Drink driving during the COVID-19 pandemic

Dr Natalie Watson-Brown[ab*], Dr Verity Truelove[b], Ms Emily Parker [b], Professor Jeremy Davey[b]

[a] Queensland University of Technology (QUT), Centre for Accident Research and Road Safety – Queensland (CARRS-Q), Kelvin Grove, Queensland, Australia

[b] Road Safety Research Collaboration, University of the Sunshine Coast (USC), Australia

*This paper is based on research by the first author conducted while affiliated with the University of the Sunshine Coast (USC)

Email address:

natalie.watsonbrown@qut.edu.au **– corresponding author**

Queensland University of Technology (QUT)

Centre for Accident Research & Road Safety - Queensland

130 Victoria Park Road, Kelvin Grove, Queensland 4059 Australia

vtruelove@usc.edu.au

eparker@usc.edu.au

jdavey4@usc.edu.au

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Abstract

Due to the COVID-19 pandemic, static roadside random breath testing (RBT) was temporarily suspended between 16 March and 12 June 2020 in Queensland, Australia. In addition to restrictions on travel and social interactions, this provided a unique opportunity to examine changes in drink-driving behaviour during and after a reduction in RBT operations in the community. Three cross-sectional surveys were disseminated at different time points to examine these differences. Over three surveys, 1,193 Queensland licensed drivers aged 18 years and over (M = 36.9, SD = 16.7) responded. While overall drink driving decreased over the three survey periods, there were groups where drink driving, or the intention to drink drive, increased over the same period. This could be expected as a result of community restrictions on socialising and travel behaviours. In each of the surveys, prior engagement in drink driving was the strongest predictor of intention to increase future engagement and actual engagement. These drink drivers were more likely aged 18-24 years, male, and held restricted licensure. Notably, a small number of participants who reported drink driving, and/or intention to drink drive during the survey period, reported not having engaged in this behaviour previously. This suggested an increased likelihood of drink drivers experiencing punishment avoidance which may promote future engagement in this behaviour. Despite a decrease in social opportunities to drink, and the suspension of highly visible roadside breath testing sites, drink driving persisted. This research highlights the importance of RBTs as a general deterrent for drink driving.

Keywords: coronavirus, COVID-19, pandemic, random breath testing, drink driving, road policing

Drink driving during the COVID-19 pandemic

1. Introduction

During the COVID-19 pandemic, road crashes have persisted despite reduced travel. In the United States, the traffic volume decreased by approximately 17 % yet road crash fatality rates increased from 1.06 fatalities per 100 million vehicle miles travelled in the first half of 2019 to 1.25 fatalities per 100 million vehicle miles travelled in the first half of 2020 (National Centre for Statistics and Analysis (NHSTA), 2020). In Australia, the road crash fatalities in the first eight months of 2020 have shown a 9% decrease compared to the same time last year. However, in Queensland (the state where the current study was undertaken) there has been an increase in crash fatalities of 18% for the same period (BITRE, 2020). This is despite traffic density being reported to be at least 40% less during restrictions compared to the same time last year (TMR, personal communication, April 30, 2020). Notably, of these crash fatalities in Queensland, 23% have involved a drink driver or rider (YTD 31 May 2020; TMR, 2020). This is an increase compared to the 21% in 2019 (complete year that includes the typical seasonal drink driving peak in December) (TMR, 2020). During this time, restrictions on travel, household visitors, and public venues were enforced, as well as a suspension on static roadside random breath testing (RBT). This provided a unique opportunity to examine the relationships and potential impact of these changes on drink driving behaviour and perceptions of apprehension. The results of this study will not only aid in understanding the impact of COVID-19 on the community but also the effect of reduced RBTs on drink driving behaviour and attitudes.

1.1 Random Breath Testing and COVID-19

RBT operations in Queensland are a police-led strategy, whereby motorists can be randomly selected to provide a blood alcohol sample using a breathalyser, and subject to legal ramifications if they exceed the legal blood alcohol limit[1] (Homel, Carseldine, & Kearns, 1988). Research has shown RBTs to be effective in reducing drink-driving re-offending, crashes, and consequent fatalities (Freeman et al., 2021; National Academies of Sciences Engineering and Medicine, 2018; Tay, 2005). RBTs can be large-scale roadside static operations or ad-hoc random selections when police officers are mobile. Whilst Queensland static roadside RBT operations were suspended during the COVID-19 restrictions, police officers were permitted to continue testing on an ad-hoc basis. The number of RBTs conducted in Queensland in the first six months of 2020 was 562,778, more than a 50% decrease compared to the 1,269,916 tests in 2019 (Queensland Police Service, personal communication, October 15, 2020). There was a 15% decrease in drink drivers that were apprehended during this time. Despite this reduction in testing in 2020, 6,715 drink drivers were apprehended through testing. In the same period in 2019, and from more than double the amount of testing, 7,897 drink drivers were apprehended. Such operations are based on the principles of deterrence theory which state, criminal behaviour will decrease if the threat of apprehension is certain and the punishment is perceived as severe and swift (Akers & Sellers, 2013). The randomness of testing contributes to the perception that a motorist can be tested at any time, resulting in higher perceptions of the certainty of apprehension (Homel et al., 1988).

[1] In Queensland, the legal BAC for driving is less than 0.05. Drivers on a restricted licence, Learner and Provisional 1 and 2, and professional drivers are not permitted to have a BAC greater than zero (Queensland Government, 2018).

As a result of the COVID-19 pandemic, the government introduced restrictions on community movement to reduce transmission. Restrictions in Queensland, occurring between 23 March and 2 May, included non-essential travel and visitor limits, and closure of public venues including pubs, clubs and restaurants. In line with these health driven restrictions, static roadside RBTs were suspended on 16 March. This response was in part to limit direct, personal contact and exposure to potential transmission of the virus between the public and police officers. Furthermore, as part of the government response to the pandemic, many normal operational police practices were impacted upon due to the redeployment of police officers to specific COVID-19 activities. In particular, operational officers normally responsible for the processing of RBT were redeployed, resulting in a significant reduction in RBTs being conducted in the community.

