

Title: Patterns in reduction or cessation of drinking in Australia (2001-2013) and motivation for change

Running title: Motivation for reducing drinking in Australia

Authors:

1. Amy Pennay, PhD, Research Fellow, Centre for Alcohol Policy Research, La Trobe University, Melbourne, Australia.
2. Sarah Callinan, PhD, Research Fellow, Centre for Alcohol Policy Research, La Trobe University, Melbourne, Australia.
3. Michael Livingston, PhD, Senior Research Fellow, Centre for Alcohol Policy Research, La Trobe University, Melbourne Australia; and Department of Clinical Neurosciences, Karolinska Institutet, Stockholm, Sweden.
4. Daniel I Lubman, PhD, Professor, Turning Point, Melbourne, Australia; and Monash University, Melbourne, Australia.
5. John Holmes, PhD, Senior Research Fellow, School of Health and Related Research, University of Sheffield, UK.
6. Sarah MacLean, PhD, Senior Lecturer, School of Allied Health, La Trobe University, Melbourne, Australia; and Centre for Alcohol Policy Research, La Trobe University, Melbourne, Australia.
7. Rachel Herring, PhD, Senior Research Fellow, Drug and Alcohol Research Centre, Department of Mental Health, Social Work and Integrative Medicine, School of Health Education, Middlesex University, London, UK.
8. Paul Dietze, PhD, Professor, Centre for Population Health, Burnet Institute, Melbourne, Australia; and School of Public Health and Preventive Medicine, Monash University, Melbourne, Australia

*Corresponding author: Amy Pennay, Centre for Alcohol Policy Research, La Trobe University, Bundoora, Victoria, Australia, 3083. a.pennay@latrobe.edu.au; +61 3 9479 8725.

Keywords: alcohol, abstinence, young people, epidemiology, Australia

Abstract

Aims: This paper examines: 1) change over time (2001-2013) in recently reducing or ceasing drinking in the Australian population, and 2) the reasons given for reducing or ceasing drinking in the most recent survey (2013); stratified by sex and age group.

Methods: Data are from five waves of the National Drug Strategy Household Survey (N=119,397). Logistic regression models with interaction terms were used to identify a shift in sex or age over time in predicting reduction or cessation of drinking, and to predict motivations for reducing or ceasing drinking by sex and age.

Results: Reports of recently reducing the quantity or frequency of drinking increased from 2001 to 2007, and remained stable between 2007 and 2013. There was a steady increase in the number of Australians reporting recently ceasing drinking from 2001 to 2013, with a significant effect for age (younger groups more likely than older groups to cease drinking in the past two waves). Reasons for reducing or ceasing drinking varied by age, with older people more likely to report health reasons, and younger people more likely to report lifestyle reasons or enjoyment.

Conclusion: Increases over time in reports of reduction or cessation of drinking due to health, lifestyle, social and enjoyment reasons, suggests that the social position of alcohol in Australia may be shifting, particularly among young people.

Summary

Rates of reducing and ceasing drinking increased between 2001 and 2013 in Australia. Young people were more likely to modify drinking due to lifestyle and enjoyment reasons; older groups were more likely to report health reasons. These trends contribute to the broader context of declining alcohol consumption in Australia.

Introduction

Per capita consumption of alcohol in Australia has been in decline over the past ten years. Sales data suggests the downward trend began around 2007 (10.76 litres per person), decreasing over time to 2015 (9.52 litres per person; Australian Bureau of Statistics, 2017). This trend is not unique to Australia, with similar decreases in national consumption evident in other western countries, such as the UK and Sweden (Meng et al., 2014, Kraus et al., 2015). It has been suggested that the decline in per capita consumption in Australia is largely being driven by reduced uptake of drinking and more moderate consumption among younger generations (Livingston et al., 2016). However, survey data also show that there has been an increase over time in classifying as an 'ex-drinker' and decreased rates of risky drinking in the Australian population (Australian Institute of Health and Welfare, 2014). This group of existing drinkers who have reduced or ceased drinking has not been adequately studied in Australia. For example, we don't know which demographic groups have modified their drinking, nor why.

Recent international studies suggest that those who have recently reduced or ceased drinking are more likely to be female and older (Wilsnack et al., 2009, Beard et al., 2017, Ng Fat et al., 2015). A longitudinal study of US men in the 1960s and 1970s suggested that those who had ceased drinking were less likely to be married and had lower socio-economic status than current drinkers or those who had reduced their drinking (Hermos et al., 1988). A more recent UK longitudinal study indicated that those who had ceased drinking were less likely to be married, less likely to have children, less likely to have tertiary qualifications and more likely to have poor psychosocial health (Ng Fat et al., 2015). It is not clear how reflective these demographic patterns are of Australia, and unfortunately these prior studies have not explored change over time in population patterns of reduction or cessation of drinking.

With rates of ceasing and reducing drinking seemingly on the rise in Australia, it is important to understand what is motivating individuals to modify their consumption so as to support the maintenance of these trends. However, little is known about these reasons at present. In a recent UK population study, the main reason reported by participants who had recently attempted to reduce their drinking were all health focused: to 'Improve my fitness', 'Help with weight loss', and 'A concern about future health problems' (Beard et al., 2017). International data from eight countries (Argentina, Peru, Uruguay, Nigeria, Uganda, Sri Lanka, Sweden and Canada) identified that among former drinkers, having no interest in drinking was the most commonly selected reason for not drinking, followed by concerns about effects on health, cost and taste (Bernards et al., 2009). This study found variation in reasons by age and sex, specifically that younger respondents were more likely than older respondents to report no interest in drinking, and to be concerned about taste, cost,

and developing alcohol problems, and females were more likely than males to report no interest in drinking and not liking the taste of alcohol.

