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Are perceptions of government intervention for prevention different by gender and age? Results from the AUStralian Perceptions Of Prevention Survey (AUSPOPS)

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ABSTRACT

Objectives: Understanding public opinion and community attitudes is needed to help the implementation of chronic disease prevention policies that are acceptable to the population. The AUStralian Perceptions Of Prevention Survey ('AUSPOPS') is a national survey designed to provide evidence on the views of Australians regarding government intervention for prevention. However there is limited evidence whether age and gender have modifying effects on attitudes about prevention.

Methods: Using results from the 2018 AUSPOPS dataset, this study examines whether the effect of age on attitudes about prevention is modified by the effect of gender. Survey questions included views about statements for government intervention and whether government had gone far enough for thirteen different preventive interventions.

Results: 2601 Australian residents aged 18 years or older participated in the survey (response rate 16.7%). Results showed strong support for prevention framed as a shared responsibility between governments and individuals. Interventions where >50% of respondents felt the government had not gone far enough in prevention were restricting unhealthy food advertising for children and setting salt limits on processed food. There were significant age by gender interactions in a small number ($n = 4$) of questions examining support for government intervention for prevention, suggesting young men were least in favour of more action by government.

Conclusions: There is general support in the Australian community for government intervention for prevention. Policymakers could capitalize on this sentiment by prioritizing policies with high levels of support across all groups, and target population subgroups on issues where acceptability appears to be heterogenous.

1. Introduction

Chronic, non-communicable diseases are costly, highly prevalent conditions that contribute significantly to poor health and morbidity and cause 73.4% of deaths worldwide (Bennett et al., 2018; Roth et al., 2018). Prevention of chronic disease is a key public health priority for many countries including Australia (Australian Institute of Health and Welfare, 2016). One barrier to implementation of effective preventive policies and regulations by governments is low public acceptability of those policies (Diepeveen et al., 2013; Reynolds et al., 2020). Though understanding public opinion and acceptability of chronic disease prevention is crucial to policy and decision making, only one systematic review has been published on public opinion and attitudes regarding preventive health behaviors and interventions (Diepeveen et al., 2013). This review noted the majority of the opinion literature in prevention was from North America, United Kingdom or Europe, with a much smaller number of studies from an Australian or New Zealand context. The AUStralian Perceptions Of Prevention Survey ('AUSPOPS') was designed to address a gap in knowledge and inform Australian policymakers on the levels of community support for government intervention

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for prevention. Results from the previous survey and focus groups indicated support for both government and individual responsibility for health, and that community perceptions of prevention were more complex than were generally presented (Grunseit et al., 2018).

Currently there is a paucity of research examining the opinions of different groups in Australia towards government intervention for chronic disease prevention as well as the acceptability of specific preventive interventions. Identifying which specific groups in the Australian population are more supportive of policies and action by government in the prevention of chronic disease is important to develop appropriate messages for policy reform and implementation (Miller et al., 2019). In the Australian population, factors that have been shown to correlate with attitudes about prevention include health behavior, such as smoking status (Carter and Chapman, 2006; Hayes et al., 2014; Purcell et al., 2020) or transport use (Rissel et al., 2018), knowledge about health risks (Watson et al., 2017), socioeconomic status (Farrell et al., 2016; Morley et al., 2012), parental status (Morley et al., 2012), education level (Grunseit et al., 2018), gender (Farrell et al., 2019; Jongenelis et al., 2019; Miller et al., 2019; Sainsbury et al., 2018) and age (Howse et al., 2017; Jongenelis et al., 2019; Miller et al., 2019; Sainsbury et al., 2018).

The available international evidence generally indicates a positive relationship between older age or female gender, and more support for regulatory policies and interventions (Diepeveen et al., 2013). This has been found in relation to alcohol control in the UK (Li et al., 2017), physical activity (Yun et al., 2018) and nutrition policies in Canada (Bhawra et al., 2018) and healthy eating policies in Europe (Mazzocchi et al., 2015). This evidence also shows more of a constant relationship regarding the effect of gender on opinions, and some conflicting evidence in regards to age (Beeken and Wardle, 2013; Morain and Mello, 2013). Among the few studies in Australia which have separately investigated age and gender, findings are also somewhat mixed. In the 2016 AUSPOPS, older adults were less supportive of prevention generally, but when asked about specific interventions, they felt government did not go far enough (Grunseit et al., 2018). Different results from two Australian surveys about sugar-sweetened beverage regulation exemplify the conflicting findings with respect to age. One survey, conducted in a university setting, found that younger adults (18–30 years of age) were less supportive of environment-centered, low agency policies addressing sugary drink consumption compared to those aged over 30 years (Howse et al., 2017). In contrast, two other surveys conducted in the broader Australian population found younger adults (18–30 years) were more likely to support a tax on sugary drinks to fund obesity prevention (Miller et al., 2019; Sainsbury et al., 2018), while older adults supported graphic warning labels for sugar-sweetened beverages and favored initiatives aimed at children (Miller et al., 2019). Surveys have demonstrated more support among older adults for policies such as banning unhealthy food advertising and taxing unhealthy foods (Watson et al., 2017), and traffic calming measures to support physical activity and transport (Rissel et al., 2018). Other Australian evidence indicates a relationship between increasing age and greater support for alcohol control policies (Callinan et al., 2014), and e-cigarette prohibition (Jongenelis et al., 2019). However, given the heterogeneity in study characteristics, the types of survey questions, participant sampling and study settings, it is difficult to determine whether the conflicting findings can be explained by sample or methodological differences, or on the topic or issue surveyed, or a combination of these. Framing of survey questions could be important, given some Australian studies have found support for a tax on sugary drinks when it was framed in different ways (eg. hypothecated tax to support obesity prevention measures) (Morley et al., 2012; Scully et al., 2017).

