	0.158
≥7	34.9	29.3	31.3	48.8		
3–6	29.3	23.3	35.2	27.0		
1 or 2	35.3	47.4	33.5	24.2		
Soft drink consumption					40.99***	0.133
Daily	17.7	13.7	16.8	24.2		
Once weekly	48.7	40.7	53.4	50.5		
Once monthly or less	33.6	45.6	29.7	25.3		
Energy drink consumption					27.19***	0.108
Daily	1.8	0.3	1.2	4.1		
Once weekly	6.4	2.8	8.2	7.8		
Once monthly or less	91.8	96.9	90.6	88.1		
Sports drink consumption					4.10	0.042
Daily	1.7	1.4	1.6	2.4		
Once weekly	13.6	11.1	14.5	15.4		
Once monthly or less	84.7	87.5	84.0	82.3		
Fruit juice consumption					3.60	0.056
Daily	22.6	24.8	20.9	22.9		
Once weekly	45.7	42.7	48.5	44.0		
Once monthly or less	31.8	32.5	30.5	33.1		
SSB consumption perception					229.94***	0.447
Too much	39.7	12.6	40.4	71.3		
Not too much	60.2	87.4	59.6	28.7		
Sugary drink consumption is habitual					62.64***	0.233
Agree	49.2	34.3	50.3	65.5		
Do not agree	50.7	65.7	49.7	34.5		
Difficulty reducing consumption					144.93***	0.251
Never intend to stop	6.7	11.7	5.9	1.7		
Fairly	21.8	7.2	21.9	39.9		
Very	5.4	3.4	3.7	10.6		
Not at all	65.8	77.7	68.5	47.8		
BMI perception					33.58***	0.171
Overweight	47.0	41.9	41.9	61.4		
Acceptable weight or underweight	53.0	58.1	58.1	38.6		
Likelihood of benefitting from reduced consumption					294.75***	0.505
Somewhat or very likely	63.4	28.0	73.8	88.7		
Did not indicate likely	36.4	72.0	26.2	11.3		



**Table 2** *Continued*

	Likelihood of reducing sugary drink consumption in the next 6 months				Test of association	
	Overall	Not at all	Somewhat	Very	$\chi^2$	Cramers V†
	%	%	%	%		
Current health at risk					352.44***	0.391
Somewhat	30.1	15.1	40.3	31.1		
Moderately	15.6	5.1	14.1	31.4		
Very much	7.2	1.4	3.1	20.8		
Not at all	46.9	78.3	42.5	16.7		
Future health at risk					438.66***	0.436
Somewhat	33.4	17.4	47.6	28.7		
Moderately	16.6	6.0	17.2	28.7		
Very much	9.4	0.9	3.9	28.7		
Not at all	40.5	75.7	31.3	14.0		
Frequency of past weeks' takeaway food consumption					26.24***	0.151
Not at all	30.0	40.2	25.8	24.2		
≥1 times	70.0	59.8	74.2	75.8		
Availability of soft drinks in the home					10.39*	0.067
Always or almost always	30.6	29.1	29.7	34.2		
Sometimes or seldom	55.0	52.7	58.7	51.7		
Never	14.3	18.2	11.5	14.0		
Availability of fruit juice in the home					2.04	0.030
Always or almost always	55.5	58.4	54.2	54.3		
Sometimes or seldom	37.9	35.0	39.5	39.2		
Never	6.5	6.6	6.3	6.5		
Availability of sugary drinks at others' homes					10.06	0.066
Don't know or not applicable	2.3	3.1	2.0	2.0		
Always or almost always	43.5	40.7	43.4	47.4		
Sometimes or seldom	50.1	50.1	51.9	47.4		
Never	4.0	6.0	2.7	3.1		
Proportion of close friends/family members who consume SSBs at least once weekly					25.73**	0.105
Don't know or not applicable	3.4	6.0	2.7	1.0		
None	4.9	5.7	4.5	3.8		
Some	27.8	31.3	27.6	23.5		
About half	19.4	18.2	19.6	21.2		
Most	28.5	23.4	30.7	31.7		
All of them	16.0	15.4	14.9	18.8		
Agreeing that most people their age drink sugary drinks					24.10***	0.144
Don't agree or don't know	27.1	36.5	23.3	21.5		
Agree strongly or somewhat	72.9	63.5	76.7	78.5		
Agreeing that they should drink SSBs when provided					2.67	0.048
Don't agree or don't know	81.9	83.1	80.0	84.3		
Agree strongly or somewhat	17.9	16.9	20.0	15.7		

Note. \* $P < 0.05$ ; \*\* $P < 0.01$ ; \*\*\* $P < 0.001$ .