Preliminary findings since the inception of the pandemic have identified that the reduction in physical social networking and restricted travel has brought about increased mental health concerns and an increase in alcohol and drug consumption (Vingilis et al., 2020). This social context including the impact of the current economic downturn due to COVID-19, was predicted to lead to increased opportunities for engagement in dangerous driving behaviours (Vingilis et al., 2020). The absence of road police presence within this environment could result in outcomes that may differ from previously studied global events. Subsequently, this period has provided a rare opportunity to explore drink driving behaviours during a time of reduced road policing enforcement, reduced public drinking opportunities, and significant social change. It is important to understand what has occurred and how drivers have responded to changes.

1.2 Study Aims

The study explored changes in drink-driving behaviours across three timeframes during and after the period of COVID-19 restrictions. Contributing factors to increased engagement in drink driving were examined in response to reduced RBT in Queensland, Australia.

2. Method

2.1 Participants

Across the three surveys there were 1,192 participants who met the selection criteria of current licenced drivers aged 18 years and over (M = 36.9, SD = 16.7) from Queensland, Australia. Participants in each of the three surveys were not necessarily the same individuals and the study was a repeated measures cross-sectional design. The total sample comprised of 859 females (72.1%), 323 males (27.1%), and 10 participants who identified as gender non-specific (0.8%). A large proportion of participants lived in urban postal codes (76.3%) and held an open licence (80.5%). Further demographic information for each survey is presented in Table 1.

Table 1

***Summary of Descriptive Statistics for each of the Three Surveys* (*n* = 1,192)**

Characteristic	Survey 1		Survey 2		Survey 3	
	n	%	*n*	%	*n*	%
n (% of total sample)	287	24.1	389	32.6	516	43.3
Age						
18-24	93	32.4	146	37.5	162	31.4
25-39	93	32.4	111	28.5	110	21.3
40-54	60	20.9	89	22.9	114	22.1

55-80	41	14.3	43	11.1	129	25.0
Gender						
Female	199	69.3	273	70.2	387	75.0
Male	85	29.6	110	28.3	128	24.8
Non-specific	3	1.0	6	1.5	1	0.2
Licence Type[a]						
Open	231	80.5	310	79.7	419	81.2
Provisional 2	37	12.9	44	11.3	62	12.0
Provisional 1	12	4.2	27	6.9	15	2.9
Learner	4	1.4	3	0.8	12	2.3
Other[b]	3	1.0	5	1.3	8	1.6
Postcode						
Urban	235	81.9	307	78.9	447	86.6
Regional	52	18.1	82	21.1	69	13.4
Average driving hours per week (Pre-COVID)						
Less than 5 hours	108	37.6	96	24.7	166	32.2
6-10 hours	117	40.8	167	42.9	206	39.9
11- 20 hours	50	17.4	93	23.9	112	21.7
21-30 hours	10	3.5	21	5.4	20	3.9
30+ hours	2	0.7	12	3.1	12	2.3

[a]Learner licensure mandates 100 hours of supervised driving practice over a minimum of 12 months. Provisional 1 licensure is the first phase of independent driving that includes restrictions such as passenger limits and prohibited mobile phone use while driving. Provisional 2 is the second phase of independent driving that includes fewer restrictions. Open licensure has no restrictions.
[b]Other included international licences, motorcycle licences, and a variety of light rig and heavy rig truck licences.

There were no significant differences across the three surveys concerning gender, $F(2, 1189) = 2.641$, $p = .072$. However, there was a significant difference for age $F(2, 1189) = 15.033$, $p < .001$. A Bonferroni post hoc test revealed that the mean age was significantly lower in Survey 1 ($M = 35.32$, $SD = 16.24$, $p < .001$) and Survey 2 ($M = 34.19$, $SD = 14.66$, $p < .001$) compared to Survey 3 ($M = 39.90$, $SD = 17.93$). There was no significant difference between Survey 1 and Survey 2 on age ($p = 1.000$).

Participant representativeness was somewhat reflective of the overall Queensland population in regard to regions with 84% of the population residing in urban and 16% in regional. Females and 18–24-year-olds were overrepresented in the study.

2.2 Materials

This study used three surveys conducted over three separate timeframes; details of each timeframe are provided in section 2.3. All surveys sought responses regarding general demographic information (age, gender, licence type, postcode, driving history), past drinking and drink-driving behaviour (prior to COVID-19 restrictions), as well as items assessing the awareness of the suspension of static roadside RBT operations, perceptions of deterrence, and intentions to drink drive and changes in drink-driving behaviour during the survey periods. Three brief 5-minute survey instruments, developed specifically for this study, were utilised.

Items were informed by existing drink-driving literature (Freeman et al., 2020; Freeman & Watson, 2009). A number of common survey items were included across all three surveys, and a number of specific items were included in response to the rapidly changing COVID-19 period across the separate surveys. Measures common to all three surveys included:
Driving behaviours – The average number of hours of driving per week in the 12 months prior to and following the COVID-19 lockdown (e.g., *Before the COVID-19 restrictions, on average, how many hours of driving were you doing per week?*).
Drinking behaviours – The items concerning drinking behaviours referenced a diversity of typical social locations where alcohol would be consumed. That is, *pubs or clubs, restaurants, friend's/family's place* and *home.* These items asked about frequency of drinking at each social location before COVID-19 restrictions (e.g., *In the past 12 months (prior to COVID-19 restrictions), how often would you consume alcohol at home*? scored on a 6-point scale from *never* to *daily or most days*).
Drink-driving behaviours (prior to COVID-19 restrictions) **–** Drink-driving items were based on previous research (Freeman et al., 2020) and included two drink-driving scenarios: when you think you are over the legal limit (*In the past 12 months (prior to COVID-19 restrictions, how often have you driven a motor vehicle when you thought you were over your legal alcohol limit?* scored on a 6-point scale from *never* to *daily*) and after 1-2 drinks (*In the past 12 months (prior to COVID-19 restrictions), how often would you have had 1-2 drinks and driven within the hour?* scored on the same 6-point scale). Additionally, the frequency of drink driving from social locations (*pubs or clubs, restaurants, friend's/family's place* and *home*) was scored on a 6-point scale from *never* to *daily or most days*.
Certainty of apprehension – Perceptions of certainty of being apprehended for drink driving were determined through two items based on previous research (Freeman & Watson, 2006, 2009; Homel et al., 1988): the belief that you would be apprehended if driving over the legal limit (*In the past 12 months (prior to COVID-19 restrictions), how likely do you believe that if you were to drive over the legal limit after drinking alcohol you would have been caught by police?* scored on a 6-point scale from *very unlikely* to *very likely*), and the belief that other drivers would be caught. An additional item identified how many times participants had been tested at an RBT operation in the past 12 months (*How many times in the past 12 months have you been stopped and tested by Queensland police at an RBT operation?*).
Response to the suspension of static RBTs – An initial item determined knowledge of the RBT suspension as a result of COVID-19 restrictions (*On the 16th March 2020 it was announced that police would suspend large-scale routine Random Breath Testing (RBT) because of COVID-19. Are/were you aware of this change? –* a note was included stating *Police will continue/continued target testing where they suspect/ed a driver is/was under the influence of alcohol and drugs.*) with another item asking whether their drink-driving behaviours had changed over the period.