The literature from Australia on gender and views about prevention policies and government intervention is more consistent than for age. In Australia, women are more likely than men to demonstrate support for preventive policy actions such as sugar-sweetened beverage regulation (Miller et al., 2019), obesity prevention (Farrell et al., 2019; Sainsbury et al., 2018), alcohol control policies (Callinan et al., 2014), food regulation (Pollard et al., 2013; Sainsbury et al., 2018), and e-cigarette regulation (Jongenelis et al., 2019). By comparison, male respondents express greater opposition to policies on risk factors such as obesity and poor diet. Men are less likely than women to consider interventions such as government regulation on food advertising important (Pollard et al., 2013) and are less likely to support taxation of unhealthy foods (Farrell et al., 2019). The 2016 AUSPOPS indicated a similar trend, with men significantly more likely than women to agree that government interferes too much in people's daily lives, with women more likely to agree there was not enough government regulation in place to help maintain people's health (Grunseit et al., 2018). In contrast Rissel et al. (2018) found no independent effect of gender on support for active transport policies. However, there is no evidence whether perceptions of prevention among men and women are modified by age.

For governments to better facilitate the introduction of policy change for prevention of chronic disease, they must consider the different levels of acceptability of government intervention across subpopulations. Given the evidence that both age and gender are important demographic characteristics by which opinions vary, further investigation is needed to determine whether the gender differences observed are stable regarding age, on both general attitudes to government intervention as well as on attitudes to specific interventions. This study examined whether the effect of age on attitudes modifies the effect of gender, using results from the 2018 AUSPOPS dataset to investigate the following research questions:

1. What is the association between age, gender and community attitudes towards government intervention for prevention?
2. Are there identifiable patterns in the types of specific interventions (i.e. target issue, intervention mechanism) and level of support demonstrated by participants, based on age and/or gender?

2. Methods

2.1. Study design

Data were from a 15-min cross-sectional survey (AUSPOPS) conducted in October–December 2018. In the context of limited previous empirical studies, the survey questionnaire was based on a number of questions used previously in a government survey (Social Research Centre, 2011), formative research using focus group discussions (Grunseit et al., 2018) and a process of feedback with key policy partners in government in Australia who provided suggestions for the types of questions and areas covered in the survey. The questions underwent cognitive testing and pilot testing with a sample from the target population ($n = 31$), with minor question order and wording changes as a result. Additional questions were included for the 2018 survey based on the 2016 analyses (Grunseit et al., 2018) and input from Australian policymakers and practitioners working in the prevention field.

2.2. Questionnaire

A copy of the 2018 survey questionnaire is provided (Appendix A).

General attitudes to prevention were measured by asking the question "In general, do you think Australia has too much, too little or about right amount of government regulation and policies in place to help people be healthy?" (E3, Appendix A). The response options were "too much", "about the right amount" and "not enough".

Views about government regulation were canvassed using a group of eight statements which reflected government intervention as interfering (Jochelson, 2006), paternalistic (Hoek, 2015; Magnusson, 2015) or protective (Calman, 2009). Four of these statements were generated from the previous AUSPOPS analysis and were designed to examine perceptions of alternative conceptualizations of government intervention including shared responsibility, 'nanny state', and prevention as an

investment (Grunseit et al., 2018). Respondents were asked "People in our society often disagree about how far to let individuals go in making decisions for themselves. Do you agree or disagree with the following statements?" (E5, Appendix A). Respondents' level of agreement with these eight statements was measured on a 5-point Likert scale comprising "strongly disagree", "disagree", "neither agree nor disagree", "agree", and "strongly agree".

Respondents were also asked for their views about 13 specific existing and hypothetical policy measures to help Australians be healthy. Respondents were asked "For each of the following government initiatives, please tell me whether you think it shows the government going too far, not far enough or having about the right amount of involvement in helping people be healthy?" (E2, Appendix A). Responses were whether it showed government involvement was "going too far", "about the right amount" or "not far enough".

2.3. Recruitment of participants

Respondents were obtained using a commercial sample provider via Random Digit Dialing covering both landline and mobile phone populations and using dual-frame sampling (Hu et al., 2011; McMillen et al., 2015). For the landline sample, respondent selection was the person in the household aged 18 years or older who had the 'next birthday'. For the mobile sample, the person who answered was asked to participate. Ethics approval was obtained from the University of Sydney, approval #2016/141.