†Cramer's V is a measure of effect size for nominal variables that can range between 0 and 1, with values closer to 1 indicating a stronger association.

and to be susceptible to health consequences of overconsumption than those who did not hold these views. While it is unknown whether these intentions would translate into behaviour change, these results suggest that people who consider themselves to benefit from reducing consumption may be most responsive to interventions aimed at encouraging people to consider their personal risk. Furthermore, interventions that successfully highlight adverse consequences of consuming SSBs may be particularly influential in changing consumption intentions among regular SSB consumers. The results also indicate the importance of educating those at risk (high consumers) who do not view their consumption as problematic. High consumers with low intention to change may benefit from interventions/campaigns that communicate

the health risks of consumption, which may lead to the consideration of behaviour change.

These findings are consistent with experimental and field studies showing that exposure to SSB-related health information corresponds with increased perceptions of personal health risks and reduced intentions to select an SSB from a range of drink options<sup>(47-50)</sup>. Similarly, risk perceptions have been linked to intentions and behaviour in other domains, although the direct effects of risk appraisals on behaviour are generally small<sup>(63,64)</sup>. Also noteworthy is that the indirect route of risk perceptions via intentions may have limited impact in real-world settings due to barriers to implementation resulting in an intention-behaviour gap<sup>(35,36)</sup>. Michie *et al.*'s<sup>(65)</sup> framework suggests that three essential