Among specific populations, a longitudinal of US men indicated that men who had reduced drinking were more likely to report social-situational reasons, while those who had ceased drinking were more likely to report health reasons (Hermos et al., 1988). Similarly, a longitudinal study from the UK reported that among older people (60-85 years), concern about health and fewer opportunities for social occasions were common reasons for reducing drinking (Britton and Bell, 2015). University students in the US reported that their reasons for limiting drinking included concern about health, being brought up not to drink, or concern about the influence of drinking on school or sport performance, as well as parental disapproval (Greenfield et al., 1989).

In sum, previous research indicates that older females tend to report reducing or ceasing drinking at higher rates than other demographic groups, and most studies indicate that health is a concern for people who reduce, but particularly cease, drinking, with age influencing these reasons. The primary purpose of this paper is to explore patterns of reduction or cessation of drinking in Australia over time, and to detect whether this is being driven by particular demographic groups. Our secondary aim is to explore motivations for reducing or ceasing or drinking and how they differ across demographic groups.

Method

Sample

Data were taken from five waves of Australia's National Drug Strategy Household Survey (NDSHS), administered every three years from 2001 to 2013. A multi-stage stratified area random sample design was employed at a household level. One person within each household was randomly selected to participate in the study, that is, the household member aged 12 or older with the next birthday. If that person was unavailable or declined, the interviewer moved to the next house. Details of each survey are shown in Table 1. While the response rates (~50%) might be considered low compared to surveys in other countries, it is worth noting that it is relatively high in an Australian context and has been shown to broadly reflect total shifts in alcohol consumption in Australia over time when compared to sales data (Livingston and Dietze, 2016, O'Toole et al., 2008). Respondents who had not consumed alcohol in the past twelve months and those aged under 14 were excluded (as this was the minimum age in some waves). There was no upper age limit.

Measures

The NDSHS survey includes questions on alcohol, tobacco and illicit drug use as well as a wide range of demographic questions. Participants were asked if they had consumed alcohol in the past 12 months, and quantity and frequency of consumption over the 12 month period was collected. Those who had consumed alcohol in the past twelve months were also asked 'In the last 12 months have you (*mark all that apply*): i) Reduced the amount of alcohol you drink at any one time; ii) Reduced the number of times you drink; iii) Switched to drinking more low-alcoholic drinks than you used to; or iv) Stopped drinking alcohol'. These questions remained consistent over the time period 2001 to 2013. Anyone who responded yes to any of these questions was asked to choose their reasons for doing so from a range of multiple response options. These reasons were presented in the following way:

- a) Health reasons (e.g. weight, diabetes, avoid hangover)
- b) Lifestyle reasons (e.g. work/study, less opportunity, young family)
- c) Social reasons (e.g. believe in moderation, concerned about violence, avoid getting drunk)
- d) Pregnant and/or breastfeeding
- e) Taste/enjoyment (e.g. prefer low alcohol beer, don't get drunk)
- f) Financial reasons
- g) Adult/parent pressure
- h) Peer pressure
- i) The price of the alcohol I drink increased

Prior to 2010 participants were only able to choose one option. In 2010 and 2013 participants were able to choose multiple options. This precludes analysis of change over from 2001-2013 for this measure so we have focused these analyses on responses from the most recent survey in 2013.

Analyses

Analyses were undertaken in Stata 14 (StataCorp, 2015). Given the importance of age identified in previous work (Australian Institute of Health and Welfare, 2014, Livingston et al., 2016), we divided age into the following groups to enable detection of differences in the patterns particularly of younger drinkers: 14-17 years; 18-23 years; 24-29 years; 30-49 years, 50-64 years and 65 years. Given the distinctive nature of the youngest and oldest age groups, we selected the 30-49 age group as the reference category to enable findings to be more easily interpreted. Residential postcodes were linked to the Socio-Economic Indexes for Areas (SEIFA) index of relative disadvantage, reflecting the level of socio-economic disadvantage in an area. Rankings are generated on a five point scale, with 1 being the most disadvantaged and 5 being the most advantaged (Australian Bureau of Statistics, 2011).

The proportion of people stating that they reduced or ceased drinking in each wave was calculated. In order to identify a shift in age or sex over time in predicting outcome variables, logistic regression models with interaction terms (year x age and year x sex) were calculated, controlling for neighbourhood disadvantage and marital status, and test parameters were compared using an adjusted Wald test. The proportion of respondents selecting each reason for reducing or drinking, among those who had reduced or ceased consuming alcohol was also calculated. In the analysis of reasons for reducing or ceasing drinking in 2013, we were unable to include the pregnant/breastfeeding category due to low cell sizes when split by age, making the model unstable. All results presented are weighted to correct for disproportionate representation on the basis of age, sex and location.

Results

Rates of reducing or ceasing drinking in the past 12 months

Table 2 shows that there was an increase between 2001 and 2007 in the percentage of people who reported reducing the quantity or frequency of their drinking in the past twelve months, followed by a stable trend between 2007 and 2013. Reported rates of ceasing drinking increased over the study period. Reports of switching to lower alcohol drinks decreased over time. Supplementary Table 1 displays change over time in the proportion of participants reporting recently reducing or ceasing drinking, stratified by age and sex.

Table 3 demonstrates that respondents were significantly more likely to have reduced or ceased drinking over the last 12 months in each year after 2001. It also shows that younger people were significantly more likely to report ceasing drinking than older groups. The 14-17 year old age group were almost three times more likely to report ceasing drinking compared with 30-49 year olds. On the other hand, this age group (14-17 year olds) were the least likely to report reducing drinking, with 24-29 year olds most likely to report reducing drinking. Females were more likely than males to report ceasing drinking, but males were more likely to report reducing their drinking. Those in more disadvantaged neighbourhoods were more likely to report reducing and ceasing drinking.

With regards to interaction analyses, Table 3 shows that there was a significant interaction between year and age in relation to cessation of drinking, primarily driven by 24-29 year olds being more likely to cease drinking in 2010 relative to 30-49 year olds, and those aged 50-64 and 65+ being less likely to cease drinking in 2013 relative to 30-49 year olds. This suggests the interaction is stemming from an increase in younger drinkers and a decrease in older drinkers ceasing drinking over the past two surveys.