2.4. Data treatment

Age and gender were the two main independent variables of interest for this study. Age was collected as a continuous variable and recoded for analysis as a dichotomous categorical variable (18 < 35 years; ≥35 years). The cut-point for age corresponds to changes in personal risk for chronic disease after 35 years (Nichols et al., 2016) and differences in life stages throughout younger and older adulthood i.e. further study, work, child-rearing (Laska et al., 2016; Partridge et al., 2018).

For the question asking about general attitudes to prevention, the response categories for the question regarding the acceptable amount of government regulation for health were not collapsed for analysis.

For the question regarding different conceptualizations of regulation for health, the response categories for "strongly disagree/disagree/" and "neither agree nor disagree" (neutral) were combined to form a dichotomous response to compare with the "agree/strongly agree" response. This approach was used to identify the proportion of respondents who were outright supportive of the statement.

For the thirteen policy options, the categories of "going too far" and "about the right amount" were also combined in order to compare these respondents to those who responded "not far enough".

2.5. Data analysis

Data were weighted for age, gender, state and region (capital city/non-capital city), education, country of birth and telephony status (landline only, mobile only, landline and mobile user). These were derived from figures published by the Australian Bureau of Statistics (2015, 2018a) and the Australian Communications and Media Authority (2017).

Pearson's Chi-square test was used to examine bivariate associations of the two independent variables (age and gender), and percentage agreement or support for further government action on the general and specific intervention perception outcomes. Multivariable adjusted analyses were conducted using generalized linear models using a binomial distribution and a log link to analyze the association between age and gender adjusted for one another, education and area level socioeconomic status, as these factors have been shown to be associated with attitudes towards prevention previously (Diepeveen et al., 2013). We also included an age by gender interaction term to examine for moderation effects. If the interaction term was not significant at $p = 0.10$, the model was re-run without it. Results are reported as adjusted prevalence ratios with 95% confidence intervals. Other than for the interaction term, a 5% threshold for statistical significance was used. All analyses were performed using STATA (version 15.1).

3. Results

3.1. Sample characteristics

The total number of participants was 2601. The total response rate was 16.7% based on the AAPOR Response Rate 3 (The American Association for Public Opinion Research, 2016).

Table 1 shows the demographic characteristics of the sample.

3.2. General attitudes towards government regulation for health

Most participants said there was either the right amount (40.4%) or not enough (50.4%) government regulation to help people be healthy, while the remaining 9.2% said there was too much regulation. However, the distribution differed significantly by age and gender. Younger adults, compared with older adults, were more likely to respond that Australia does not have enough government regulation and policies for people to be healthy, according to adjusted prevalence ratios (APR = 0.83, 95% CI 0.74, 0.94). Women compared to men were also more likely to respond there was not enough regulation for health (APR = 1.12, 95% CI = 1.01, 1.24).

3.3. Agreement with statements regarding government intervention for prevention

Table 2 shows the bivariate and multivariable analysis of proportions

Table 1
Survey characteristics (unweighted) ($n = 2601$).

Characteristic	n	%
Gender		
Male	1237	47.6
Female	1364	52.4
Age		
18 < 35 yrs	429	16.5
35 < 55 yrs	738	28.4
≥55 yrs	1432	55.1
Country of birth		
English speaking country	2183	84.0
Non English-speaking country	415	16.0
Language spoken at home		
English	2266	87.1
Other language	335	12.9
Indigenous status		
Non-Indigenous	2536	97.9
Aboriginal and/or Torres Strait Islander	54	2.1
Employment status		
Employed	1343	51.8
Unemployed	72	2.8
Retired/pension	957	36.9
Student	108	4.2
Home duties	85	3.3
Other	29	1.1
Highest level of education completed		
High school or lower	832	32.8
Post-secondary	822	32.4
University degree	883	34.8
Income support or pension status		
No	1724	66.6
Income support or pension	864	33.4
Private health insurance status		
No	1012	39.1
Private health insurance	1578	60.9

Table 2
Bivariate and multivariable analysis of proportions and adjusted prevalence ratios (APR) by age and gender of agreement with statements regarding government intervention for prevention.

	Bivariate analysis							Multivariable analysis		
	Total	Age			Gender			Age (ref: 18 < 35)	Gender (ref: Male)	Interaction age*gender
Statements regarding government intervention for prevention	'Agree' (%)	18 < 35 yrs. (%)	≥35 yrs. (%)	*p*-value	Male (%)	Female (%)	p-value	APR (95%CI)	APR (95% CI)	APR (95%CI)
E5.a "sometimes government needs to make laws that keep people from harming themselves"	81.1	84.1	79.7	0.085	79.6	82.4	0.170	0.95 (0.90, 1.00)	1.03 (0.98, 1.08)	Not significant
E5.b "the government interferes far too much in our everyday lives"	42.8	41.5	43.4	0.528	49.2	36.7	<0.001	1.08 (0.93, 1.26)	0.76 (0.67, 0.86)	Not significant
E5.c "It's not the government's business to try to protect people from themselves"	44.9	37.9	48.1	<0.001	46.9	42.9	0.123	1.25 (1.07, 1.46)	0.93 (0.83, 1.04)	Not significant
E5.d "government should put limits on the choices individuals can make so they don't get in the way of what's good for society"	40.0	40.6	39.7	0.777	40.0	39.9	0.958	1.17 (0.93, 1.46)	1.24 (0.94, 1.62)	0.73 (0.54, 0.99)
E5.e "maintaining the community's health requires a combination of both government regulation and personal responsibility."	92.7	93.7	92.3	0.356	91.9	93.4	0.232	1.02 (0.97, 1.08)	1.06 (1.00, 1.12)	0.94 (0.88, 1.01)
E5.f "limiting the advertising and sale of unhealthy products make it easier for people to make healthy choices."	78.9	78.3	79.1	0.728	77.4	80.3	0.183	1.00 (0.94, 1.06)	1.03 (0.98, 1.08)	Not significant
E5.g "it is not worth spending money on prevention because people will do what they want anyway"	39.9	34.5	42.4	0.010	41.6	38.1	0.163	1.22 (1.03, 1.44)	0.98 (0.87, 1.11)	Not significant
E5.h "government regulation on health has made Australia a nanny state."	37.8	37	38.2	0.706	40.4	35.3	0.046	1.02 (0.87, 1.20)	0.90 (0.79, 1.03)	Not significant