**Table 3** Nominal logistical regression analyses

	Likelihood of reducing sugary drink consumption in the next 6 months										
	Not at all	Somewhat	Very	Somewhat v not at all				Very v somewhat			
	%	%	%	Unadjusted OR		Adjusted OR		Unadjusted OR		Adjusted OR	
Likelihood of reducing consumption in the next 6 months	30.1	43.9	25.2								
Model 1 (demographic and health characteristics only)											
Age (years)											
18–30	18.0	55.7	26.3	4.17	2.78, 6.25***	4.27	2.70, 6.75***	1.01	0.65, 1.57	1.34	0.80, 2.25
31–45	28.8	42.1	29.1	1.96	1.35, 2.86***	1.87	1.22, 2.86**	1.47	0.94, 2.30	1.75	1.06, 2.90
46–60	28.4	42.4	29.1	2.00	1.37, 2.94***	1.94	1.29, 2.93**	1.46	0.93, 2.29	1.59	0.98, 2.58
≥61 (Ref.)	47.8	35.5	16.7	1		1		1		1	
BMI											
Don't know	34.9	44.2	20.9	0.92	0.45, 1.89	1.41	0.64, 3.07	0.96	0.42, 2.20	0.93	0.40, 2.19
Obese (>30)	23.3	40.3	36.4	1.27	0.86, 1.85	1.69	1.12, 2.54*	1.83	1.27, 2.64**	1.66	1.12, 2.46*
Overweight (25.1–29.9)	31.9	45.9	22.3	1.04	0.77, 1.43	1.27	0.91, 1.77	0.99	0.70, 1.40	0.94	0.65, 1.35
Underweight/healthy (≤25) (Ref.)	32.8	45.0	22.2	1		1		1		1	
Ever received a diagnosis of ... (Ref. = no)											
Heart disease	42.3	34.6	23.1	0.54	0.32, 0.91*	0.81	0.46, 1.43	1.17	0.63, 2.17	1.16	0.60, 2.24
Arthritis or gout	38.4	35.7	25.9	0.57	0.41, 0.80**	0.91	0.61, 1.35	1.33	0.92, 1.93	1.36	0.88, 2.08
Depression	29.4	37.9	32.8	0.86	0.61, 1.22	0.81	0.56, 1.17	1.69	1.20, 2.39**	1.58	1.10, 2.27*
Lung condition	27.1	50.2	22.6	1.35	0.95, 1.91	1.31	0.90, 1.89	0.74	0.51, 1.07	0.67	0.46, 0.99*
Model 2 (SSB attitudes and behaviours)†											
Sugary drink quantity in the past week											
≥7	25.2	39.4	35.4	1.52	1.09, 2.08*	1.07	0.70, 1.65	2.15	1.51, 3.08***	1.26	0.81, 1.98
3–6	23.9	52.8	23.3	2.13	1.54, 3.03***	1.61	1.10, 2.36*	1.06	0.72, 1.55	0.81	0.53, 1.23
1 or 2 (Ref.)	40.6	41.9	17.5	1		1		1		1	
Soft drink consumption											
Daily	23.4	42.0	34.6	1.89	1.25, 2.86**	1.39	0.81, 2.41	1.70	1.11, 2.58*	0.81	0.48, 1.39
Once weekly	25.4	48.4	26.2	2.00	1.49, 2.70***	1.83	1.26, 2.66**	1.11	0.79, 1.57	1.00	0.67, 1.50
Once monthly or less (Ref.)	41.5	39.4	19.2	1		1		1		1	
Energy drink consumption											
Daily	5.3	31.6	63.2	4.35	0.53, 33.33	4.66	0.48, 45.26	3.59	1.33, 9.68*	2.21	0.73, 6.71
Once weekly	13.3	56.0	30.7	3.13	1.52, 6.25**	1.76	0.77, 4.04	0.98	0.58, 1.67	0.72	0.39, 1.32
Once monthly or less (Ref.)	32.0	43.6	24.3	1		1		1		1	
Fruit juice consumption											
Daily	33.3	41.0	25.7	0.90	0.62, 1.30	1.45	0.90, 2.33	1.01	0.68, 1.50	0.94	0.59, 1.49
Once weekly	28.5	47.1	24.5	1.20	0.88, 1.67	1.70	1.15, 2.52**	0.84	0.60, 1.16	1.00	0.68, 1.48
Once monthly or less (Ref.)	31.1	42.5	26.4	1		1		1		1	
SSB consumption perception											
Too much	9.6	44.9	45.5	4.76	3.33, 6.67***	3.98	2.65, 5.97***	3.67	2.70, 5.00***	2.82	2.00, 3.98***
Not too much (Ref.)	44.1	43.8	12.1	1		1		1		1	
Sugary drink consumption is habitual											
Agree	21.1	45.2	33.7	1.92	1.47, 2.56***	1.58	1.15, 2.19**	1.88	1.40, 2.53***	1.54	1.10, 2.15*
Do not agree (Ref.)	39.3	43.4	17.3	1		1		1		1	
Difficulty reducing consumption											
Never intend to stop	53.9	39.5	6.6	0.56	0.34, 0.93*	0.43	0.25, 0.77**	0.42	0.16, 1.10	0.32	0.12, 0.87*
Fairly	9.8	44.1	46.1	3.45	2.17, 5.56***	2.44	1.47, 4.07**	2.61	1.89, 3.61***	1.91	1.33, 2.73***
Very	19.4	30.6	50.0	1.22	0.58, 2.56	0.88	0.37, 2.07	4.08	2.23, 7.46***	2.64	1.34, 5.23**
Not at all (Ref.)	35.6	46.0	18.4	1		1		1		1	



