



Attitudinal Factors Associated with Drink Counting

Journal:	<i>Drug and Alcohol Review</i>
Manuscript ID	CDAR-2020-0363.R2
Manuscript Type:	Brief Report
Date Submitted by the Author:	n/a
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Keywords (Please ensure that the Keywords and a short Running Head are also included in the manuscript file):	Alcohol drinking, Health promotion, Harm reduction, Attitude, Protective behavioural strategies

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This is the peer reviewed version of the following article: Booth, L., Jongenelis, M.I., Drane, C., Miller, P.G., Chikritzhs, T., Hasking, P., Hastings, G., Thorn, M. and Pettigrew, S. (2021), Attitudinal factors associated with drink counting. *Drug Alcohol Rev.*, which has been published in final form at <https://doi.org/10.1111/dar.13277>. This article may be used for non-commercial purposes in accordance with Wiley Terms and Conditions for Use of Self-Archived Versions.

Brief report**Attitudinal Factors Associated with Drink Counting****Running title: Attitudes to drink counting****Leon Booth PhD**

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Competing interest statement

This work was supported by the National Health and Medical Research Council (NHMRC). The NHMRC was not involved in the design of the study; the collection, analysis, and reporting of the data; the writing of the manuscript; and the decision to submit the manuscript for publication. The authors have no conflict of interest to declare.

Abstract

Introduction: ‘Count your drinks’ is a protective behavioural strategy (PBS) that has been found to be effective in reducing alcohol consumption. Previous research has shown that females, older people, and low-risk drinkers are more likely to use this strategy, but little is known about the attitudinal factors associated with engaging in drink counting. This information is important for developing effective interventions to encourage use of this PBS.

Aim: To assess whether the following attitudinal factors are associated with frequency of enactment of the ‘Count your drinks’ PBS: (i) perceived ease of use, (ii) perceived effectiveness, (iii) personal relevance, and (iv) believability.

Design and Methods: 683 Australian drinkers completed an online survey assessing demographic variables, alcohol consumption, frequency of drink counting, and attitudes to the ‘Count your drinks’ PBS. A hierarchical regression analysis was used to determine whether the attitudinal factors were associated with frequency of enactment after controlling for demographic and alcohol-related factors.

Results: Attitudes to the ‘Count your drinks’ PBS accounted for 28% of the variance in reported frequency of drink counting. Perceptions of personal relevance, ease of use, and effectiveness were found to be significantly associated with frequency of enactment.

Conclusion: Interventions designed to encourage drinkers to count their drinks should aim to increase the perceived personal relevance, ease of use, and effectiveness of this strategy.

Key words: Alcohol drinking; Health promotion; Attitude; Harm reduction; Protective behavioural strategies.

Introduction

Protective behavioural strategies (PBSs) are cognitive behavioural strategies proposed to be useful in reducing alcohol consumption and the risk of experiencing alcohol-related harms[1-3]. They include strategies (i) limiting alcohol intake (e.g. ‘Decide not to exceed a certain number of drinks’), (ii) modifying the manner of drinking (e.g. ‘Drink slowly rather than gulping or sculling’), and (iii) reducing risk of alcohol-related harms (e.g. ‘Use a designated driver’)[4]. Of the PBSs identified as being potentially effective, some have been found to have no effect on consumption and some have been associated with higher levels of intake, possibly due to usage contexts[1,5]. One PBS found to be associated with significant reductions in alcohol consumption over time is ‘Count your drinks’[5,6]. In Australia, the context of the present study, approximately 57% of drinkers report regularly counting their drinks[7], indicating substantial potential to increase use of this strategy to reduce alcohol-related harms.

Identifying factors associated with drink counting can inform interventions designed to increase use of this PBS[8]. Previous research has mainly focused on demographic correlates and found older people, females, and low-risk drinkers to be more likely to count their drinks[5,8]. Little is known about the attitudinal factors associated with drink counting, and the limited work to date has been primarily conducted among young adults and/or examined categories of PBSs rather than individual strategies[9,10]. This prior work has found more positive attitudes to PBSs to be associated with more frequent PBS enactment[9,10], which is consistent with decision making theories such as the Theory of Planned Behaviour and the Health Belief Model that highlight the importance of attitudes in forming behavioural intentions[11,12].