and adjusted prevalence ratios (APR) by age and gender of agreement with statements regarding government intervention for prevention. APRs for the main effects of gender and age were considered significant at $p < 0.05$, and at $p < 0.10$ for the age by gender interaction term.

The statement with the highest level of agreement from the sample was maintaining the community's health was a shared responsibility between government and individuals (92.7%). Other statements showing high levels of agreement included (E5.a) governments setting limits in order to protect people from themselves (81.1%) and (E5.f) limiting advertising and sale of unhealthy products to help people to make healthier choices (78.9%). Statements with lower levels of agreement were (E5.h) those that implied regulation had made Australia a nanny state (37.8%), (E5.g) that prevention was not worth spending money on (39.9%) and (E5.d) individuals' choices should be limited to benefit society (40.0%).

The bivariate analyses (Table 2) suggested that a greater proportion of men compared to women agreed with perception of government intervention as interfering (49.2% men v 36.7% women). Older adults were also more likely than younger adults to agree with the statements "It's not the government's business to try to protect people from themselves" (E5.c) (48.1% older v 37.9% younger) and "It is not worth spending money on prevention because people will do what they want anyway" (E5.g) (42.4% older v 34.5% younger).

In the multivariable analyses (Table 2), there was a significant interaction between age and gender for putting limits on individuals' choices for the good of society (E5.d) (APR = 0.73, 95% CI 0.54, 0.99), and for shared responsibility (E5.e) (APR = 0.94, 95% CI 0.88, 1.01). As may be seen by Fig. 1a and b, women's agreement with the statement tended to diminish with age, while men's agreement increased with age. However, post-estimation simple effects testing (data not shown) indicated that only women for statement E5.e showed a marginally significant change in the likelihood of agreement by age (APR = 0.97, 95% CI 0.93, 1.00) (Fig. 1b). Overall these results indicate that men and women were more likely to respond in similar ways in the older age group compared to the men and women in the younger adult age group.

3.4. Attitudes regarding specific interventions for prevention

Table 3 shows the bivariate and multivariable analysis of adjusted effects of age and gender for attitudes to specific interventions for prevention. In the multivariable analysis, the threshold for statistical significance for main effects was $p = 0.05$ and for interaction terms was $p = 0.10$.

The two interventions for which most respondents believed that government had not gone far enough were (E2.d) restricting the advertising of unhealthy foods to children (58.6% 'not far enough') and (E2.h) setting salt limits on processed food (50.5%). By comparison, much smaller proportions of respondents said that the government had not gone far enough in terms of (E2.c) lower speed limits of 30 km/h. in high pedestrian areas (17.9%) and (E2.k) laws setting limits on working hours (25.5%). This suggests that most respondents thought there was enough or too much involvement by government in these proposed areas of intervention.

In the bivariate analysis (Table 3), for nine of the thirteen interventions young adults were significantly less likely than older adults to answer that government had not gone far enough. This was particularly the case for (E2.f) a tax on soft drink ('not far enough': young adults 32.9% v older adults 49.0%), and (E2.p) banning venues with an alcohol license from selling cigarettes (young adults 20.6% v older adults 39.0%). Men were less likely than women to indicate that government needed to do more on seven of the 13 interventions. For two interventions were men more likely than women to believe that government had not gone far enough: (E2.b) bans on smoking in cars with children ('not far enough': men 49.4% v women 47.9%); and (E2.j) compulsory immunization at school entry (men 31.9% v women 30.7%).