**Table 3** *Continued*

	Likelihood of reducing sugary drink consumption in the next 6 months										
	Not at all	Somewhat	Very	Somewhat v not at all				Very v somewhat			
	%	%	%	Unadjusted OR		Adjusted OR		Unadjusted OR		Adjusted OR	
<b>Model 3 (health risk perceptions)†</b>											
BMI perception											
Overweight	27.2	39.6	33.3	1.00	0.76, 1.32	0.99	0.65, 1.51	2.21	1.65, 2.97***	2.42	1.56, 3.75***
Acceptable weight or underweight (Ref.)	33.2	48.4	18.4	1		1		1		1	
Likelihood of benefitting from reduced consumption											
Somewhat or very likely	13.3	51.3	35.4	7.14	5.26, 10.00***	4.85	3.45, 6.81***	2.80	1.85, 4.23***	1.95	1.24, 3.07**
Did not indicate likely (Ref.)	60.1	32.0	7.9	1		1		1		1	
Current health at risk											
Somewhat	15.1	58.9	26.0	5.00	3.45, 7.14***	1.20	0.71, 2.05	1.96	1.32, 2.91**	1.67	0.99, 2.82
Moderately	9.9	39.6	50.5	5.00	2.94, 9.09***	1.58	0.76, 3.30	5.66	3.65, 8.76***	3.50	1.91, 6.42***
Very much	6.1	19.5	74.4	4.00	1.45, 11.11**	0.58	0.16, 2.09	16.88	8.98, 31.76***	5.34	2.35, 12.14***
Not at all (Ref.)	50.7	40.2	9.1	1		1		1		1	
Future health at risk											
Somewhat	15.7	62.6	21.6	6.67	4.76, 9.09***	4.20	2.52, 6.99***	1.35	0.88, 2.06	0.82	0.47, 1.42
Moderately	10.9	45.6	43.5	7.14	4.17, 11.11***	3.80	1.90, 7.64***	3.73	2.36, 5.87***	1.42	0.76, 2.65
Very much	2.8	18.7	78.5	11.11	3.23, 33.33***	8.07	1.76, 36.95**	16.39	9.03, 29.75***	4.06	1.84, 8.95**
Not at all (Ref.)	56.9	34.3	8.8	1		1		1		1	
<b>Model 4 (social and environmental exposure)†</b>											
Frequency of past weeks' takeaway food consumption											
Not at all	41.0	38.4	20.6	0.52	0.39, 0.69***	0.83	0.60, 1.16	0.92	0.66, 1.28	0.96	0.66, 1.38
≥1 times (Ref.)	25.9	46.7	27.4	1		1		1		1	
Availability of soft drinks in the home											
Always or almost always	28.8	42.9	28.2	1.61	1.05, 2.50*	1.39	0.86, 2.24	0.95	0.59, 1.52	0.78	0.47, 1.31
Sometimes or seldom	29.1	47.2	23.7	1.75	1.18, 2.63**	1.39	0.90, 2.13	0.72	0.46, 1.13	0.64	0.40, 1.03
Never (Ref.)	39.0	36.0	25.0	1		1		1		1	
Availability of sugary drinks at others' homes											
Don't know or not applicable	40.7	37.0	22.2	1.37	0.46, 4.00	1.72	0.52, 5.71	0.93	0.25, 3.47	0.96	0.24, 3.89
Always or almost always	28.4	44.0	27.6	2.33	1.15, 4.76*	1.95	0.90, 4.22	0.97	0.41, 2.31	0.89	0.36, 2.22
Sometimes or seldom	30.3	45.7	24.0	2.27	1.12, 4.55*	2.05	0.96, 4.36	0.82	0.34, 1.93	0.80	0.33, 1.97
Never (Ref.)	47.7	31.8	20.5	1		1		1		1	
Agreeing that most people their age drink sugary drinks											
Don't agree or don't know	41.3	38.4	20.3	0.53	0.39, 0.71***	0.85	0.60, 1.22	0.90	0.64, 1.28	0.91	0.61, 1.35
Agree strongly or somewhat (Ref.)	26.4	46.4	27.2	1		1		1		1	

Ref. = reference category.

Note. Variables included in the analysis but results not reported as they were not statistically significant in any of the models: gender; socioeconomic disadvantage; ever had type 2 diabetes; sport drink consumption; availability of juice in the home; proportion of friends consuming sugary drinks; pressure to consume sugary drinks.

\* $P < 0.05$ ; \*\* $P < 0.01$ ; \*\*\* $P < 0.001$ .

†Controlling for demographic and health characteristics: age, gender, socioeconomic disadvantage, BMI, ever have a diagnosis of type 2 diabetes, heart disease, arthritis or gout, depression or lung condition.



conditions are needed for implementing a successful behaviour change: capability, opportunity and motivation. Accordingly, intent is only one component of behaviour change, but this does not diminish its importance when developing public health interventions. Further research is needed to investigate what additional factors will support those intending to reduce their SSB consumption to succeed.

More broadly, for risk perceptions to have any influence, they should be conveyed in a way that limits opportunity for self-exemption, for example, well-designed social marketing campaigns<sup>(47,66)</sup> and factual on-bottle warning labels<sup>(67–73)</sup>. Interventions/campaigns will need to address the self-exemptions that may also arise from people being unclear on what constitutes risky SSB consumption, unaided by the lack of quantified limits in the Australian Dietary Guidelines<sup>(15)</sup>. Qualitative data indicate that Australian consumers' perceptions of excessive consumption vary substantially<sup>(14)</sup>. Moreover, while participants could name the potential health effects associated with SSB consumption, they tended to see these health effects as having low personal relevance and that could be offset by 'balancing' sugary drink consumption with diet and exercise<sup>(14)</sup>. Interventions/campaigns will need to be designed to avoid dismissive reactions to information regarding unhealthy consumption behaviours that are common<sup>(74)</sup> and reinforced by industry marketing practices that downplay the risks<sup>(75)</sup>.