Items were modified for each survey in response to the rapidly changing COVID-19 pandemic. These items that were included in the specific surveys are discussed below.

2.2.1 Survey 1

Additional to the measures outlined in Section 2.2, Survey 1 also assessed:
Drinking behaviours – The change in frequency of drinking at each social location since COVID-19 restrictions were introduced (e.g., *Due to COVID-19, in the last few weeks how has your frequency of drinking at home changed?* Scored as *increased, decreased* or *stayed the same*) and how participants perceived their frequency of drinking would change over next month.

Response to the suspension of static RBTs – Two items questioned intended changes in drink-driving behaviours since the suspension. These items addressed both the participant's and other drivers' intention to change drink driving behaviours (*How likely do you think others will increase their engagement in drink driving now that routine Random Breath Testing (RBT) has been suspended?* scored on a 6-point scale from *very unlikely* to *very likely*).

2.2.2 Survey 2

Additional to the measures outlined in Section 2.2, Survey 2 also assessed:
Driving behaviours – Frequency of engaging in other dangerous driving behaviours (exceeding speed limit, using hand-held mobile phone while driving, and drug-driving) prior to and during COVID-19 restrictions (e.g., *In the past 12 months (prior to COVID-19 restrictions), how often would you exceed the speed limit?* scored on a 6-point scale from *never* to *daily or most days*).
Drinking behaviours – The frequency of having a drink containing alcohol before and during COVID-19 restrictions (e.g., *Since the COVID-19 restrictions, on average, how often do you have a drink containing alcohol?* scored on 5-point scale from *less than monthly* to *daily or most days*). The change in frequency of drinking and location of drinking since COVID-19 restrictions were introduced.
Certainty of apprehension – Perceptions of certainty of being apprehended for drink driving specifically during COVID- 19 restrictions (e.g., *Since the COVID-19 restrictions, how likely do you believe that someone driving over the legal limit would be caught by police?* scored on a 6-point scale from *very unlikely* to *very likely*).
Response to the suspension of static RBTs – Two items questioned intended changes in drink-driving behaviours since the suspension (e.g., *Due to COVID-19, has your drink-driving behaviour changed?* scored as *decreased, stayed the same,* or *increased*). These items examined both their own behaviours and the behaviours of others. Also, frequency of actual drink-driving during COVID-19 (*Since the COVID-19 restrictions, how often have you driven a motor vehicle when you thought you were over the legal limit?* scored on a 6-point scale from *never* to *daily or most days*).

2.2.3 Survey 3

Additional to the measures outlined in Section 2.2, Survey 3 also assessed:
Driving behaviours – Frequency of engaging in other dangerous driving behaviours (exceeding speed limit, using hand-held mobile phone while driving, drug-driving, driving after taking prescription drugs known to affect driving, and driving while fatigued) before, during and after COVID-19 restrictions (e.g., *Now that the COVID-19 restrictions are easing, how often will you use a hand-held mobile phone while driving?* scored on a 6-point scale from *never* to *daily or most days*).
Drinking behaviours – The frequency of having a drink containing alcohol before, during and after COVID-19 restrictions (e.g., *Now that the COVID-19 restrictions are easing, on average, how often will you have a drink containing alcohol?* scored on a 5-point scale from *less than monthly* to *daily or most days*).
Response to reintroduction of static RBTs – An item was added to determine knowledge of the reintroduction of static routine RBTs (*On the 12th June 2020, the suspension of routine Random Breath Testing (RBT) was lifted. Are you aware of this change?*).
Any items which measured before behaviours and intentions occurring before or during COVID-19 restrictions (drinking behaviours, driving behaviours, etc.) were again measured using the new wording of "now that restrictions are easing".

2.3 Procedure

The three online surveys were designed to examine drink-driving behaviours during reduced RBTs as a result of the COVID-19 pandemic. Survey 1 was disseminated online from the beginning of April to mid-May 2020, Survey 2 was from mid-May until mid-June, and Survey 3 was from end of June to mid-August. Survey 1 was conducted during the timeframe when all non-essential businesses were closed, non-essential travel bans were put in place, and static routine RBTs were suspended. Survey 2 was disseminated as Queensland began to ease restrictions, when families could have up to five visitors, travel restrictions gradually eased, and non-essential businesses were permitted to reopen with staggered capacity restrictions. During this period there were significantly reduced RBT operations. Survey 3 was disseminated following the announcement that RBTs would be reinstated. Ethical approval was obtained from University of the Sunshine Coast Human Research Ethics Committee (approval number: A201370). A convenience sampling approach recruiting participants via paid social media advertising was used. Advertisements were posted on Facebook and Instagram and therefore recruitment was limited to social media users living in Queensland aged 18 years and over. Consent was required prior to completing the surveys and anonymity was assured.

2.4 Data Analysis

Data was analysed using IBM Statistical Package for the Social Sciences (SPSS), Version 26. Crosstabulation matrices were used to explore relationships within each survey. Following the exploratory analyses, multiple linear regression analyses were conducted to understand the contributing factors to intention to increase drink driving, engagement in drink driving, and intention to drink drive after the COVID-19 lockdown. Due to high kurtosis regressions were conducted using the bias-corrected and accelerated (BCa) bootstrapped 95% confidence interval based on 1,000 samples (Freedman, 1981). Paired-samples *t*-tests were conducted to analyse changes in drink driving behaviours associated with the reduction in RBTs and the reinstatement of the suspension of static RBTs in Surveys 2 and 3. Unless stated, assumptions were tested and not violated. Results were considered significant at $p < .05$. Missing data was dealt with listwise.