In the multiple variable analyses (Table 3), two interventions showed a significant interaction effect between age and gender: removing unhealthy food advertising from public places (E2.m) (APR = 0.61, 0.43, 0.86) and banning licensed venues from selling cigarettes (E2.p) (APR = 0.57, 95% CI 0.35, 0.91). For statement E2.m, although post-estimation simple effects testing (data not shown) showed the incremental effect of

Figure 1a. Marginal probabilities by age and gender of agreeing with statement E5.d (government putting limits on individuals' choices)

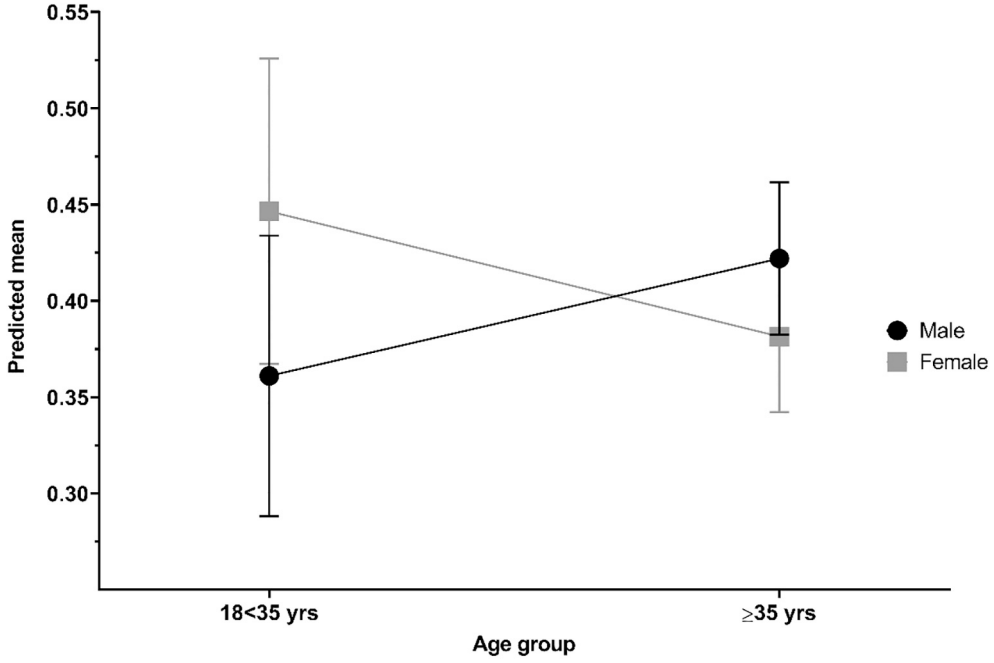

Figure 1b. Marginal probabilities by age and gender of agreeing with statement E5.e (shared responsibility for health between government and individuals)

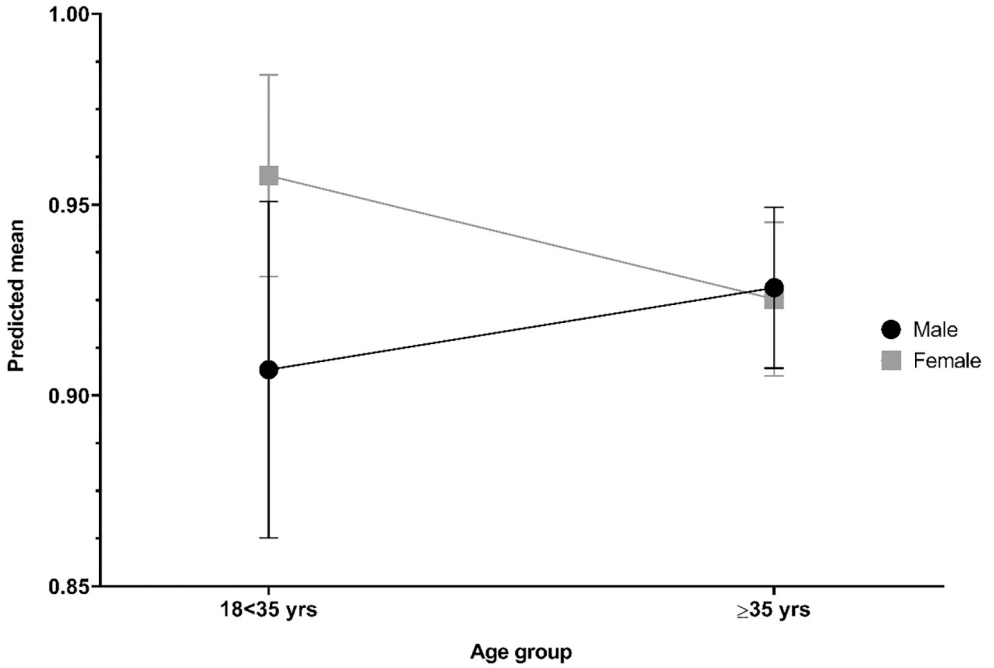

Fig. 1. a. Marginal probabilities by age and gender of agreeing with statement E5.d (government putting limits on individuals' choices). Marginal probabilities by age and gender of agreeing with statement E5.e (shared responsibility for health between government and individuals).

age for responding government had not "gone far enough" for these interventions was significant for men (APR = 2.02, 95% CI 1.52, 2.68) and women(APR = 1.22, 95% CI 1.01, 1.49), the significant interaction showed a stronger effect for men compared to women (Fig. 2a). This same effect was found for E2.p, with the likelihood of agreement increasing with age for men (APR = 2.68, 95% CI 1.86, 3.87) and women (APR = 1.52, 95% CI 1.14, 2.04) shown in post-estimation simple effects testing, but the interaction effect demonstrating it was more pronounced in the former (Fig. 2b).