Each of the social and environmental exposure variables differentiated those 'somewhat' from 'not at all' likely to reduce SSB consumption in the bivariate analyses, but not in the multivariate analyses adjusting for demographics. Age remained a significant predictor throughout and so could have masked the relationship due to young adults being both higher SSB consumers and more influenced by social and environmental variables. Relationships between social and environmental variables and a reduction, or intended reduction, in SSB consumption were observed in studies of adolescents and university students<sup>(37,39,40,76)</sup>. Moreover, population-level environmental interventions addressing SSB consumption have been effective<sup>(77)</sup>.

Limitations of the study include the cross-sectional design and self-reported intentions to change. There is a noted intention–behaviour gap<sup>(35,36)</sup>, and therefore, the extent to which intentions translate into behaviour are ultimately unknown in this study. Measures were based on existing literature but were rudimentary (i.e. single-item questions for complex behaviours) due to questionnaire length and telephone survey methodology. Future research would benefit from using validated measurement scales, conducting follow-ups of behaviours and investigating mediators of the relationship between social and environmental factors and SSB consumption, as suggested in the theoretical models of behaviour change. To truly assess the predictors of change in behaviour(s), a longitudinal study is warranted, but was beyond resourcing of the current study. The results may not be generalisable to jurisdictions where population-wide interventions have already been implemented.

Obesity and other health effects associated with SSB consumption are global major burdens of disease. However, many countries have been slow to implement population-wide strategies to reduce consumption. This study showed that those who are aware of the risks and acknowledge that they consume too much have intentions to change. Capitalising on these intentions to facilitate behaviour change is possible through policy reforms that have successfully reduced SSB consumption in other countries (e.g. taxes, warning labels) and would add value to educational approaches that raise the awareness of health risks associated with SSB consumption.

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## Supplementary material

For supplementary material accompanying this paper visit <https://doi.org/10.1017/S1368980021000239>

## References

1. Malik VS, Pan A, Willett WC *et al.* (2013) Sugar-sweetened beverages and weight gain in children and adults: a systematic review and meta-analysis. *Am J Clin Nutr* **98**, 1084–1102.