1 The potential for promoting drink counting as a means of encouraging drinkers to reduce
2 their alcohol consumption is important in the context of the most recent National Drug
3 Strategy Household Survey (NDSHS) showing that 52% of drinkers reported attempting to
4 reduce their alcohol intake[13]. In addition, promoting drink counting is consistent with
5 national drinking guidelines that make recommendations in terms of quantities of standard
6 drinks consumed[14]. Given the importance of attitudinal factors in forming behavioural
7 intentions[11,12] and the lack of evidence relating to the role of these attitudinal factors in
8 influencing PBS use, the aim of the present study was to assess the extent to which Australian
9 drinkers' perceptions of the believability, ease of use, personal relevance, and perceived
10 effectiveness of this strategy are associated with frequency of enactment. These four attitudes
11 have been found to influence intentions to quit smoking following exposure to quit
12 messages[15,16], indicating their potential utility for informing the development of drink
13 counting interventions.

15 Method

16 Sample

17 As part of a larger study, an ISO accredited web-panel provider (Pureprofile) was
18 commissioned to administer an online survey to 2,010 adult drinkers aged 15 to 70 years.
19 Quotas were used to recruit from the panel a sample that was nationally representative in
20 terms of age and gender (Table 1). The focus of the present study was a subsample of 683
21 drinkers who were randomly assigned to a condition where they were exposed to the 'Count
22 your drinks' PBS and asked perception questions. This subsample did not significantly differ
23 from the larger sample on demographic and alcohol-related characteristics, but compared to
24 national estimates there was an underrepresentation of non-tertiary-educated individuals and
25 drinkers exceeding the then guideline for reducing the risk of long-term harm (i.e.,

1 consuming no more than two standard drinks per day on average), and an overrepresentation
2 of drinkers exceeding the short-term harm guideline (i.e., consuming no more than four
3 standard drinks on a single occasion in the previous month)[7]. The study was approved by a
4 university Human Research Ethics Committee and all respondents provided informed consent
5 and received a small financial reward for participation.

6
7 *Insert Table One Here*

8 9 **Survey Instrument**

10 Respondents reported their demographic characteristics (age, gender, postcode, education
11 level, and income). As per the NDSHS[13], alcohol consumption was assessed by asking “*In*
12 *the last 12 months, how often did you have an alcoholic drink of any kind?*” (1=I did not have
13 an alcoholic drink to 8=Every day), “*On a day that you have an alcoholic drink, how many*
14 *standard drinks do you usually have?*” (1=Half a drink to 11=20+ drinks). Those drinking >2
15 standard drinks/day on average were classified as being at long-term risk of harm[14]. To
16 assess risk of short-term harm[14], respondents were asked, “*In the last month, have you*
17 *consumed more than 4 standard drinks in a single sitting?*” (No/Yes). Frequency of drink
18 counting was assessed by asking respondents to report how often they count their drinks
19 when consuming alcohol (5-point scale: 1 (Never) to 5 (Always)). Attitudes to the ‘Count
20 your drinks’ strategy were also assessed on the following 5-point scales adapted from the
21 tobacco literature[15,16]: perceived effectiveness - “*If drinkers were to follow this strategy,*
22 *how likely is it that they would drink less than they otherwise might have?*” (1=Very unlikely
23 to 5=Very likely); believability - “*To what extent do you agree that this strategy is believable*
24 *as a way for drinkers to limit their alcohol intake?*” (1=Strongly disagree to 5=Strongly
25 agree); relevance - “*To what extent do you agree that this strategy is personally relevant to*

1 you?" (1=Strongly disagree to 5=Strongly agree); and ease of use - "How easy or difficult
2 would it be for you to follow this strategy?" (1=Very difficult to 5=Very easy).

4 **Data Analyses**

5 As scores on the outcome variable were found to be normally distributed (skewness < 2,
6 kurtosis < 4), initial correlation analyses were conducted to identify variables associated with
7 frequency of drink counting. Variables that emerged as significant were entered into a
8 hierarchical multiple regression model. Demographic and alcohol-related variables were
9 treated as control variables and entered at step 1, with the attitudinal variables introduced at
10 step 2. As PBS enactment has been found to differ based on age, gender, and alcohol-related
11 variables[8], moderation analyses were also conducted to determine whether the relationships
12 between attitudes and drink counting were affected by these variables.