Once non-significant interaction terms were removed, four models showed that both older adults and women were more likely to say that government had not gone far enough: lower speed limits in high pedestrian areas (E2.c), restrictions on alcohol advertising (E2.e), taxing soft drink (E2.f), and restrictions on sports sponsorship by unhealthy

Table 3
Bivariate and multivariable analysis of proportions and adjusted prevalence ratios (APR) by age and gender for responding whether government has gone 'not far enough' for specific interventions for prevention.

	Bivariate analysis							Multivariable analysis		
	Total	Age			Gender			Age (ref: 18 < 35)	Gender (ref: Male)	Interaction Age*gender
Specific intervention	'Not far enough' (%)	18 < 35 years (%)	≥35 years (%)	p-value	Male (%)	Female (%)	p-value	APR (95%CI)	APR (95% CI)	APR (95%CI)
E2.a plain packaging for tobacco products	31.8	30.6	32.4	0.385	30.3	33.2	0.312	1.09 (0.91, 1.32)	1.14 (0.98, 1.33)	Not significant
E2.b bans on smoking in cars with children	48.6	47.1	49.3	0.028	49.4	47.9	0.773	1.03 (0.90, 1.17)	1.00 (0.89, 1.11)	Not significant
E2.c lower speed limits (30 km/h.) in high pedestrian areas	17.9	12.9	20.2	<0.001	15.8	20.0	<0.001	1.65 (1.21, 2.25)	1.34 (1.08, 1.66)	Not significant
E2.d restrictions on advertising unhealthy foods to children	58.6	49.4	62.8	<0.001	56.4	60.7	0.200	1.25 (1.11, 1.40)	1.07 (0.98, 1.16)	Not significant
E2.e restrictions on alcohol advertising	42.9	32.7	47.6	<0.001	39.9	45.8	<0.001	1.44 (1.22, 1.70)	1.14 (1.02, 1.28)	Not significant
E2.f taxing soft drink	43.9	32.9	49.0	<0.001	39.3	48.3	<0.001	1.50 (1.27, 1.78)	1.23 (1.10, 1.37)	Not significant
E2.h setting salt limits on processed food	50.5	35.8	57.2	<0.001	49.2	51.7	0.624	1.61 (1.38, 1.89)	1.05 (0.95, 1.15)	Not significant
E2.j compulsory immunization at school entry	31.3	26.5	33.4	0.042	31.9	30.7	0.216	1.25 (1.03, 1.53)	0.96 (0.82, 1.11)	Not significant
E2.k Laws setting limits on working hours	25.5	23.0	26.7	0.360	22.5	28.5	<0.001	1.19 (0.95, 1.50)	1.26 (1.06, 1.51)	Not significant
E2.l creation of bike lanes separated from cars	44.1	36.7	47.5	<0.001	42.4	45.8	0.018	1.31 (1.11, 1.53)	1.12 (1.00, 1.25)	Not significant
E2.m removing advertising for unhealthy food and drinks in places owned by the government (such as train stations)	45.2	33.5	50.5	<0.001	40.0	50.2	<0.001	2.02 (1.52, 2.68)	1.86 (1.34, 2.58)	0.61 (0.43, 0.86)
E2.n restrictions on sports sponsorship by companies that sell unhealthy food and drinks	46.8	35.1	52.2	<0.001	43.6	49.9	0.005	1.47 (1.25, 1.72)	1.13 (1.02, 1.26)	Not significant
E2.p banning venues with an alcohol license from selling cigarettes	33.2	20.6	39.0	<0.001	31.7	34.7	0.008	2.68 (1.86, 3.87)	1.72 (1.10, 2.69)	0.57 (0.35, 0.91)

food and drink companies (E2.n). The models also indicated three interventions where there was no effect of gender but older people were more likely than younger people to say government had not gone far enough: restrictions on advertising unhealthy foods to children (E2.d), setting salt limits on processed food (E2.h), and compulsory immunization at school entry (E2.j). There was only one intervention in the models which showed no effect of age but did for gender – women were more likely than men to say government had not gone far enough in terms of laws setting limits on working hours (E2.k). There were no discernible patterns across different target behaviors (e.g. diet or alcohol), intervention mechanism (e.g. bans or taxes), or stage of implementation (e.g. already implemented or hypothetical).

4. Discussion

The findings of the 2018 AUSPOPS provide some evidence and guidance for Australian policymakers in terms of understanding the opinions and attitudes of the general population and important subpopulations (such as younger and older adults, and women and men). Although previous research both internationally and in Australia found a strong effect for gender (Farrell et al., 2019; Farrell et al., 2016; Sainsbury et al., 2018), the evidence for age tended to be more mixed (Miller et al., 2019; Morain and Mello, 2013; Sainsbury et al., 2018).

