



Substance Use & Misuse

ISSN: (Print) (Online) Journal homepage: <https://www.tandfonline.com/loi/isum20>

The Impact of Last Drinks Legislation: Exit Intoxication and Perceptions of Risk within Nighttime Entertainment Districts in Brisbane, Australia

Grant J. Devilly

To cite this article: Grant J. Devilly (2021): The Impact of Last Drinks Legislation: Exit Intoxication and Perceptions of Risk within Nighttime Entertainment Districts in Brisbane, Australia, Substance Use & Misuse, DOI: [10.1080/10826084.2021.2019772](https://doi.org/10.1080/10826084.2021.2019772)

To link to this article: <https://doi.org/10.1080/10826084.2021.2019772>



Published online: 29 Dec 2021.



Submit your article to this journal [↗](#)



Article views: 13



View related articles [↗](#)



View Crossmark data [↗](#)

The Impact of Last Drinks Legislation: Exit Intoxication and Perceptions of Risk within Nighttime Entertainment Districts in Brisbane, Australia

Grant J. Devilly^{a,b} 

^aSchool of Applied Psychology, Griffith University, Mt Gravatt, Australia; ^bGriffith Criminology Institute, Griffith University, Mt Gravatt, Australia

ABSTRACT

Background: There is a growing emphasis on reducing alcohol fueled violence. We do not know whether legislation to close nighttime entertainment districts (NEDs) earlier leads to decreased intoxication and fear of violence within the NED. *Methods:* We collected data before restrictive alcohol legislation ($n=2,670$ participants) and again after legislation was introduced ($n=1,926$ participants). Patrons were systematically assessed with surveys and breathalyzers as they exited Brisbane NEDs. *Results:* Consistent with a 2-hour reduction in closing times, people left the NED substantially earlier. The exit intoxication levels of people did not change between pre- and post-legislation. After the legislation was introduced perceived risk of violence increased. *Conclusions:* Perceived alcohol scarcity leads to increased preloading. With only restrictive legislation on alcohol sales, people do not drink to lower levels of inebriation.

KEYWORDS

Alcohol legislation;
alcohol use reduction;
nighttime entertainment districts;
exit intoxication;
youth;
violence

Legislation is frequently used as a tool to reduce alcohol consumption and violence in nighttime entertainment districts (NEDs; e.g., Babor et al., 2010). While there is evidence that legislation which shuts the NED early can be effective for reducing violence (e.g., Kypri et al., 2011), this reduction appears to come at the cost of reduced attendance in the NED. A review of the evidence looking at violence reduction in NEDs suggested that the earlier 'lockout' of patrons reduced violence within venues but there was no evidence that violence outside of venues was affected, leading the authors to call for titrated interventions which fit the specific needs of individual NEDs (Mazerolle et al., 2012).

In Australia, legislation has been applied in various States with the goal of reducing alcohol-related violence. New laws were enforced in New South Wales in February 2014 (The Liquor Amendment Act, 2014), with the aim to curb the incidence of alcohol induced violence in areas including Newcastle and Sydney (New South Wales Government, 2014). However, this legislation has recently (December 2019) been overturned following a Select Committee review, which noted a perceived reduction in the city's "fun and vibrant atmosphere" (Sydney Morning Herald, 2019).

As of July 1, 2016, the Queensland Government implemented legislation (Alcohol-Fueled Violence legislation) to restrict practices on alcohol sales in nighttime entertainment precincts, in an effort to reduce violence within the entertainment districts (Queensland Government, 2016). A 2-hour reduction in maximum trading hours of alcohol sales (from 5 a.m. back to 3 a.m.) for venues in specifically designated NEDs was included in the legislation, along with a reduction

in maximum trading hours for venues outside the entertainment precincts (closing at 2 a.m.). Furthermore, the legislation did not permit new approvals for trading hours beyond 10 p.m. for the sale of take-away alcohol, and it banned rapid intoxication drinks (i.e., 'shots') after 12 a.m. (Queensland Government, 2016).

In the case of both the New South Wales legislation (Liquor Act, 2007 No 90) and that of Queensland (Liquor Act, 1992), casinos are unaffected by the legislative changes. In both States alcohol sales in casinos comes under their respective Casino Acts (Casino Control Act 1982 in Queensland; Casino Control Act 1992 No 15 in New South Wales) and not the respective Liquor Acts.