14 **Results**

16 The following variables were found in correlation analyses to be significantly associated with
17 frequency of drink counting: female gender, being at risk of short-term harm, being at risk of
18 long-term harm, and the attitudinal variables of perceived effectiveness, believability,
19 relevance, and ease of use (see supplementary Table S1). Table 2 presents the results of the
20 hierarchical linear regression that included these variables. Multicollinearity was not
21 observed. At step one, control variables accounted for 5% of variance in count enactment:
22 $F(3, 679) = 13.58, p < .001$ Attitudinal variables were entered at step 2 and accounted for an
23 additional 28% of variance: $F(7, 675) = 48.16, p < .001$. Of these, relevance accounted for the
24 most unique variance, followed by ease of use and then perceived effectiveness; believability
25 was not significant. The risk of short-term alcohol-related harm was also significant at step 2.

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3 1 The moderation analyses did not reveal any significant interaction effects at the Bonferroni
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5 2 corrected alpha level ($p=.003$).

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8 3 *Insert Table Two Here*

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12 5 **Discussion**

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14 6 This study adds to the limited body of research that links positive attitudes to PBSs to greater
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16 7 enactment of PBSs[9,10]. Previous research on the drink counting PBS has focused on
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18 8 demographic and alcohol consumption variables and found that older people, females, and
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20 9 low-risk drinkers are more likely to count their drinks[5,8]. The present finding that drinking
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22 10 at levels associated with short-term harm was inversely associated with frequency of drinking
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24 11 counting is consistent with this prior research. The lack of significant effects for the assessed
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26 12 demographic variables suggests that attitudinal factors are likely to be more influential than
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28 13 demographic factors.

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35 15 Reviews of public health interventions highlight the need to examine factors associated with
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37 16 behaviour change to inform the development of effective approaches[17]. The results of the
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39 17 present study indicate that interventions designed to increase enactment of the drink counting
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41 18 PBS will need to make the personal relevance of this strategy salient, such as by encouraging
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43 19 drinkers to monitor their intake according to drinking guidelines. It will also be important to
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45 20 convince drinkers that drink counting is effective and easy to enact, potentially via public
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47 21 health messaging. Third, formative research is needed to explicate drinkers' attitudes relating
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49 22 to the enactment of drink counting to better understand any misconceptions and other
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51 23 potential barriers to using this PBS. Such research is especially needed among those drinking
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53 24 at levels associated with short-term harm due to their lower current levels of enactment.
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3 1 The primary limitation of this study was the use of an online panel, which may have resulted
4
5 2 in a non-representative sample. While the use of quotas ensured reasonable demographic
6
7 3 representation, there were notable differences in short- and long-term risk status between the
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9 4 present sample and the national drinking population. A further limitation is that the cross-
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11 5 sectional design precludes causal inferences on the relationship between positive attitudes to
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13 6 drink counting and more frequent enactment. Future longitudinal work is needed to confirm
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15 7 the directionality of effects.
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21 9 In conclusion, encouraging Australians to count their drinks could be an effective means of
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23 10 reducing population-level alcohol-related harms. The findings highlight the importance of
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25 11 developing interventions that enhance perceptions of the personal relevance, efficacy, and
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27 12 ease of drink counting to optimise adoption.
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1 *Table 1. Sample Profile (n = 683)*

Demographic attribute	<i>n</i>	Present Study (%)	Australian Drinking Population (%) ^a
<u><i>Gender</i></u>			
Female	335	49	49
Male	348	51	51
<u><i>Age (in years)</i></u>			
Mean (SD)	40.8 (14.9)		
15–24	129	19	16
25–34	141	21	21
35–44	127	19	19
45–54	134	20	19
55–64	109	16	17
65–70	49	6	8
<u><i>Education</i></u>			
Non-Tertiary	411	60	72
Tertiary	272	40	28
<u><i>Socioeconomic status^b</i></u>			
Low	254	37	39
Mid	277	41	40
High	152	22	21
<u><i>Frequency of using Count PBS</i></u>			
Always	233	34	34
Usually/Most of the time	195	29	23
Sometimes	133	20	17
Rarely	90	13	12
Never	32	5	14
<u><i>Drinking status^c</i></u>			
Risk of short-term harm	270	37	22
Risk of long-term harm	79	12	33

2 *Note:* Due to rounding, percentages may not sum to 100%

3 ^aPercentages for age and gender are estimated using data on the Australian drinking populations aged 15-
4 75 years supplied by the Australian Institute of Health and Welfare [7] and population data from the
5 Australian Bureau of Statistics [18]. Percentages for socioeconomic status are estimated from the total
6 National Drug Household Survey sample (n = 22,274) due to the unavailability of drinker-only data
7 Australian Institute of Health and Welfare [7]. Percentage for education are based on the general
8 Australian population aged 15 -74 using data from the Australian Bureau of Statistics [19].