3. Results

The following presents the results for Surveys 1, 2, and 3 individually with the context for the entire study presented in Figure 1.

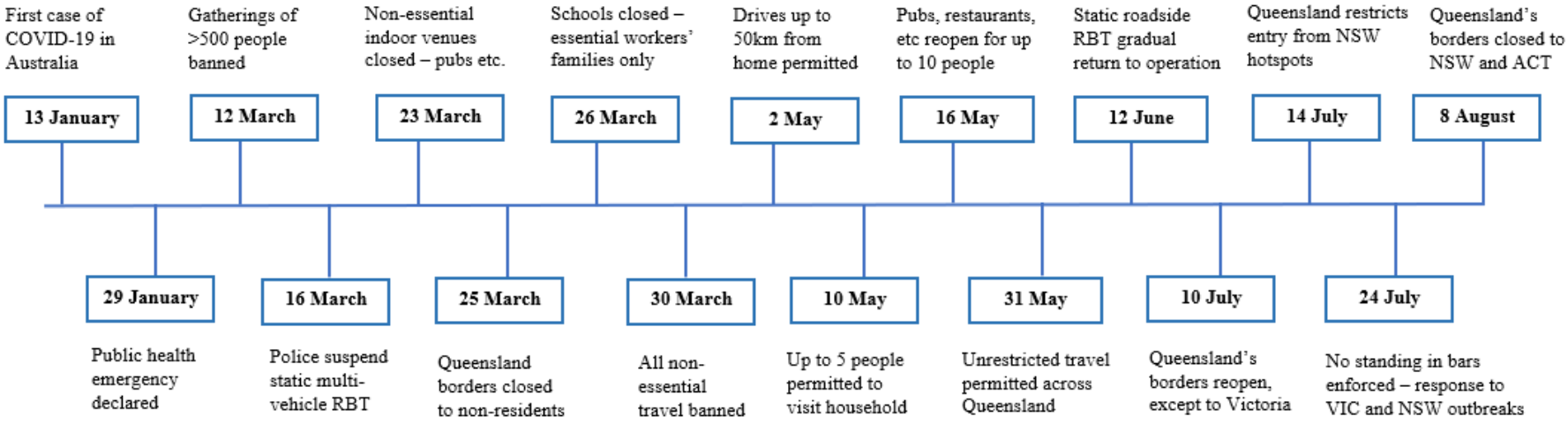

Figure 1. **Timeline spanning the three surveys including legislative changes, and other significant events, since the inception of the COVID-19 pandemic in Queensland, Australia.**

3.1 Survey 1

The timeframe for Survey 1 data collection was 1 April – 8 May. The context for this period is presented in Figure 1, highlighting that on 16 March static roadside RBTs were suspended in response to COVID-19.

The means and standards deviations for the variables of interest in Survey 1 are reported in Table 2. Overall, there was a decrease in drink driving. The proportion of participants reporting engagement in drink driving in the past 12 months was 23%. Four percent of participants reported an intention to increase drink driving behaviours during the COVID-19 restrictions, with 2.5% reporting an actual increase in drink driving behaviour at the time of the survey. Eighty-five percent reported that their engagement, or not, in drink driving had remained the same since COVID-19 restrictions, and 12.5% reported a decrease in drink driving. However, 77% of participants believed other drivers would increase engagement in drink driving in response to reduced RBT operations. Sixty-two percent reported that they knew police had suspended routine RBT operations from the 16 March as a result of COVID-19 restrictions. Of the drink drivers intending to increase these behaviours 64% were aged 18-24 years, with this age group representing 32% of participants. The proportion of males intending to increase engagement in drink driving was greater than females and P1-licensed drivers were also more likely to report an increase compared to other licence groups. Eighty-two percent of participants intending to increase engagement in drink driving admitted to drink driving in the past 12 months. Surprisingly, 18% stated not having engaged in drink driving in the past 12 months but were intending to drink drive during the period of reduced RBT. Of those intending to increase engagement in drink driving, 73% believed - in the last 12 months - that if they were to drink and drive, it was unlikely they would be caught by police officers.

3.1.1 Hierarchical multiple linear regression

A hierarchical multiple linear regression was conducted to examine the predicting factors of the likelihood of increasing engagement in drink driving during the COVID lockdown. The dependent variable was *how likely do you think that you will increase your engagement in drink driving now that routine Random Breath Testing (RBT) has been suspended* (*M* = 1.27, *SD* =0.70). The results of this regression are reported in Table 2. Age was entered into step 1 of the regression as a control variable with other variables of interest entered into step 2.

Table 2 ***Hierarchical Multiple Linear Regression Examining the Predicting Factors of an Increased Engagement in Drink Driving during COVID Restrictions: Survey 1 (n = 276)***

Variables	M(SD)	β	*p*	B	sr^2
Step 1					
Age	35.32(16.24)	-.162	.007**	-.007	.026
Step 2					
Drink driving (P)[a]	1.32(0.71)	.271	.000***	.267	.040
Drive after 1-2 drinks (P)[a]	1.79(1.02)	.114	.051	.078	.010
Certainty - general (P)[a]	3.51(1.29)	.088	.134	.048	.006
Certainty - personal (P)[a]	3.64(1.31)	-.035	.553	-.019	.001
Drink driving frequency (P)[a]:					
Pubs/clubs	1.14(0.50)	.108	.137	.150	.006
Restaurants	1.13(0.45)	.033	.639	.051	.001
Friend's/Family's place	1.26(0.65)	.020	.795	.021	.000

Home	1.15(0.49)	.150	.030*	.214	.012
Knowledge of RBT suspension[b]	1.36(0.48)	-.014	.781	-.021	.000
Others likely to increase drink driving (D)[a]	4.27(1.27)	.081	.139	.045	.006

Note. B = unstandardised B. BCa = bias corrected and accelerated bootstrap. CI = confidence interval. sr^2 = semi partial correlation squared.
D = during COVID lockdown. P = prior to COVID lockdown (in the past 12 months).
[a]Measured on a 6-point scale. [b]Yes = 1. No = 2.
*p<.05. **p<.01. ***p<.001.