What had not been investigated previously was the interaction of age and gender on opinions and attitudes about government intervention for prevention, and that understanding this interaction could help explain for the more mixed evidence on age. For general attitudes towards government intervention for health, this study found that while women tended to demonstrate more support for government regulation for prevention compared to men, the differences in support between men and women narrowed among those aged 35 years or older for two statements. This raises the possibility that while gender has an important effect on general attitudes towards prevention, other variables such as age may moderate these attitudes, and therefore these perceptions about prevention may not be stable over time and/or between generational age groups. This finding applied for the statement where prevention was framed as balancing both government responsibility and individual responsibility for health, though this statement still demonstrated high levels of agreement across all four subgroups studied.

This study suggests that Australians – regardless of age or gender – are generally supportive of government interventions when conceptualized as empowering people and increasing their sense of agency. This could be considered a more positive 'frame' of prevention that acknowledges the importance of government intervention as supporting or enabling individual agency (Adams et al., 2016; Miller et al., 2020; Thomas et al., 2010). There was much less agreement with other

Figure 2a. Marginal probabilities by age and gender of responding government has gone 'not far enough' for statement E2.m (removing unhealthy food advertising from public places)

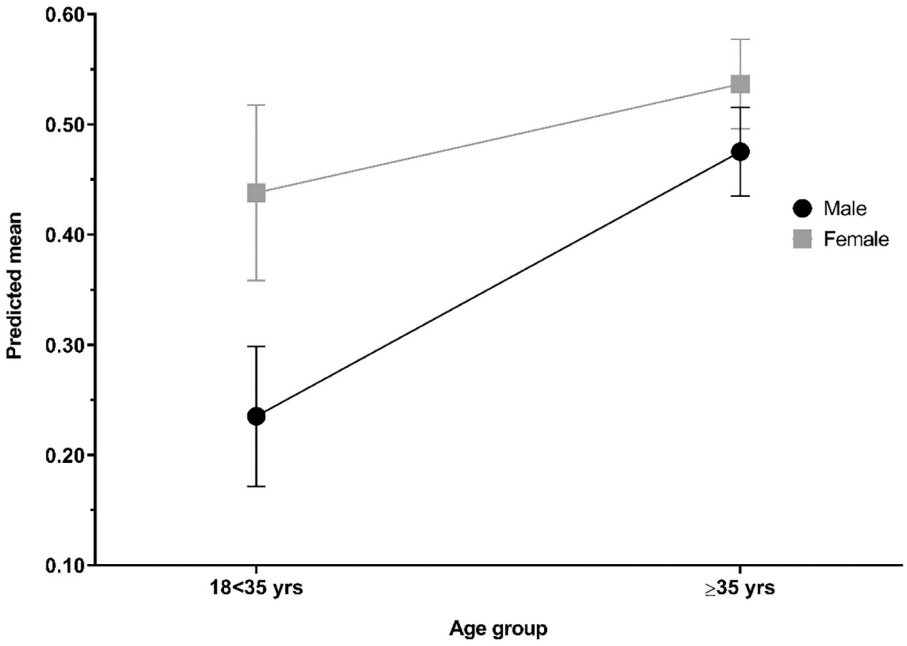

Figure 2b. Marginal probabilities by age and gender of responding government has gone 'not far enough' for statement E2.p (banning licensed venues from selling cigarettes)

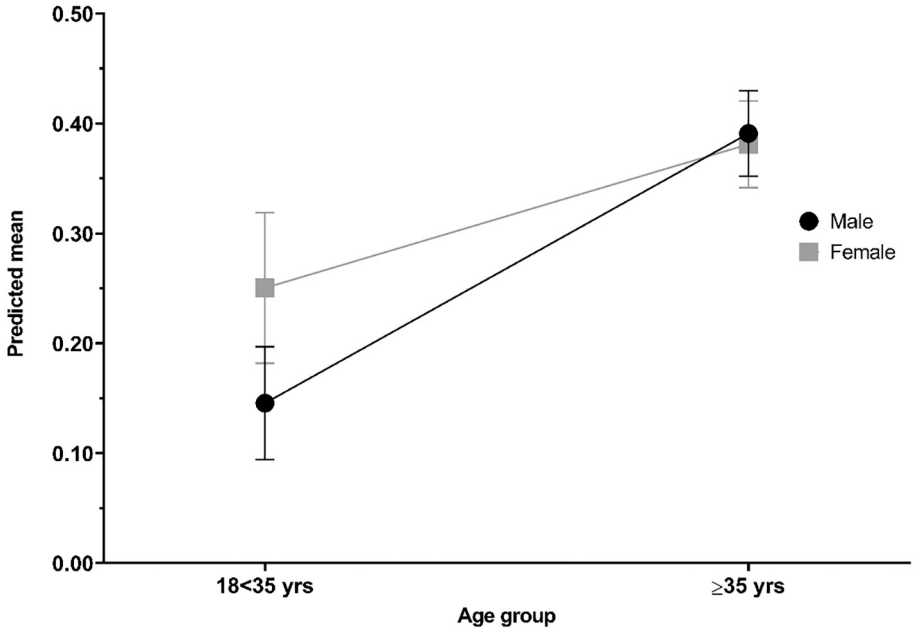

Fig. 2. a. Marginal probabilities by age and gender of responding government has gone 'not far enough' for statement E2.m (removing unhealthy food advertising from public places). b. Marginal probabilities by age and gender of responding government has gone 'not far enough' for statement E2.p (banning licensed venues from selling cigarettes).

conceptualizations of government regulation for health, for example 'nanny state'; this was also found in the results from the previous AUSPOPS (Grunseit et al., 2018). Accordingly, this analysis indicates there is an opportunity for policymakers to further explore the framing of prevention policies as supporting individual agency, and that such a framing could be broadly appealing to different age groups and genders. This could build on existing research gathered through experimental framing studies in obesity prevention (Ortiz et al., 2016) and health taxes and restrictions (Scully et al., 2017).