Reasons for reducing or ceasing drinking in the past 12 months

Table 4 shows that health was the most commonly reported reason for both reducing and ceasing drinking, followed by lifestyle reasons and social reasons. Differences by age were evident, with health reasons more commonly reported by older age groups both in terms of reducing and ceasing drinking. Lifestyle and financial reasons were more commonly reported by young people (aged 18-29) for reducing drinking (but not ceasing drinking), and taste/enjoyment was a more commonly reported reason for reducing drinking among 14-29 year olds relative to older age groups. Social reasons for reducing drinking were commonly reported by younger groups, but also those aged 50-64 years.

Drink driving was a more commonly reported reason for reducing and ceasing drinking by the oldest group (50+) as well as reducing drinking among 18-23 year olds. Parental and peer pressure was only reported as a reason for reducing and ceasing drinking by 14-17 year olds. It is important to note that the youngest group reported the highest rate of 'other' reasons, which unfortunately was not captured by a subsequent free text response. With regards to sex, females were more likely to reduce drinking for health reasons while males were more likely to cease drinking for the same reason. Males were more likely than females to reduce or cease drinking for lifestyle reasons, and cease drinking due to social reasons.

Discussion

Declines in per capita consumption of alcohol in Australia over the past ten years have occurred alongside an increase over time in the number of Australians who report having reduced or ceased drinking in the past 12 months. We found that rates of ceasing drinking in the past 12 months increased steadily between 2001 and 2013 (from 4.3% to 6%), and that rates of reducing either the quantity or frequency of drinking also increased over the study period (from around 24% to 29% in both), with most of the change happening between 2001 and 2007. It is interesting to note that almost one in two drinkers (43.4%) reported using at least one method to reduce their drinking in 2013.

The trends we have identified here contribute to the broader national context of declining alcohol consumption in Australia. Recent analyses have suggested national trends are largely being driven by cohort effects, with younger drinkers generally consuming less than previous generations at the same age, while heavy drinking generations are moving into traditionally lighter consuming periods of the life course (Livingston et al., 2016). However, in addition to this, in the current analysis we found an increase in the proportion of people reporting that they have recently reduced or ceased drinking, suggesting broader changes in consumption even among established drinkers. These shifts

may reflect social processes described by Skog (1985) to explain changes in population drinking – as abstinence and lighter drinking becomes more normalised via recent cohort changes we would expect to see reductions in drinking among established drinkers due to reduced drinking in their social networks. More complex quantitative data are necessary to test these processes comprehensively, but our findings are suggestive, especially when placed alongside broader changes in social attitudes to alcohol (Livingston and Callinan, 2017).

When interpreting our results it is important to note that the wording of the item used to understand recent reduction or cessation of drinking is interpretable in a number of ways. It is possible that it includes people who have permanently reduced or ceased drinking, people who reduced or ceased drinking for a period of time before returning to previous or higher consumption levels, or people who temporarily reduced or ceased drinking as part of illness or change in life circumstances, or engagement in initiatives such as FebFast, Dry July or similar programs encouraging temporary abstinence which have increased in popularity over the past ten years (de Visser et al., 2016, Pennay et al., 2016). The cross-sectional nature of the data also makes it difficult to interpret the temporality of these trends. For example, it is not clear whether the same group of people are showing up in these data in each wave (with successive attempts to reduce or cease consumption), or whether drinkers who reduced or discontinued drinking remained doing so and it is therefore a new group of drinkers reducing or ceasing drinking in each wave. It is probable that the data represents a combination of these scenarios.

With respect to demographics, we identified that younger groups are more likely to have reported recently ceasing drinking than older groups, particularly in the last two waves. Interestingly, we found the youngest group (14-17 year olds) were also the least likely to report recently reducing drinking but the most likely to report recently ceasing drinking. With less time to have established a regular drinking pattern, it is possible that 14-17 year olds may have reported discontinuing drinking after a bad experience or while completing secondary school, and might recommence drinking again in the short-term future; however, these findings do support trends reflecting a preference for abstinence among young people in Australia (Livingston, 2014). We also identified that young adults are more likely to report reducing or ceasing drinking than older adults, contrary to previous studies which indicate that older people are more likely to report reducing or ceasing drinking (Wilsnack et al., 2009, Beard et al., 2017).

With regards to sex, it is interesting to note that consistent with previous research, females were more likely to report recently ceasing drinking (Bernards et al., 2009, Ng Fat et al., 2015); however, males were more likely to report recently reducing drinking, contrary to prior research (Beard et al., 2017). Males being more likely to report reduction of drinking and females being more likely to report cessation of drinking may be a consequence of social roles (particularly pregnancy, breast

feeding and caring); or the possibility that alcohol-related health promotion messages are more salient for females than males; either way, this requires further investigation. Consistent with previous research, lower socio-economic status was associated with greater likelihood of reporting reducing and ceasing drinking (Hermos et al., 1988).

In order to contextualise these trends, it is important to understand why Australians report recently reducing or ceasing drinking. Consistent with international studies, we identified that health was the most frequently reported reason for reducing or ceasing consumption (Bernards et al., 2009, Beard et al., 2017, Britton and Bell, 2015, Greenfield et al., 1989). The popularity of health as an item suggests that one of the factors that might be influencing changes in national drinking patterns is increased attention to health and fitness, and corresponding growing awareness of the negative health effects of alcohol (Wyn, 2009).