As evident in Table 2 the model was significant at step 1 where age was entered as a control variable, F (1,273) = 7.395, p = .007, with an R^2 of .026 and an adjusted R^2 of .023. This meant that younger drivers were more likely to report an intention to increase engagement in drink driving due to the reduction in RBT operations. Step 2 was also significant, F (11,263) = 11.360, p < .001, with an R^2 of .322 and an adjusted R^2 of .294. The additional drink driving variables entered at step 2 were able to explain an additional 29.6% of the variance in the intended increase in drink-driving behaviours during COVID restrictions. Frequency of drink driving in the past 12 months, and specifically drink driving from home, were significant predictors suggesting that past engagement in drink driving predicted the intention to increase drink driving behaviours during COVID restrictions.

3.2 Survey 2

Survey 2 data collection occurred during 12 May – 16 June. The context for this period is presented in Figure 1, noting restrictions were beginning to ease from 2 May. However, static roadside RBT operations remained suspended.

Means and standard deviations for the variables of interest in Survey 2 are reported in Table 3. Overall, the results reflected a decrease in drink-driving behaviours during restrictions. Thirty-two percent of participants reported drink driving in the past 12 months. Of the Survey 2 participants, 6% reported an intention to increase engagement in drink driving over the time period while static roadside RBT operations were suspended. Seven percent reported an actual increase in drink driving behaviours since the restrictions and RBT reduction. Eleven percent reported actual engagement (two participants had been drink driving on a weekly basis). Eighty-one percent maintained their level of drink driving, or not drink driving, and 12% reported a decrease in drink driving. Seventy-five percent of respondents believed that other drivers were likely to increase their engagement in drink driving over this timeframe. Of the participants who have engaged in drink driving since restrictions, 29% stated not having engaged in drink driving in the past 12 months but engaged in drink drive during the period of reduced RBT. This means 6% were established drink drivers and maintained their engagement in drink driving over the survey period. Knowledge of the suspension of static RBT operations was 58%. Of those reporting an intention to increase drink driving in response to the static RBT suspension, 65% were aged 18-24 years. Of the male participants a greater proportion, compared to females, responded that they would be likely to increase engagement in drink driving. A greater proportion of P1-licensed drivers also reported the intention to increase engagement in drink driving.

Survey 2 not only included questions about actual drink driving but also intentions to increase drink driving. When examining intentions to increase drink driving, 61% of those intending to increase drink driving had engaged in drink driving in the past 12 months.

However, 39% of those who reported an intention to increase engagement in drink driving had no such history of having engaged in drink driving in the past 12 months. Seventeen percent intending to increase engagement also reported not having driven after 1-2 drinks in the past 12 months. Just over half of those who intended to increase their drink driving believed that in the period prior to COVID-19 it was unlikely that anyone, including themselves, would be caught by police officers for drink driving. This proportion changed to 74% believing it unlikely that they and others would be caught by police officers for drink driving since the introduction of the COVID-19 restrictions. Forty-eight percent of participants intending to increase engagement in drink driving consumed alcohol on a weekly basis prior to COVID-19 restrictions with 7% reporting alcohol consumption on a daily basis. During COVID-19 restrictions, the frequency of drinking by 83% of those participants reporting the intention to increase engagement in drink driving was daily-weekly. Eighty-seven percent of the drink drivers who intended to increase their engagement in this behaviour had knowledge of the formal suspension of static roadside RBT operations.

3.2.1 Hierarchical multiple linear regression

A hierarchical multiple linear regression was also conducted on Survey 2 data to examine the contributing factors to the engagement in drink-driving behaviours during COVID restrictions. The dependent variable was *since the COVID-19 restrictions, how often have you driven a motor vehicle when you thought you were over the legal limit* (*M* = 1.20, *SD* =0.61). The results are reported in Table 3 that show age was entered at Step 1 of the regression and other variables of interest at step 2.

Table 3 ***Hierarchical Multiple Linear Regression Examining the Predicting Factors of the Engagement in Drink Driving during COVID Restrictions: Survey 2 (n = 299)***

Variables	M(SD)	β	*p*	B	sr^2
Step 1					
Age	34.07(14.37)	-.080	.166	-.003	.006
Step 2					
Drink driving (P)[a]	1.34(0.73)	.399	.000***	.334	.071
Drive after 1-2 drinks (P)[a]	1.89(1.13)	-.005	.917	-.003	.000
Drink driving frequency (P):[a]					
Pubs/clubs	1.11(0.40)	.053	.291	.083	.002
Restaurants	1.11(0.42)	.052	.288	.075	.002
Friend's/Family's place	1.32(0.75)	.990	.284	.001	.000
Home	1.17(0.61)	.390	.000***	.390	.080
Knowledge of RBT suspension[b]	1.35(0.48)	.019	.630	.025	.000
Certainty - general (D)[a]	2.62(1.19)	.004	.947	.002	.000
Certainty - personal (D)[a]	2.81(1.41)	-.021	.708	-.009	.000
Others likely to increase drink driving (D)[a]	4.38(1.20)	.008	.835	.004	.000
Increase in drink driving (D)[c]	1.94(0.44)	.264	.000***	.370	.052
Drinking frequency (P)[a]	4.26(1.28)	.049	.427	.023	.001
Drinking frequency (D)[d]	3.35(1.48)	-.056	.369	-.023	.001

Note. B = unstandardised B. BCa = bias corrected and accelerated bootstrap. CI = confidence interval. sr^2 = semi partial correlation squared.
D = during COVID lockdown. P = prior to COVID lockdown (in the past 12 months).
[a]Measured on a 6-point scale. [b]Yes = 1. No = 2. [c]Decreased = 1. Stayed the same = 2. Increased = 3. [d]Measured on a 5-point scale.
*p<.05. **p<.01. ***p<.001.

Step 1, which included age as a control variable, was not statistically significant, F (1,297) = 1.926, p = .166, with an R^2 of .006 and adjusted R^2 of .003. Step 2, which included relevant drink-driving items, was significant, F (14,284) = 27.396, p < .001, with an R^2 of .575 and adjusted R^2 of .554. These drink-driving, drinking, certainty of apprehension, and knowledge of the static RBT suspension items were able to explain an additional 56.8% of the variance in drink driving during the COVID restrictions. However, only drink driving in the past 12 months, specifically from home, and an increase in drink driving during restrictions were able to significantly predict this behaviour.