It is surprising that although young adults, in comparison to older adults, indicated more agreement with general statements regarding government regulation for health, this changed when they were asked about specific interventions for prevention. For some specific interventions for prevention, responses did differ based on age; overall,

younger adults were less likely to indicate government had not gone far enough in terms of the specific interventions. A parental effect on acceptability of prevention has been suggested in research which controlled for parental status (Morley et al., 2012). Given adults aged 35 years or older are more likely to be parents compared to younger adults, it is possible that a parental effect was informing participants' responses, particularly when they were asked about interventions such as regulating advertising to children, requiring immunization at school entry, and restrictions on sports sponsorship by companies that sell unhealthy food and drinks. Young adults are also the targets of aggressive unhealthy product advertising, which may normalize such marketing practices (Howse et al., 2017; Howse et al., 2018), and in turn could affect acceptability of measures for this age group. Though it should be noted that other research has suggested younger adults were more supportive for government action to prevent non-communicable disease (Morain and Mello, 2013).

Two interventions for prevention demonstrated significant differential effects by age and gender: banning cigarette sales in alcohol venues, and removing advertising for unhealthy foods and drinks in public places. Young men were significantly less likely to respond that government had not gone far enough with these interventions.The likelihood of responding that government had not gone far enough increased more among men compared to women in the older age group. Although it is unclear what is driving these effects, young men aged 18–34 years in Australia have a much higher prevalence of daily smoking of 18.1% compared to older age groups and young women, and smoke well above the national average of 13.8% (Australian Bureau of Statistics, 2018b). This could influence their responses. However it should also be noted there are a number of factors which are associated with demonstrating support or acceptability of interventions, such as stage of implementation (Diepeveen et al., 2013), effectiveness (Reynolds et al., 2020) and whether the person themselves participates in the behavior being targeted (Diepeveen et al., 2013). These results suggest that even for popular areas of government intervention such as tobacco control and smoking (Diepeveen et al., 2013; Hayes et al., 2014), there is room for further improvement in building acceptability for increased government regulation for prevention, especially among groups that participate in the behavior being targeted or regulated.

Further research could provide more guidance for policymakers by repeating community attitude surveys about prevention and public health over time with the same survey questions, as AUSPOPS does; these serial community attitude surveys already occur in Australia for other areas of public health, such as the National Drug Strategy Household Survey (Matthew-Simmons et al., 2008; Callinan et al., 2014). The evidence would allow researchers, advocates and government officials and decision-makers to monitor changes in opinions and norms for different population groups based on the policy context and time period, and to monitor acceptability as interventions and strategies are implemented, particularly focusing on any differences within specific subgroups. This could help demonstrate shifts in public opinion that result from changes in government policy, as has been demonstrated with tobacco control in Australia (Purcell et al., 2020). By supporting methods such as serial surveys that track people's attitudes and opinions over time, policymakers and researchers in Australia will be able to have a clearer answer to the question of whether support needs to precede implementation, implementation can lead to more support in the community, or there is a reciprocal and mutually reinforcing relationship between public support and policy implementation.

The strengths of this study include that it was a large, nationally representative survey of Australian adults. The results were adjusted to account for possible effects of other variables such as socioeconomic status and education level. The limitations include that it was a cross-sectional survey with a 16.7% response rate, slightly lower than the 2016 survey (Grunseit et al., 2018). The participation rate is a limitation as the views of non-responders remains unknown and the likelihood of non-response error may have impacted on the results. However other opinion research has found similar response rates (Mazzocchi et al., 2015) and more recent research suggests there that a lower response rate does not necessarily result in nonresponse bias (Daikeler et al., 2019; Hendra and Hill, 2019). Other limitations include the collapsing of multi-point scales into dichotomous variables, which results in a reduction of information and could mask differences by level of agreement or support (as opposed to agreement vs disagreement).

5. Conclusion

This study adds empirical evidence about community attitudes and perceptions regarding chronic disease prevention policies and interventions. Despite some heterogeneity across both gender and age, there appears to be community support for government action on prevention. The evidence from this population sample suggests the conceptualization of prevention as a shared responsibility for government and individual is socially normative in Australia. Effective, acceptable messages regarding prevention may need to take advantage of and use this conceptualization. Policymakers could capitalize on positive sentiment by prioritizing prevention policies with high existing levels of support across all groups. They could also target population subgroups on certain issues where acceptability appears to be heterogenous – for example, young adults and advertising restrictions, or young men and tobacco control. There are clear opportunities for public health to develop a more compelling case for preventive action by governments that builds on existing support and tests frames including government action as enabling personal action and agency.

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Declaration of Competing Interest

None to declare.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ypmed.2020.106289.

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