We found interesting age-related differences, in that younger groups were less likely to report health reasons for recently reducing or ceasing drinking and were more likely to report lifestyle, taste and enjoyment reasons. Lifestyle reasons for changing drinking patterns such as work/study and having a young family make intuitive sense as part of young adulthood. In contrast, social reasons such as believing in moderation being concerned about violence and wanting to avoid drunkenness (reported by both younger and older groups) and not enjoying getting drunk (reported by younger groups) are interesting as they support the hypothesis that declining rates of drinking in Australia might be influenced by a shifting social position of alcohol. In particular, this appears to entail a change in social norms that limit the acceptability of heavy or frequent drinking, especially among young people. Indeed, we know that attitudes to alcohol have become more conservative over time in Australia (Livingston and Callinan, 2017), which may be in part influenced by increased attention to alcohol use, greater understanding of the negative effects of alcohol, and a subsequent increase over time in alcohol-related prevention and education programs (Battacharya, 2016, de Looze et al., 2015, Pennay et al., 2015). High rates of 'other' as a reason selected for ceasing drinking among all age groups and for reducing drinking among 14-17 year olds raises the probability that there are important alternative explanations for reducing or ceasing drinking not picked up by the response options in the survey. For example, it has been suggested the increased use of digital technology and socialising more online or in spaces where drinking is not normative may be a factor driving reductions in drinking (Battacharya, 2016, Pennay et al., 2015).

Most of the other reasons for reducing or ceasing drinking were as might be expected, with finances a bigger issue for younger groups, and drink driving a concern for 18-23 year olds as 18 is the minimum eligible age to receive a probationary driver's licence in Australia, and a zero blood alcohol limit is required for probationary drivers for a period of three years. Parental and peer pressure was a factor for some 14-17 year olds, which may partially support another hypothesised explanation

that changes in parental monitoring (restricting supply), and modelling (parents' own behaviour and disapproval of youth alcohol use), may have influenced recent shifts in youth drinking practices (Pennay et al., 2015, de Looze et al., 2014). Females were more likely to report reducing their alcohol use for health reasons and males were more likely to report ceasing alcohol use due to health reasons, which could suggest a discrepancy in the health issues that were being conceptualised by males and females in response to this question. Males being more likely than females to reduce or cease drinking due to lifestyle and social reasons is interesting, and warrants further qualitative exploration.

Differences particularly with regards to age, in reasons for reducing or ceasing drinking, point to the potential benefit of targeted alcohol prevention and harm reduction messages for different groups. For example, health-related messages appear particularly salient for older populations and a focus on the pleasures of moderation, avoiding violence and ways to enjoy leisure time without intoxication might resonate more with younger groups. Alternatively, these findings point towards areas where progress might be made with certain groups. For example, young people do not appear particularly concerned about the health consequences of alcohol use, and so efforts to increase their knowledge in this regards might be fruitful in further decreasing drinking.

Limitations

There are a number of limitations with respect to the items from the NDSHS we have used in this paper. Firstly, it not possible to know from these data the nature of the reduction or cessation and how sustained these changes were, and therefore how it correlates with national trends. Longitudinal analyses would be particularly helpful in this respect. As we did not design the survey, it is not clear how the response options used in this analysis were derived and given the inconsistency in survey items across countries, standardisation of these items is needed to enable better international comparability. In particular, not having a free text response that follows the 'other' option is an oversight that should be remedied in future iterations of the survey. There is also the possibility of attribution bias, for example, participants may have attributed a certain individual-level factor as responsible for their reduced drinking without considering the potential importance of broader social or cultural forces. There are also limitations with respect to household population surveys in terms of not representing those who do not live in homes, are not home to respond or refuse involvement. Response rates for the NDSHS could be considered low, but are respectable when dropping response rates are considered (O'Toole et al., 2008).

Conclusion

This paper has explored change over time in rates of recently reducing or ceasing drinking in an Australian sample, and their reported reasons for doing so. We found an increase over time in reports of reduction or cessation of drinking, which aligns with per capita consumption changes. Popular reasons for doing so include health, lifestyle, social and enjoyment reasons, suggesting that the position of alcohol in Australia may be shifting and that public health efforts focusing on these factors should be maintained. It will be important to track the way these reasons change over time to understand what factors associated with drinking resonate most with Australians. We also appreciate the need to contextualise national drinking trends with broader environmental, social, economic and cultural factors that are difficult for participants to pinpoint in a survey and require more complex analyses of structural and social factors using multiple methods and forms of data.

Acknowledgements: This paper draws on National Drug Strategy Household survey data owned by the Australian Institute of Health and Welfare, and sourced through the Australian Data Archive. This research is supported by funding from the Australian Research Council (DP160101380). Pennay and Livingston are supported by fellowship funding from the National Health and Medical Research Council (GNT1069907 and GNT1123840 respectively). Callinan is supported by fellowship funding from the Australian Research Council (DE180100016). The Centre for Alcohol Policy Research receives core funding from the Foundation for Alcohol Research and Education.

Conflict of interest statement:

Lubman has received speaker fees from AstraZeneca and Janssen, and provided consultancy advice to Lundbeck for work unrelated to this study. Dietze has received funding from Gilead Sciences Inc and ReckittBenckiser for work unrelated to this study. The researchers have no other connections with the tobacco, alcohol, pharmaceutical or gaming industries, or any body substantially funded by one of these organisations.