2. Vartanian LR, Schwartz MB & Brownell KD (2007) Effects of soft drink consumption on nutrition and health: a systematic review and meta-analysis. *Am J Public Health* **97**, 667–675.
3. Te Morenga L, Mallard S & Mann J (2012) Dietary sugars and body weight: systematic review and meta-analyses of randomised controlled trials and cohort studies. *BMJ* **346**, e7492.
4. Malik VS, Popkin BM, Bray GA *et al.* (2010) Sugar-sweetened beverages and risk of metabolic syndrome and type 2 diabetes: a meta-analysis. *Diabetes Care* **33**, 2477–2483.
5. Bernabe E, Vehkalahti MM, Sheiham A *et al.* (2014) Sugar-sweetened beverages and dental caries in adults: a 4-year prospective study. *J Dent* **42**, 952–958.
6. Sohn W, Burt BA & Sowers MR (2006) Carbonated soft drinks and dental caries in the primary dentition. *J Dent Res* **85**, 262–266.
7. Van Rompay MI, McKeown NM, Goodman E *et al.* (2015) Sugar-sweetened beverage intake is positively associated with baseline triglyceride concentrations, and changes in intake are inversely associated with changes in HDL cholesterol over 12 months in a multi-ethnic sample of children. *J Nutr* **145**, 2389–2395.
8. Te Morenga LA, Howatson AJ, Jones RM *et al.* (2014) Dietary sugars and cardiometabolic risk: systematic review and meta-analyses of randomized controlled trials of the effects on blood pressure and lipids. *Am J Clin Nutr* **100**, 65–79.
9. Micha R, Peñalvo JL, Cudhea F *et al.* (2017) Association between dietary factors and mortality from heart disease, stroke, and type 2 diabetes in the United States. *JAMA* **317**, 912–924.
10. Hu FB & Malik VS (2010) Sugar-sweetened beverages and risk of obesity and type 2 diabetes: epidemiologic evidence. *Physiol Behav* **100**, 47–54.
11. Popkin BM & Hawkes C (2016) Sweetening of the global diet, particularly beverages: patterns, trends, and policy responses. *Lancet Diabetes Endocrinol* **4**, 174–186.
12. World Health Organization (2015) *Guideline: Sugars Intake for Adult and Children*. Geneva: WHO.
13. Welsh JA, Lundeen EA & Stein AD (2013) The sugar-sweetened beverage wars: public health and the role of the beverage industry. *Curr Opin Endocrinol Diabetes Obes* **20**, 401–406.
14. Miller C, Braunack-Mayer A, Wakefield M *et al.* (2019) “When we were young, it really was a treat; now sugar is just the norm every day” – a qualitative study of parents’ and young adults’ perceptions and consumption of sugary drinks. *Health Promot J Austr* **31**, 47–57.
15. National Health and Medical Research Council (2013) *Australian Dietary Guidelines*. Canberra: NHMRC.
16. Rothman RL, Housam R, Weiss H *et al.* (2006) Patient understanding of food labels. *Am J Prev Med* **31**, 391–398.
17. Brownbill AL, Braunack-Mayer A & Miller C (2019) Health star ratings: what’s on the labels of Australian beverages? *Health Promot J Austr* **30**, 114–118.
18. Backholer K, Blake M & Vandevijvere S (2017) Sugar-sweetened beverage taxation: an update on the year that was 2017. *Public Health Nutr* **20**, 3219–3224.
19. FAO (2018) *La Ley Chilena De Etiquetado De Alimentos (The Chilean Food Labelling Law)*. Rome, Italy: FAO.
20. Australian Institute of Health and Welfare (2017) *A Picture of Overweight and Obesity in Australia 2017. Cat. No. PHE 216*. Canberra: AIHW.
21. Australian Bureau of Statistics (2018) *National Health Survey: First Results, 2017–18. 4364.0.55.001*. Canberra: ABS.
22. Australian Bureau of Statistics (2015) *Australian Health Survey: Nutrition First Results – Foods and Nutrients, 2011–12. Consumption of Sweetened Beverages*. Canberra: ABS.