3.2.2 Paired-samples *t*-tests

The difference between engagement in drink driving in the past 12 months prior to COVID-19 (*In the past 12 months (prior to COVID-19 restrictions), how often have you driven a motor vehicle when you thought you were over your legal alcohol limit?*) and drink driving during COVID restrictions (*Since the COVID-19 restrictions, how often have you driven a motor vehicle when you thought you were over the legal limit?*) was examined using a *t*-test, with the difference reported in Table 4. This difference, -0.15, was significant $t(303) = 4.09$, $p < .001$, and represented a small-sized effect, $d = 0.21$. The perception of the certainty of other drivers being caught for drink driving during the past 12 months prior to COVID-19 and during COVID-19 restrictions was also compared. The difference -0.72, was also significant $t(297) = 10.79$, $p < .001$, and represented a medium-sized effect, $d = 0.62$. The same comparison was made regarding whether the participant perceived they would be caught for drink driving between the past 12 months prior to COVID-19 and during COVID-19 restrictions with this difference also significant $t(297) = 9.11$, $p < .001$, and represented a medium-sized effect, $d = 0.49$.

Table 4 ***Differences in Drink-driving Behaviour and Perceptions of Certainty of Apprehension between the Past 12 Months and during COVID Restrictions while static RBT was Suspended***

Variables	Mean 1	Mean 2	BCa95% CI		*t*(*df*)	*p*	Cohen's *d*
			lower	upper			
Drink driving	1.37 (P)	1.22 (D)	.075	.214	4.085(303)	.000	.212
General certainty	3.30 (P)	2.58 (D)	.587	.849	10.786(297)	.000	.621
Personal certainty	3.45 (P)	2.76 (D)	.537	.833	9.105(297)	.000	.487

Note. BCa = bias corrected and accelerated bootstrap. CI = confidence interval.
D = during COVID lockdown. P = prior to COVID lockdown (in the past 12 months).

3.3 Survey 3

Data was collected for Survey 3 between 24 June – 12 August. The context for this timeframe is presented in Figure 1. During this survey period the community was opening up, however, restrictions remained regarding social distancing and travel. The reduction in RBT operations was still noticeable with operations redeployed to border restrictions and COVID-19 control. Although the formal policy on the suspension of static RBT operations had been lifted on 12 June, roadside RBT remained severely curtailed.

Means and standard deviations for Survey 3 variables of interest are reported in Table 5. Overall, there was a decrease in engaging in drink driving during the COVID-19

restrictions. Thirty percent of all participants reported engaging in drink driving prior to COVID-19. During the survey period, 12% of participants who responded to Survey 3 reported engaging in drink-driving behaviours. Thirty-three percent of those who engaged in drink driving reported that this was an increase compared to their typical engagement in drink driving, with 13% reporting this was a decrease and 54% reporting no change in drink driving compared to the past 12 months. Of participants reporting engagement in drink driving during the restrictions, 62% had engaged in this behaviour prior to COVID-19. However, 38% of those who reported engagement in drink driving had no such history of having engaged in drink driving prior to COVID-19. Twenty-seven percent reported they had not driven after 1-2 drinks. With COVD-19 restrictions easing over this survey period, 83% of participants reported that their engagement in drink driving would remain the same with 2% suggesting an increase. Of those reporting no intention to change their behaviours 15% reported that this was to continue engagement in drink driving behaviours. Despite the reduction in RBT operations over the COVID-19 period 30% believed a drink driver was likely to be caught by police officers and 42% believed that if they were to drink drive, they would be caught by police officers. In Survey 3 a specific item asked about perceptions of future certainty of apprehension. The perception of being caught for drink driving by police officers with restrictions easing increased to 54% concerning other drivers and 61% concerning themselves. Specifically concerning those who engaged in drink driving over the COVID-19 period, around half perceived that prior to COVID-19 it was likely that themselves or others would be caught for drink driving, however, with reference to the COVID-19 period they perceived that the likelihood of being caught was much less at 18% concerning others and 20% concerning themselves.

Similar findings to Surveys 1 and 2 regarding age, gender and licence type were found in Survey 3 with 18-24-year-old males, and P1-licensed drivers reporting engagement in drink driving during restrictions. More than half of these participants drink driving during restrictions were drinking on a daily basis. Fifty-eight percent of participants were unaware of the static RBT operational suspension being lifted. With the easing of restrictions, including RBT operations reinstated, in this survey 93% of the drink drivers reported that they were unlikely to continue drink driving once restrictions were lifted and RBT operations increased. However, when the same question was asked slightly differently, 41% said they may drink and drive once or a few times in the future.

3.3.1 Hierarchical multiple linear regression

A hierarchical multiple linear regression was also conducted with Survey 3 data to investigate the contributing factors to participants' intended frequency of engaging in drink driving given the COVID restrictions were easing. The dependent variable was *now that the COVID-19 restrictions are easing, how often will you drive a motor vehicle when you think you might be over the legal limit* (M = 1.09, SD = 0.38). Table 5 presents the results of the regression analysis. Step 1 included age and step 2 relevant drink driving items.

Table 5 ***Hierarchical Multiple Linear Regression Investigating the Contributing Factors to the Engagement in Drink Driving with the Easing of COVID Restrictions: Survey 3 (n = 339)***

Variables	M(SD)	β	*p*	B	sr^2
Step 1					
Age	39.45(17.22)	-.060	.271	-.001	.004

Step 2					
Drink driving (P)[a]	1.26(0.71)	.561	.000***	.300	.236
Drive after 1-2 drinks (P)[a]	1.91(1.17)	.079	.117	.025	.005
Drink driving frequency (A)[a]:					
Pubs/clubs	1.19(0.68)	-.030	.624	-.016	.000
Restaurants	1.21(0.65)	-.012	.847	-.007	.000
Friend's/Family's place	1.27(0.72)	.120	.089	.063	.005
Home	1.25(0.83)	-.046	.433	-.021	.001
Knowledge of RBT suspension[b]	1.38(0.49)	.010	.864	.007	.000
Knowledge of RBT suspension lifted[b]	1.56(0.50)	-.006	.917	-.004	.000
Certainty - general (D)[a]	2.65(1.37)	-.042	.450	-.012	.001
Certainty - personal (D)[a]	3.08(1.54)	.053	.326	.013	.002
Others likely to increase drink driving (A)[a]	3.91(1.15)	.037	.415	.012	.001
Increase in drink driving (D)[c]	1.96(0.44)	.124	.005**	.106	.015
Drinking frequency (P)[a]	4.43(1.34)	.048	.431	.014	.001
Drinking frequency (D)[d]	3.58(1.43)	-.045	.457	-.012	.001

Note. B = unstandardised B. BCa = bias corrected and accelerated bootstrap. CI = confidence interval. sr^2 = semi partial correlation squared.
D = during COVID lockdown. P = prior to COVID lockdown (in the past 12 months). A = after restrictions were eased.
[a]Measured on a 6-point scale. [b]Yes = 1. No = 2. [c]Decreased = 1. Stayed the same = 2. Increased = 3. [d]Measured on a 5-point scale.
*p<.05. **p<.01. ***p<.001.