References

- AUSTRALIAN BUREAU OF STATISTICS. 2011. *Socio-Economic Indexes for Areas (SEIFA)* [Online]. Canberra: Australian Bureau of Statistics.
<http://www.abs.gov.au/websitedbs/censushome.nsf/home/seifa>. [Accessed].
- AUSTRALIAN BUREAU OF STATISTICS 2017. Apparent Consumption of Alcohol, Australia, 2015-2016. Canberra: Australian Bureau of Statistics.
<http://www.abs.gov.au/ausstats/abs@.nsf/mf/4307.0.55.001/>.
- AUSTRALIAN INSTITUTE OF HEALTH AND WELFARE 2014. National Drug Strategy Household Survey detailed report 2013. Drug statistics series no. 28. Cat. no. PHE 183. Canberra: AIHW.
- BATTACHARYA, A. 2016. Youthful Abandon: Why are young people drinking less? London: Institute of Alcohol Studies.
- BEARD, E., BROWN, J., KANER, E., WEST, R. & MICHIE, S. 2017. Predictors of and reasons for attempts to reduce alcohol intake: A population survey of adults in England. *PLoS One*, 12, e0173458.
- BERNARDS, S., GRAHAM, K., KUENDIG, H., HETTIGE, S. & OBOT, I. 2009. 'I have no interest in drinking': a cross-national comparison of reasons why men and women abstain from alcohol use. *Addiction*, 104, 1658-1668.
- BRITTON, A. & BELL, S. 2015. Reasons Why People Change Their Alcohol Consumption in Later Life: Findings from the Whitehall II Cohort Study. *PLoS One*, 10, 1-8.
- DE LOOZE, M., RAAIJMAKERS, Q., TER BOGT, T., BENDTSEN, P., FARHAT, T., FERREIRA, M., GODEAU, E., KUNTSCHKE, E., MOLCHO, M., PFÖRTNER, T., SIMONS-MORTON, B., VIENO, A., VOLLEBERGH, W. & PICKETT, W. 2015. Decreases in adolescent weekly alcohol use in Europe and North America: evidence from 28 countries from 2002 to 2010. *European Journal of Public Health*, 25, 69-72.
- DE LOOZE, M., VERMEULEN-SMIT, E., TER BOGT, T., VAN DORSELAER, S., VERDURMEN, J., SCHULTEN, I., ENGELS, R. & VOLLEBERGH, W. 2014. Trends in alcohol-specific parenting practices and adolescent alcohol use between 2007 and 2011 in the Netherlands. *International Journal of Drug Policy*, 25, 133-141.
- DE VISSER, R. O., ROBINSON, E. & BOND, R. 2016. Voluntary temporary abstinence from alcohol during "Dry January" and subsequent alcohol use. *Health Psychology*, 35, 281-289.
- GREENFIELD, T., GUYDISH, J. & TEMPLE, M. 1989. Reasons Students Give for Limiting Drinking: A Factor Analysis with Implications for Research and Practice. *Journal of Studies on Alcohol*, 50, 108-115.
- HERMOS, J., LOCASTRO, J., GLYNN, R., BOUCHARD, G. & LABRY, O. 1988. Predictors of Reduction and Cessation of Drinking in Community-Dwelling Men: Results from the Normative Aging Study. *Journal of Studies on Alcohol*, 49, 363-368.
- KRAUS, L., ERIKSSON, T., M., LINDELL, A., PABST, A., PIONTEK, D. & ROOM, R. 2015. Age, period, and cohort effects on time trends in alcohol consumption in the Swedish adult population 1979-2011. *Alcohol and Alcoholism*, 50, 319-327.
- LIVINGSTON, M. 2014. Trends in non-drinking among Australian adolescents. *Addiction*, 109, 922-929.
- LIVINGSTON, M. & CALLINAN, S. 2017. Changing attitudes to alcohol in Australia. *Journal of Studies on Alcohol and Drugs*, 78, 844-852.
- LIVINGSTON, M. & DIETZE, P. 2016. National survey data can be used to measure trends in population alcohol consumption in Australia. *Australian and New Zealand Journal of Public Health*, 40, 233-235.
- LIVINGSTON, M., RANINEN, J., SLADE, T., SWIFT, W., LLOYD, B. & DIETZE, P. 2016. Understanding trends in Australian alcohol consumption: an age-period-cohort model. *Addiction*, 111, 1590-1598.
- MENG, Y., HOLMES, J., HILL-MCMANUS, D., BRENNAN, A. & MEIER, P. 2014. Trend analysis and modelling of gender-specific age, period and birth cohort effects on alcohol abstinence and consumption level for drinkers in Great Britain using the General Lifestyle Survey 1984-2009. *Addiction*, 109, 206-15.

- NG FAT, L., CABLE, N. & SHELTON, S. 2015. Worsening of Health and a Cessation or Reduction in Alcohol Consumption to Special Occasion Drinking Across Three Decades of the Life Course. *Alcoholism: Clinical and Experimental Research*, 39, 166-174.
- O'TOOLE, J., SINCLAIR, M. & LEDER, K. 2008. Maximising response rates in household telephone surveys. *BMC Medical Research Methodology*, 8.
- PENNAY, A., LIVINGSTON, M. & MACLEAN, S. 2015. Young people are drinking less: it's time to find out why. *Drug and Alcohol Review*, 34, 115-118.
- PENNAY, A., MACLEAN, S. & RANKIN, G. 2016. Hello Sunday Morning: Alcohol, (non)consumption and selfhood. *International Journal of Drug Policy*, 28, 67-75.
- SKOG, O. 1985. The collectivity of drinking cultures: a theory of the ditribution of alcohol consumption. *British Journal of Addiction*, 80, 83-99.
- STATA CORP 2015. Stata Statistical Software: Release 14. College Station, TX: StataCorp LP.
- WILSNACK, R. W., WILSNACK, S. C., KRISTJANSON, A. F., VOGELTANZ-HOLM, N. D. & GMEL, G. 2009. Gender and alcohol consumption: patterns from the multinational GENACIS project. *Addiction*, 104, 1487-1500.
- WYN, J. 2009. Young people's wellbeing: Contradictions in managing the healthy self. *ACHPER Healthy Lifestyles Journal*, 56, 5-9.

Table 1: Details of the National Drug Strategy Household Survey used in this study

Year	Survey N	RR	Method	<14	Drinker %	Missing	Sample N [#]
2001	26,744	50%	F2F, D&C, CATI	0%	83.9	0%	22,437
2004	23,532	46%	D&C*	2.4%	85.4	2.6%	19,576
2007	19,443	49%	D&C*	1.9%	83.1	1.5%	15,916
2010	26,157	51%	D&C	1.8%	82.1	1.4%	21,175
2013	23,521	49%	D&C	0%	81.4	2.7%	18,639

F2F Face to Face; D&C Drop and Collect; CATI Computer Assisted Telephone Interview.