23. Pennay A, Cheetham A, Droste N *et al.* (2015) An examination of the prevalence, consumer profiles, and patterns of energy drink use, with and without alcohol, in Australia. *Alcohol Clin Exp Res* **39**, 1485–1492.
24. Pollard CM, Meng X, Hendrie GA *et al.* (2016) Obesity, socio-demographic and attitudinal factors associated with sugar-sweetened beverage consumption: Australian evidence. *Aust N Z J Public Health* **40**, 71–77.
25. French S, Rosenberg M, Wood L *et al.* (2013) Soft drink consumption patterns among Western Australians. *J Nutr Educ Behav* **45**, 525–532.
26. Han E & Powell LM (2013) Consumption patterns of sugar-sweetened beverages in the United States. *J Acad Nutr Diet* **113**, 43–53.
27. Rivard C, Smith D, McCann SE *et al.* (2012) Taxing sugar-sweetened beverages: a survey of knowledge, attitudes and behaviors. *Public Health Nutr* **15**, 1355–1361.
28. Paulsen M, Myhre J & Andersen L (2016) Beverage consumption patterns among Norwegian adults. *Nutrients* **8**, 561.
29. Drewnowski A & Rehm CD (2015) Socioeconomic gradient in consumption of whole fruit and 100 % fruit juice among US children and adults. *Nutr J* **14**, 3.
30. Park S, Onufrak S, Blanck HM *et al.* (2013) Characteristics associated with consumption of sports and energy drinks among US adults: national Health Interview Survey, 2010. *J Acad Nutr Diet* **113**, 112–119.
31. Miller C, Ettridge K, Wakefield M *et al.* (2020) Consumption of sugar-sweetened beverages, juice, artificially-sweetened soda and bottled water: an Australian population study. *Nutrients* **12**, 817.
32. Fishbein M & Ajzen I (1975) *Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research*. MA: Addison-Wesley.
33. Ajzen I (1991) The theory of planned behavior. *Organ Behav Hum Decis Process* **50**, 179–211.
34. Fishbein M (2008) A reasoned action approach to health promotion. *Med Decis Making* **28**, 834–844.
35. Papias EK (2017) Situating interventions to bridge the intention-behaviour gap: a framework for recruiting nonconscious processes for behaviour change. *Soc Personal Psychol Compass* **11**, e12323.
36. Sheeran P & Webb TL (2016) The intention-behavior gap. *Soc Personal Psychol Compass* **10**, 503–518.
37. Riebl SK, MacDougall C, Hill C *et al.* (2016) Beverage choices of adolescents and their parents using the theory of planned behavior: a mixed methods analysis. *J Acad Nutr Diet* **116**, 226–239.
38. Mousavi SM, Sharafkhani N, Didarloo P *et al.* (2019) Using the theory of planned behavior to explain intent to consume sugar-sweetened beverages among secondary school students. *Int J Pediatr* **7**, 9413–9422.
39. Ezendam NPM, Evans AE, Stigler MH *et al.* (2010) Cognitive and home environmental predictors of change in sugar-sweetened beverage consumption among adolescents. *Br J Nutr* **103**, 768–774.
40. Deliens T, Clarys P, De Bourdeaudhuij I *et al.* (2015) Correlates of university students’ soft and energy drink consumption according to gender and residency. *Nutrients* **7**, 6550–6566.
41. Sharma M, Catalano HP, Nahar VK *et al.* (2017) Applying Multi-Theory Model (MTM) of health behavior change to predict water consumption instead of sugar-sweetened beverages. *J Res Health Sci* **17**, e00370.
42. Gase LN, Robles B, Barragan NC *et al.* (2014) Relationship between nutritional knowledge and the amount of sugar-sweetened beverages consumed in Los Angeles County. *Health Educ Behav* **41**, 431–439.
43. Collado-Rivera M, Branscum P, Larson D *et al.* (2018) Evaluating the determinants of sugary beverage consumption among overweight and obese adults: an application of the integrative model of behavioural prediction. *Health Educ J* **77**, 109–125.