9 ^bSocio-Economic Indexes for Areas (SEIFA) classification [20].

10 ^cLong-term risk = consumption of > two standard drinks per day over the past 12 months; Short-term risk
11 = consumption of > four standard drinks in a single sitting in the last month [14].

1 Table 2. Hierarchical regression results for factors associated with drink counting

Factor	B	Std. Error	[95% CI for B]	β	sr^2	p-value
<i>Step 1</i>						
Gender (Female)	0.17	0.09	[-0.01, 0.34]	.07	.005	.064
Risk of short-term harm	-0.51	0.10	[-0.69, -0.32]	-.21	.039	< .001
Risk of long-term harm	-0.11	0.15	[-0.40, 0.17]	-.03	.001	.444
<i>Step 2</i>						
Gender (Female)	0.15	0.08	[0.00, 0.30]	.06	.004	.051
Risk of short-term harm	-0.26	0.08	[-0.42, -0.09]	-.11	.009	.002
Risk of long-term harm	-0.04	0.12	[-0.29, 0.20]	-.01	.000	.721
Perceived effectiveness	0.11	0.05	[0.01, 0.21]	.09	.005	.026
Believability	-0.04	0.05	[-0.13, 0.06]	-.03	.000	.484
Relevance	0.38	0.04	[0.31, 0.46]	.37	.094	< .001
Ease of Use	0.28	0.04	[0.20, 0.37]	.24	.041	< .001

2 Note: Standardised regression coefficients are standardised to the unit of measurement.

Table S1. Univariate correlation analyses

	1	2	3	4	5	6	7	8	9	10	11	12
1. Frequency of using Count	-											
2. Gender (Female)	.10**	-										
3. Age	.04	-.08*	-									
4. SES decile	.02	-.03	.05	-								
5. Education level	.06	-.07	.03	.26***	-							
6. Income	.05	-.02	-.04	.23***	.24***	-						
7. Risk of short-term harm	-.23***	-.12**	-.18***	.01	-.01	.00	-					
8. Risk of Long-term harm	-.10**	-.13**	.10*	-.01	-.03	-.03	.29***	-				
9. Perceived effectiveness	.31***	-.03	.10**	.09*	-.01	.02	-.03	.01	-			
10. Believability	.31***	-.02	.07	.05	-.01	.01	-.09*	.03	.56***	-		
11. Relevance	.49***	.00	-.02	.04	.03	.04	-.10**	-.06	.45***	.50***	-	
12. Ease of use	.43***	.10**	.11**	-.02	-.05	.03	-.30***	-.12**	.29***	.40***	.36***	-

*p < .05 ** p < .01 ***p < .001

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Table S1. Univariate correlation analyses

	1	2	3	4	5	6	7	8	9	10	11	12
1. Frequency of using Count	-											
2. Gender (Female)	.10**	-										
3. Age	.04	-.08*	-									
4. SES decile	.02	-.03	.05	-								
5. Education level	.06	-.07	.03	.26***	-							
6. Income	.05	-.02	-.04	.23***	.24***	-						
7. Risk of short-term harm	-.23***	-.12**	-.18***	.01	-.01	.00	-					
8. Risk of Long-term harm	-.10**	-.13**	.10*	-.01	-.03	-.03	.29***	-				
9. Perceived effectiveness	.31***	-.03	.10**	.09*	-.01	.02	-.03	.01	-			
10. Believability	.31***	-.02	.07	.05	-.01	.01	-.09*	.03	.56***	-		
11. Relevance	.49***	.00	-.02	.04	.03	.04	-.10**	-.06	.45***	.50***	-	
12. Ease of use	.43***	.10**	.11**	-.02	-.05	.03	-.30***	-.12**	.29***	.40***	.36***	-

*p < .05 ** p < .01 ***p < .001