*While there were CATI surveys in 2004 and 2007 these respondents were not asked the questions that were the focus of the paper.

[#]Excludes people who had not consumed alcohol in the past 12 months, and people aged <14.

[^]There was no missing data in 2001 for the items of interest, which seems implausible. While it is not explicitly stated anywhere, it may be that respondents who did not respond to any of the questions on reducing alcohol consumption were coded as not having reduced their consumption rather than missing.

Table 2: Percentage of respondents using reduction techniques or ceasing drinking in the past 12 months 2001-2013 (95% CI)

	2001	2004	2007	2010	2013
Reduce amount per occasion	24.7 (24.0, 25.4)	26.1 (25.4, 26.9)	29.0 (28.1, 29.8)	30.7 (30.0, 31.5)	29.6 (28.8, 28.4)
Reduce number of occasions	23.4 (22.8, 24.1)	26.6 (25.9, 27.4)	29.4 (28.6, 30.3)	29.4 (28.7, 30.2)	29.5 (28.7, 30.3)
More low alcohol drinks	8.5 (8.1, 9.0)	7.9 (7.5, 8.4)	7.4 (6.9, 7.9)	5.0 (4.6, 5.3)	5.3 (5.0, 5.7)
Stopped drinking	4.3 (4.0, 4.6)	5.2 (4.8, 5.6)	5.3 (4.9, 5.8)	5.6 (5.2, 6.0)	6.0 (5.6, 6.4)
Any reduction technique	41.5 (40.7, 42.3)	45.9 (45.1, 46.8)	48.2 (47.3, 49.2)	47.3 (46.5, 48.1)	46.9 (46.0, 47.8)

N = 97,743

Table 3. Logistic regression models predicting reduction and cessation of drinking, including age x year, and sex x year, interactions

		Reduced drinking		Ceased drinking	
		Age model	Sex model	Age model	Sex model
Age	14-17	0.66***		2.96***	
	18-23	1.09		1.56**	
	24-29	1.34***		1.52**	
	30-49	1(Ref)		1(Ref)	
	50-64	0.98		0.68**	
	65+	1.00		0.66**	
Sex	Male		1(Ref)		1(Ref)
	Female		0.79***		1.65***
Year	2001	1(Ref)	1(Ref)	1(Ref)	1(Ref)
	2004	1.21***	1.15***	1.24*	1.08
	2007	1.33***	1.26***	1.25*	1.23*
	2010	1.27***	1.19***	1.30**	1.30**
	2013	1.26***	1.18***	1.87***	1.30**
Neighbourhood Advantage	Lowest (1)	1(Ref)	1(Ref)	1(Ref)	1(Ref)
	2	0.95*	0.95*	0.95	0.96
	3	0.92**	0.92**	0.86*	0.87*
	4	0.90***	0.90***	0.87*	0.88*
	Highest (5)	0.86***	0.86***	0.82**	0.80***
Marital status	Single	1(Ref)	1(Ref)	1(Ref)	1(Ref)
	Married/Defacto	0.93**	0.95**	1.33***	0.70***
	Separated/Divorced/ Widowed	0.94	0.97	1.62***	0.64***
Interactions	14-17*2004	0.82		1.02	
	14-17*2007	0.89		0.91	
	14-17*2010	0.98		1.13	
	14-17*2013	0.83		0.85	
	18-23*2004	1.07		1.11	
	18-23*2007	1.04		1.01	
	18-23*2010	1.02		1.23	
	18-23*2013	0.88		0.77	
	24-29*2004	0.81*		0.95	
	24-29*2007	0.83*		1.37	
	24-29*2010	0.98		1.38*	
	24-29*2013	0.9		0.81	
	50-64*2004	0.96		0.95	
	50-64*2007	0.99		0.99	
	50-64*2010	0.98		0.87	
	50-64*2013	1.02		0.62**	
	65+*2004	1.00		1.00	
	65+*2007	0.99		1.06	
	65+*2010	0.90		0.80	
	65+*2013	0.92		0.57**	
Interaction	Female*2004		1.03		1.23
	Female*2007		1.05		1.05
	Female*2010		1.12*		1.03
	Female*2013		1.07		1.20

*p<0.05, **p<.01, ***p<0.01

Table 4: Reasons for reducing and ceasing alcohol consumption by age and sex (2013)