44. Rosenstock IM (1974) Historical origins of the health belief model. *Health Educ Monogr* **2**, 328–335.
45. Rogers RW (1975) A protection motivation theory of fear appeals and attitude change. *J Psychol* **91**, 93–114.
46. Ferrer RA, Klein WMP, Persoskie A *et al.* (2016) The tripartite model of risk perception (TRIRISK): distinguishing deliberative, affective, and experiential components of perceived risk. *Ann Behav Med* **50**, 653–663.
47. Morley BC, Niven PH, Dixon HG *et al.* (2018) Controlled cohort evaluation of the LiveLighter mass media campaign's impact on adults' reported consumption of sugar-sweetened beverages. *BMJ Open* **8**, e019574.
48. Kite J, Gale J, Grunseit A *et al.* (2018) Impact of the Make Healthy Normal mass media campaign (Phase 1) on knowledge, attitudes and behaviours: a cohort study. *Aust N Z J Public Health* **42**, 269–276.
49. Boles M, Adams A, Gredler A *et al.* (2014) Ability of a mass media campaign to influence knowledge, attitudes, and behaviors about sugary drinks and obesity. *Prev Med* **67**, Suppl. 1, S40–S45.
50. Grummon AH & Hall MG (2020) Sugary drink warnings: a meta-analysis of experimental studies. *PLoS Med* **17**, e1003120.
51. Rampersaud GC, Kim H, Gao Z *et al.* (2014) Knowledge, perceptions, and behaviors of adults concerning nonalcoholic beverages suggest some lack of comprehension related to sugars. *Nutr Res* **34**, 134–142.
52. Park S, Onufrak S, Sherry B *et al.* (2014) The relationship between health-related knowledge and sugar-sweetened beverage intake among US adults. *J Acad Nutr Diet* **114**, 1059–1066.
53. Lundeen EA, Park S, Onufrak S *et al.* (2018) Adolescent sugar-sweetened beverage intake is associated with parent intake, not knowledge of health risks. *Am J Health Promot* **32**, 1661–1670.
54. Park S, Lundeen EA, Pan L *et al.* (2017) Impact of knowledge of health conditions on sugar-sweetened beverage intake varies among US adults. *Am J Health Promot* **32**, 1402–1408.
55. Thomson N, Worsley A, Wang W *et al.* (2017) Country context, personal values and nutrition trust: associations with perceptions of beverage healthiness in five countries in the Asia Pacific region. *Food Qual Prefer* **60**, 123–131.
56. Kim H & House L (2014) Linking consumer health perceptions to consumption of nonalcoholic beverages. *Agric Resour Econ Rev* **43**, 165901.
57. Bucher T & Siegrist M (2015) Children's and parents' health perception of different soft drinks. *Br J Nutr* **113**, 526–535.
58. Munsell CR, Harris JL, Sarda V *et al.* (2016) Parents' beliefs about the healthfulness of sugary drink options: opportunities to address misperceptions. *Public Health Nutr* **19**, 46–54.
59. Zhang C-Q, Wong MC-Y, Zhang R *et al.* (2019) Adolescent sugar-sweetened beverage consumption: an extended Health Action Process Approach. *Appetite* **141**, 104332.
60. Australian Communications and Media Authority (2017) *Communications Report 2015–16*. Canberra: Australian Government.
61. Miller C, Dono J, Wakefield M *et al.* (2019) Are Australians ready for warning labels, marketing bans and sugary drink taxes? Two cross-sectional surveys measuring support for policy responses to sugar-sweetened beverages. *BMJ Open* **9**, e027962.
62. Australian Bureau of Statistics (2011) *Census of Population and Housing: Socio-Economic Indexes for Areas (SEIFA), Australia; Cat. No. 2033.0.55.001*. Canberra: ABS.
63. Brewer NT, Chapman GB, Gibbons FX *et al.* (2007) Meta-analysis of the relationship between risk perception and health behavior: the example of vaccination. *Health Psychol* **26**, 136–145.
64. Sheeran P, Harris PR & Epton T (2014) Does heightening risk appraisals change people's intentions and behavior? A meta-analysis of experimental studies. *Psychol Bull* **140**, 511–543.
65. Michie S, van Stralen MM & West R (2011) The behaviour change wheel: a new method for characterising and designing behaviour change interventions. *Implement Sci* **6**, 42.
66. Robles B, Blitstein JL, Lieberman AJ *et al.* (2015) The relationship between amount of soda consumed and intention to reduce soda consumption among adults exposed to the Choose Health LA 'Sugar Pack' health marketing campaign. *Public Health Nutr* **18**, 2582–2591.
67. Acton RB & Hammond D (2018) The impact of price and nutrition labelling on sugary drink purchases: results from an experimental marketplace study. *Appetite* **121**, 129–137.
68. Billich N, Blake MR, Backholer K *et al.* (2018) The effect of sugar-sweetened beverage front-of-pack labels on drink selection, health knowledge and awareness: an online randomised controlled trial. *Appetite* **128**, 233–241.
69. Blake MR, Lancsar E, Peeters A *et al.* (2018) The effect of sugar-sweetened beverage price increases and educational messages on beverage purchasing behavior among adults. *Appetite* **126**, 156–162.
70. Bollard T, Maubach N, Walker N *et al.* (2016) Effects of plain packaging, warning labels, and taxes on young people's predicted sugar-sweetened beverage preferences: an experimental study. *Int J Behav Nutr Phys Act* **13**, 95.
71. Donnelly GE, Zatz LY, Svirsky D *et al.* (2018) The effect of graphic warnings on sugary-drink purchasing. *Psychol Sci* **29**, 1321–1333.
72. Roberto CA, Wong D, Musicus A *et al.* (2016) The influence of sugar-sweetened beverage health warning labels on parents' choices. *Pediatrics* **137**, 131.
73. VanEpps EM & Roberto CA (2016) The influence of sugar-sweetened beverage warnings: a randomized trial of adolescents' choices and beliefs. *Am J Prev Med* **51**, 664–672.
74. van 't Riet J & Rutter RAC (2013) Defensive reactions to health-promoting information: an overview and implications for future research. *Health Psychol Rev* **7**, S104–S136.
75. The Public Health Advocacy Institute (PHAI) (2017) PHAI Joins Center for Science in the Public Interest in Filing Lawsuit Against Coca-Cola for Deceptive Marketing. <https://www.phaionline.org/2017/01/04/phai-joins-center-for-science-in-the-public-interest-in-filing-lawsuit-against-coca-cola-for-deceptive-marketing/> (accessed September 2019).
76. Gregorio-Pascual P & Mahler HIM (2020) Effects of interventions based on the theory of planned behavior on sugar-sweetened beverage consumption intentions and behavior. *Appetite* **145**, 104491.
77. von Philipsborn P, Stratil JM, Burns J *et al.* (2019) Environmental interventions to reduce the consumption of sugar-sweetened beverages and their effects on health. *Cochrane Database of Syst Rev* **6**, 1465–1858.