As shown in Table 5 the model was not significant at step 1 where age was entered, F (1,337) = 1.218, p = .271, with an R^2 of .004 and an adjusted R^2 of .001. Step 2 was significant, F (15,323) = 14.563, p < .001, with an R^2 of .403 and an adjusted R^2 of .376. The drink driving variables entered at step 2 were able to explain an additional 40.0% of the variance in intention to drink drive given COVID restrictions were easing. Drink driving in the past 12 months and an increase in drink driving during the restrictions were the only variables that significantly predicted intention to drink and drive due to the easing of restrictions.

3.3.2 Paired-samples *t*-tests

Differences in drink-driving behaviours and perceptions of apprehension certainty during COVID-19 restrictions and with the easing of restrictions were examined using *t*-tests, with results shown in Table 6. Drink driving during COVID restrictions was significantly greater (0.15) than intended drink driving in response to the easing of restrictions, $t(380) = 4.30$, $p < .001$, and represented a small-sized effect, $d = 0.22$. This suggested that those who engaged in drink driving during restrictions intended to reduce their engagement as restrictions eased. The perceived level of general apprehension certainty was also significantly different between these specified time frames, with a greater perceived apprehension certainty after restrictions were eased (0.87), $t(404) = -14.23$, $p < .001$, and represented a medium-sized effect, $d = 0.67$. Personal certainty of apprehension was also significantly greater given the easing of restrictions (0.54), $t(404) = -9.56$, $p < .001$, and represented a small-sized effect, $d = 0.36$.

Table 6 ***Differences in Drink-driving Behaviour and Perceptions of Certainty of Apprehension during COVID Restrictions while static RBT was Suspended and Since Restrictions were Eased and the Suspension Lifted***

Variables	Mean 1	Mean 2	BCa95% CI		*t*(*df*)	*p*	Cohen's *d*
			lower	upper			
Drink driving	1.21 (D)	1.09 (A)	.067	.180	4.299(380)	.000	.217
General certainty	2.73 (D)	3.60 (A)	-.989	-.749	-14.234(404)	.000	.672
Personal certainty	3.17 (D)	3.71 (A)	-.661	-.435	-9.557(404)	.000	.355

Note. BCa = bias corrected and accelerated bootstrap. CI = confidence interval.
D = during COVID lockdown. A = after restrictions were eased.

4. Discussion

The aim of the study was to explore drink-driving behaviours during the COVID-19 pandemic restrictions. A key element of these restrictions was the temporary reductions in random breath testing (RBT) operations. This context provided a rare and unique opportunity to further understand the deterrent effect of RBTs. Overall, drink driving decreased during restrictions, suggesting travel bans and the closure of social venues mitigated the risk of increased drink driving due to the suspension of static roadside RBTs. Indeed, 83% of Survey 1 participants reported decreased travel since COVID-19 restrictions. This highlights the influence of broader contextual factors on deterrence measures (e.g., Mills et al., under review; Salmon et al., 2019). Similar to previous global economic downturns, such is being experienced by many countries due to the pandemic, reduced income influences decreased traffic density (Lloyd, Wallbank, & Broughton, 2015; Wegman et al., 2017; Yannis, Papadimitriou, & Folla, 2014), suggesting fewer high-risk drivers on the road. Importantly, there was a decrease in drink-driving behaviours as restrictions eased and the static roadside RBT suspension was formally lifted. It is notable though, as highlighted by Vingilis et al. (2020), that the current pandemic has impacted society, and more specifically mental health, in a way that may lead to increased drug and alcohol consumption within a context uniquely different to any previous pandemic or economic downturn, and therefore consequences are unknown.

A consistent finding across the three surveys was that engagement, and importantly, intention to increase engagement in drink-driving behaviours during and after the COVID-19 restrictions was predicted by previous drink driving. Despite the small proportion of participants reporting drink driving behaviours during restrictions, particularly in Survey 1, these drink drivers provided an opportunity to understand the characteristics and predicting factors of drink driving. Moreover, the continued engagement in drink driving despite the reduced opportunity to consume alcohol in social environments during restrictions (e.g., pubs, clubs, and restaurants, and friend's and family's residences), as well as reduced opportunities to drive, was a critical finding. Despite travel and social restrictions mitigating drink driving for some, the findings found that the impact was short lived. The proportion of participants who reported drink driving in the past 12 months was relatively consistent with previous research in Australia; ranging between 23-32% across the three surveys (Freeman et al., 2020; Freeman & Watson, 2009). The finding that prior drink driving predicted increased engagement in drink driving during COVID-19 restrictions is supported by research that has identified past drink-driving offences predict the intention to re-engage in this behaviour (Freeman et al., 2020). The majority of participants from this study who reported drink driving also reported consuming alcohol on a daily basis during the restrictions. Previous

research has shown that despite overall decreases in alcohol consumption due to an economic downturn, binge drinking has been known to increase during such times (Frasquilho et al., 2015; Jofre-Bonet, Serra-Sastre, Vandoros, & Medicine, 2018). Extensive alcohol consumption has also been found to be associated with drink driving, and this result is plausible given the negative affect of alcohol on decision making and therefore on the decision to drink drive (Freeman et al., 2020; Salmon et al., 2019).