Reasons for reducing drinking																				
Health		Lifestyle		Social		Taste/ enjoy		Drink Driving		Financial		Parent Pressure		Peer Pressure		Price		Other		
%	OR	%	OR	%	OR	%	OR	%	OR	%	OR	%	OR	%	OR	%	OR	%	OR	
Age																				
14-17	20.8	0.21***	44.8	0.83	35.0	1.44	18.3	1.96*	5.7	0.6	10.5	0.81	10.1	6.31***	5	9.87**	5.6	1.57	16.8	3.46***
18-23	40.7	0.56***	54.5	1.23	39.5	1.74***	19.6	2.13***	13.4	1.53**	19.9	1.72***	3.2	1.86	0.8	1.58	7.6	2.21***	6.6	1.20
24-29	45.6	0.69***	60.1	1.54***	31.9	1.25*	15.0	1.54**	9.1	0.98	17.7	1.48**	1.3	0.76	0.5	0.86	5.4	1.53	6.1	1.11
30-49	55.0	1 (Ref)	49.4	1 (Ref)	27.2	1 (Ref)	10.3	1 (Ref)	9.2	1 (Ref)	12.7	1 (Ref)	1.8	1 (Ref)	0.5	1 (Ref)	3.6	1 (Ref)	5.5	1 (Ref)
50-64	60.5	1.25**	23.2	0.31***	31.9	1.25**	11.0	1.08	18.1	2.19***	8.1	0.60***	0.7	0.38*	0.3	0.61	4.3	1.19	5.3	0.95
65+	56.8	1.07	10.7	0.12***	27.2	1.00	11.4	1.13	23.8	3.09***	8.1	0.61***	0.4	0.21**	0.7	1.25	6.6	1.88***	7.6	1.41*
Sex																				
Male	51.1	1 (Ref)	42.0	1 (Ref)	30.2	1 (Ref)	12.6	1 (Ref)	15	1 (Ref)	13	1 (Ref)	2.1	1 (Ref)	0.7	1 (Ref)	6	1 (Ref)	5.9	1 (Ref)
Female	54.9	1.16**	37.3	0.82***	30.8	1.03	12.3	0.97	12.1	0.78**	11.7	0.88	1.0	0.48**	0.5	0.73	3.7	0.61***	6.6	1.14
Total	52.9		39.8		30.5		12.4		13.7		12.4		1.6		0.6		4.9		6.2	
Reasons for ceasing drinking																				
Age																				
14-17	20.7	0.34*	33.3	0.73	35.7	1.77	19.9	2.14	8.3	1.43	2.2	0.26	14.8	9.35***	3.3	4.02	0	-	37.6	4.87***
18-23	33.3	0.65	48.6	1.39	29.1	1.31	13.5	1.34	11.0	1.95	13.1	1.74	0.8	0.44	1.5	1.82	5.0	2.59	20.4	2.07*
24-29	32.7	0.64	31.8	0.68	16.9	0.65	8.1	0.76	2.6	0.41	7.8	0.97	0	-	0.3	0.29	1.2	0.57	17.8	1.77
30-49	43.2	1 (Ref)	40.5	1 (Ref)	23.9	1 (Ref)	10.4	1 (Ref)	5.9	1 (Ref)	8.0	1 (Ref)	1.8	1 (Ref)	0.1	1 (Ref)	2.0	1 (Ref)	11.0	1 (Ref)
50-64	64.8	2.42***	28.8	0.59*	26.9	1.17	5.6	0.51	14.9	2.78**	11.4	1.48	3.1	1.08	1.0	1.14	4.3	2.21	18.4	1.82*
65+	59.7	1.94*	7.9	0.13***	15.6	0.59	11.7	1.14	15.4	2.89**	4.0	0.48	0	-	1.1	1.25	4.8	2.45	23.3	2.45**
Sex																				
Male	53.1	1 (Ref)	44.5	1 (Ref)	29.7	1 (Ref)	12.2	1 (Ref)	9.6	1 (Ref)	8.7	1 (Ref)	2.5	1 (Ref)	1.5	1 (Ref)	3.9	1 (Ref)	21.4	1 (Ref)
Female	36.5	0.51***	30.9	0.56***	20.9	0.63*	9.7	0.77	7.2	0.72	8.2	0.93	2.3	0.9	0.8	0.5	1.9	0.46	14.6	0.63*
Total	42.6		35.9		24.1		10.6		8.0		8.4		2.4		1.1		2.6		17.1	

*p<0.05; **p<.01, ***p<0.01

N=7,679 (Reduced Drinking); N = 1,034 (Ceased Drinking)

Supplementary Table 1: Proportion of drinkers who reduced or ceased drinking in the past 12 months by age, sex and year of survey (95% CI)