Surprisingly, findings indicated that participants who had *not* engaged in drink driving in the past 12 months, and for some that included having not driven after 1-2 drinks, also indicated either an intention to increase engagement in drink driving or actual drink driving behaviours during the COVID-19 restrictions. In Surveys 1 and 2, participants who reported no history of driving after 1-2 drinks and intended to drink drive during restrictions held a restricted license. However, this was not the case in Survey 3, where 75% of those who reported drink driving during restrictions and had no previous history of driving after consuming 1-2 drinks, held an open licence. It is important to note that Survey 3 participants were significantly older than those in Surveys 1 and 2 and therefore these findings may be influenced by this difference. Indeed, Vingilis et al. (2020) highlighted that the impact of the current pandemic has the potential to impact certain societal groups differently. This result is particularly concerning given that previous research has identified one of the strongest predictors of drink driving is the experience of punishment avoidance (Freeman & Watson, 2006; Szogi et al., 2017), that is, engaging in drink driving behaviour without being caught and subsequently punished (Stafford & Warr, 1993). Drivers with no history of drink driving who commenced this behaviour during the COVID-19 restrictions were likely to have experienced punishment avoidance, which may promote continued engagement in this risky driving behaviour in the future. These results highlight the importance of RBTs acting as a general deterrent given those who typically engage in drink driving suggested an increase in this behaviour and those who had not engaged in the past 12 months commenced drink driving during restrictions.

The deterrent effect of RBTs was also demonstrated in the certainty of apprehension results. When static roadside RBT operations were initially suspended, participants reported reduced perceptions of the certainty of being caught for drink driving. Interestingly, despite the suspension over the COVID-19 period there was a large proportion of participants who believed themselves (28-30%) or others (23-42%) could be caught by police officers for drink driving. As would be expected, participants' perceptions of certainty regarding apprehension for drink driving increased when static roadside RBT operations were formally reinstated. However, this is despite that actual RBT operations continued to be low due to the continued redeployment of police officers to COVID-19 specific activities. This finding is in line with previous research that has suggested knowledge of RBT in operation contributes to the deterrent effect (Henstridge, Homel, & Mackay, 1997). Approximately 40% of the participants were aware that the roadside static RBT suspension had been lifted. Although the results suggested participants' perceptions of the certainty of being apprehended for drink driving did not significantly contribute to either 1) the intention to increase engagement in this behaviour, nor 2) actual drink driving during restrictions. The high proportion of those reporting drink driving during the restrictions and in response to the suspension of static roadside RBT typically believed they would not be caught, and this proportion increased during restrictions. This shows that the presence of RBTs influences the perception of being

caught for those who engage and those who do not engage in drink driving. Indeed, research has shown that RBT is effective for high-risk populations as well as a general deterrent to curtail the instigation of drink driving behaviours (Bergen et al., 2014; Tay, 2005).

The study also reinforced that young and inexperienced drivers have the greatest tendency to engage in non-compliant and risky driving behaviours such as drink driving. An additional finding that was consistent across the three surveys was that young (typically aged 18-24 years), male, probationary-licensed drivers were proportionately more likely to report an intention to increase, and actually engage in drink driving. The findings reflected previous research that has shown that young males, compared to females, are more likely to engage in risky behaviours and, specifically, drink-driving behaviours (Freeman et al., 2020; Gershon et al., 2018). In Queensland, drivers aged 17 to 24 years are over-represented in drink driving offences. This age group is also mandated to progress through the graduated driver licensing system which has the additional restriction of a zero BAC for provisionally-licensed drivers. Younger male drivers in previous research have been found to report greater engagement in drink driving (Freeman et al., 2020). This segment of drivers is known to engage in risky driving behaviours generally more frequently than females and older drivers (e.g., Scott-Parker, King, & Watson, 2015). A deeper understanding of young drivers, in particular males, and their engagement in road rule violations, especially drink driving during the pandemic is warranted. This understanding could contribute to research that strives to improve young novice driver road safety for that proportion of risky drivers who deliberately engage in these types of behaviours.

The adaptability of the research to the dynamic context during heightened COVID restrictions enabled rare and informative research to be conducted. Indeed, the three surveys focused on 1) intention to increase drink driving due to the suspension of static roadside RBT operations in Survey 1, 2) actual engagement in drink driving during the restrictions in Survey 2, and 3) intention to engage in drink driving given the easing of COVID-19 restrictions in Survey 3 to capture the nuances of the dynamic COVID-19 context. Therefore, and due to feasibility issues and reason of parsimony, repeated measures cross-sectional studies were utilised to capture changes in drink driving behaviour at short notice. A longitudinal repeated measures design may have been more effective in examining variables within the changing contexts; however, the focus of the study was the behavioural response to the reduction and formal lifting of the suspension of static roadside RBT operations. Some direct comparisons between survey items across the survey periods were therefore not possible. Despite the variations in the survey items, the main findings across the three surveys were consistent and enabled an understanding of the function and importance of RBTs given the unique context. An additional limitation of the study was the overrepresentation of females in the study and therefore participants were not representative of Queensland's population restricting generalisability of the findings. The average age of participants also differed between surveys with Survey 3 participants significantly older suggesting some findings should be interpreted with caution.

5. Conclusion

During the COVID-19 pandemic, restrictions on travel and closures of social venues, in addition to the suspension of static roadside RBTs and a reduction in highly visible policing operations, provided an opportunity to explore contributing factors to the engagement in drink driving behaviours. Overall, although restrictions mitigated drink driving behaviours, the unique COVID-19 context highlighted that static roadside random breath testing is effective as a general deterrent for drink driving. Perceptions of being caught

for drink driving changed in response to reduced RBTs reinforcing the effectiveness of such deterrence operations. The recruitment of ‘new’ drink drivers (with no history of drink driving) reinforced the necessity of RBTs, given the potential for the experience of punishment avoidance to encourage repeat offences. Despite the uniqueness of the COVID-19 context, alcohol consumption and prior engagement in drink driving were associated with drink driving during restrictions which is in line with previous research findings. Moreover, young males on restricted licences, who are typically a high-risk cohort for such behaviours, were the more likely group of drivers to drink drive during restrictions. The findings that the COVID-19 restrictions on travel and access to social venues influenced reduced engagement in drink driving suggests future studies should identify contextual elements that may interact with deterrence measures. Overall, continued investment in and understanding of best practice in RBT operations is recommended and reinforced and supported by these findings that RBT is an effective deterrence measure.

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