		Reduced drinking				
		2001	2004	2007	2010	2013
Males	14-17	29.5 (25.0, 34.5)	29.0 (23.4, 35.2)	32.4 (26.4, 38.9)	32.7 (26.3, 39.7)	34.8 (26.5, 44.3)
	18-23	41.1 (37.3, 45.0)	45.1 (40.6, 49.7)	47.8 (42.7, 52.9)	48.0 (43.7, 52.2)	43.1 (38.4, 47.8)
	24-29	48.1 (44.3, 51.9)	45.0 (41.0, 49.1)	51.1 (46.3, 56.0)	51.9 (47.8, 56.0)	48.2 (43.9, 52.5)
	30-49	39.5 (37.7, 41.3)	44.7 (42.7, 46.7)	45.4 (43.2, 47.7)	44.9 (43.0, 46.8)	45.6 (43.5, 47.7)
	50-64	42.7 (40.4, 45.1)	45.6 (43.2, 48.0)	47.8 (45.1, 50.4)	44.5 (42.3, 46.7)	45.6 (43.2, 48.0)
	65+	44.9 (42.2, 47.6)	49.5 (46.8, 52.3)	50.5 (47.6, 53.4)	45.6 (43.2, 48.0)	45.9 (43.5, 48.4)
	Total	41.4 (40.2, 42.5)	44.9 (43.6, 46.1)	46.9 (45.5, 48.2)	45.5 (44.3, 46.7)	45.3 (44.0, 46.6)
Females	14-17	31.1 (26.7, 35.9)	31.5 (26.8, 36.6)	36.8 (30.8, 43.2)	37.9 (31.9, 44.3)	27.5 (21.0, 35.1)
	18-23	41.8 (38.5, 45.2)	49.4 (45.8, 53.0)	49.7 (45.2, 54.2)	48.5 (44.6, 52.4)	45.1 (40.8, 49.5)
	24-29	43.3 (40.4, 46.4)	45.7 (42.2, 49.2)	44.8 (40.8, 48.9)	50.0 (46.6, 53.4)	49.9 (46.2, 53.5)
	30-49	36.5 (35.0, 38.1)	40.3 (38.6, 42.0)	44.0 (42.0, 49.9)	42.8 (41.1, 44.5)	41.1 (39.4, 42.9)
	50-64	31.5 (29.4, 33.7)	35.8 (33.6, 38.0)	40.4 (38.0, 47.8)	40.4 (38.4, 42.5)	41.4 (39.2, 43.6)
	65+	30.9 (28.2, 33.7)	33.9 (31.1, 36.9)	38.3 (35.4, 41.3)	36.8 (34.2, 39.4)	36.5 (33.9, 39.1)
	Total	35.8 (34.8, 36.8)	39.7 (38.6, 40.8)	42.8 (41.6, 44.0)	42.6 (41.6, 43.7)	41.4 (40.3, 42.5)
Overall	14-17	30.3 (27.1, 33.7)	30.2 (26.5, 34.2)	34.6 (30.3, 39.1)	35.3 (30.8, 40.0)	31.2 (25.8, 37.3)
	18-23	41.4 (38.9, 44.0)	47.4 (44.5, 50.3)	48.7 (45.3, 52.1)	48.2 (45.3, 51.1)	44.0 (40.8, 47.3)
	24-29	45.8 (43.4, 48.2)	45.3 (42.6, 48.1)	48.0 (44.8, 51.2)	51.0 (48.3, 53.6)	49.0 (46.2, 51.9)
	30-49	38.1 (36.9, 39.2)	42.6 (41.2, 43.9)	44.7 (43.2, 46.2)	43.8 (42.6, 45.1)	43.4 (42.0, 44.8)
	50-64	37.4 (35.8, 39.0)	40.8 (39.1, 42.4)	44.1 (42.4, 45.9)	42.6 (41.1, 44.1)	43.5 (41.9, 45.1)
	65+	37.9 (36.0, 39.9)	42.4 (40.4, 44.4)	44.8 (42.7, 46.9)	41.3 (39.5, 43.1)	41.4 (39.6, 43.2)
	Total	38.7 (37.9, 39.4)	42.4 (41.5, 43.2)	44.9 (43.9, 45.8)	44.1 (43.3, 44.9)	43.4 (42.6, 44.3)
		Ceased drinking				
		2001	2004	2007	2010	2013
Males	14-17	9.9 (7.0, 13.9)	11.6 (7.8, 16.9)	10.5 (7.1, 15.3)	12.7 (8.9, 17.7)	11.7 (7.3, 18.3)
	18-23	4.3 (3.1, 6.1)	4.7 (3.0, 7.2)	4.9 (2.8, 8.4)	6.6 (4.6, 9.3)	6.2 (4.3, 9.0)
	24-29	3.4 (2.2, 5.1)	3.0 (1.9, 4.6)	6.4 (4.4, 9.3)	6.7 (4.8, 9.3)	4.2 (2.8, 6.3)
	30-49	2.7 (2.1, 3.4)	3.2 (2.6, 4.0)	3.7 (2.9, 4.6)	3.7 (3.1, 4.5)	4.6 (3.8, 5.6)
	50-64	2.8 (2.1, 3.7)	3.1 (2.4, 4.0)	2.8 (2.0, 3.8)	2.5 (1.9, 3.2)	3.0 (2.3, 3.8)
	65+	2.3 (1.6, 3.4)	2.4 (1.7, 3.3)	3.4 (2.5, 4.8)	2.7 (2.0, 3.6)	2.1 (1.5, 2.9)
	Total	3.3 (2.9, 3.8)	3.6 (3.2, 4.2)	4.2 (3.6, 4.8)	4.3 (3.8, 4.9)	4.2 (3.7, 4.7)
Females	14-17	7.8 (5.5, 10.9)	11.2 (8.2, 15.2)	10.6 (7.2, 15.5)	12.5 (8.9, 17.3)	14.3 (9.2, 21.5)
	18-23	5.7 (4.3, 7.5)	9.2 (7.3, 11.6)	7.1 (5.3, 9.4)	8.5 (6.6, 10.9)	8.0 (6.0, 10.6)
	24-29	7.8 (6.4, 9.6)	10.5 (8.5, 12.9)	11.8 (9.6, 14.5)	12.6 (10.5, 15.1)	12.5 (10.2, 15.1)
	30-49	5.7 (5.0, 6.5)	6.9 (6.1, 7.8)	6.5 (5.6, 7.4)	7.0 (6.2, 7.9)	10.1 (9.1, 11.3)
	50-64	3.1 (2.4, 4.0)	3.9 (3.0, 4.9)	4.5 (3.6, 5.6)	4.0 (3.3, 5.0)	3.7 (3.0, 4.6)
	65+	3.4 (2.4, 4.7)	5.1 (3.9, 6.6)	4.3 (3.1, 6.0)	3.4 (2.6, 4.5)	4.1 (3.1, 5.3)
	Total	5.2 (4.8, 5.7)	6.9 (6.3, 7.5)	6.5 (6.0, 7.2)	6.9 (6.3, 7.4)	7.9 (7.3, 8.5)
Overall	14-17	8.8 (6.9, 11.3)	11.4 (8.9, 14.6)	10.6 (8.0, 13.8)	12.6 (9.9, 15.9)	13.0 (9.4, 17.6)
	18-23	5.0 (4.0, 6.2)	7.0 (5.7, 8.7)	5.9 (4.4, 7.9)	7.5 (6.1, 9.3)	7.1 (5.6, 8.9)
	24-29	5.5 (4.6, 6.7)	6.4 (5.3, 7.8)	9.1 (7.5, 11.0)	9.7 (8.2, 11.4)	8.3 (6.9, 9.9)
	30-49	4.1 (3.7, 4.6)	5.0 (4.5, 5.6)	5.0 (4.5, 5.7)	5.3 (4.8, 5.9)	7.3 (6.6, 8.0)
	50-64	2.9 (2.4, 3.5)	3.5 (2.9, 4.1)	3.6 (3.0, 4.3)	3.2 (2.7, 3.8)	3.3 (2.8, 3.9)
	65+	2.9 (2.2, 3.7)	3.6 (2.9, 4.5)	3.8 (3.0, 4.8)	3.0 (2.5, 3.7)	3.0 (2.4, 3.7)
	Total	4.3 (4.0, 4.6)	5.2 (4.8, 5.6)	5.3 (4.9, 5.8)	5.6 (5.2, 6.0)	6.0 (5.6, 6.4)