A major topic of research surrounding alcohol consumption in Queensland is whether the legislative change has been effective. Recently published research has found that after the legislative implementation: patrons entered the NED later; were significantly and substantially more inebriated as they entered NEDs; there was a significant increase in the proportion of people who entered NEDs with a Breath approximated Blood Alcohol Concentration level (BrAC) over zero; and actual assault rates did not appear to change (Devilly, Hides, et al., 2019). Also, researchers have found that emergency service street care utilization (provided in situ by street carers) was moved toward the beginning of the night and involved more resource intensive deliveries (Devilly & Srbnovski, 2019) - a result consistent with an increase in preloading.

Preloading is defined as ingesting "a substance, which acts on the central or peripheral nervous system, before

going to a specified event or other social gathering (i.e. the target-event” (p. 420, Hughes & Devilly, 2021). Increased preloading was predicted to occur following Lynn’s (1989) scarcity heuristic. Where this cognitive bias is activated, people place a higher value on the item that is scarce. It was argued by the authors of that research that the perceived unavailability of alcohol would increase its value and lead to more preloading (Deville, Hides, et al., 2019). That research specifically assessed preloading as: pre-loading of alcohol, in public and private (residences and closed) spaces: Targeting demographic and cultural factors, within a NED transition location; assessing substance use behavior (energy drink mixing), and motivations for pre-loading; assessing severity by obtaining BrAC; no assessment of impairment (Hughes & Devilly, 2021).

An increase in preloading is important because recent evidence from an Australian representative sample of women (Anderson et al., 2020) found that 66% of their sample self-reported to have preloaded in the previous 12 months, and this preloading correlated with heavy episodic drinking. They also found that preloading was significantly related to vomiting, memory loss and injury ($p < .01$) within the last 12 months. Anderson et al. (2020) add a needed Australian reference, context and consistency with previous international research which found preloading to be associated with higher overall intoxication and sexual and physical assault (Foster & Ferguson, 2014). However, we are unclear on two major issues in the Australian context.

Firstly, while there may not appear to be a reduction in assaults within the NED, we are unclear on whether the legislation makes patrons ‘feel’ safer. It is likely that the legislation, which was well documented through media outlets, raised people’s awareness of the risks of entering a NED, but the legislation also promised to make the NED safer. We are unaware of any data on this issue in the published, scientific literature and hence must conservatively expect a zero-sum gain. An unrealistic change in safety estimations while in the NED may lead to different outcomes, depending upon the change direction. It may lead to more or less reckless behavior, or it may lead to more or less paranoid reactions to other patrons. This has never been tested and we first need to understand whether such legislation leads to an increased or decreased sense of safety.

Secondly, we are unclear whether the Queensland legislation impacted the BrAC of individuals exiting NEDs. It has been reported that, even when accounting for personality variables, age and body mass index, the best predictor of end of night intoxication is beginning of night intoxication (Deville, Greber, et al., 2019). Other, lesser, predictors were mediated by gender, demonstrating the need to analyze results with this variable in mind. An increase in preloading would, therefore, suggest an increase in end of night intoxication. However, increased preloading, together with arriving later into town and leaving earlier, suggests people spend less time in town drinking and become less intoxicated. This may particularly be the case as if there is a ban on rapid intoxication drinks, as in the case in Queensland. The first study into this was not conclusive, with one sub-study

suggesting some increases in intoxication at the end of the night and another sub-study suggesting no change (Deville, Greber, et al., 2019). This needs clarification with a large sample, accessed by an independent research group.

There has been one small study which has been published in the scientific literature looking into the effects of the legislation in Brisbane on intoxication levels (Coomber et al., 2018) and one large Government-released report (Miller et al., 2019). The latter did not assess intoxication levels in the NEDs of Queensland at all, and so is not relevant to the current study. In the former, researchers breathalyzed people over two weekends immediately preceding the legislation and for the two weekends immediately following the legislation. They reported that, after the legislation, people entered the NED earlier and that there was a decrease in the proportion of people scoring in the high-range of intoxication. However, their pre-legislation data collection occurred when an international rugby union match occurred in Brisbane between Australia and England, with large groups of traveling England rugby supporters attending sub-tropical Brisbane for at least one of the weekends. Also, these researchers did not look at entry or exit intoxication but rather created a type of blended intoxication level across the night. It is unclear what this intoxication level is measuring. This needs to be addressed by looking directly at entry and exit BrAC (and, possibly, within night BrAC), increasing the specificity of the data, and with data collected over a longer time frame – less affected by individual events. Gathering data with a longer than two-week lead-in and lead out of the legislation changes would also allow us to see the effects of having brought in legislation, rather than the effects of an impending legislative change.

In the current study we wished to assess intoxication of patrons as they left the NED, using a large sample acquired over years rather than days, both before and after the legislation.

In respect of these aims, and the research cited above, this study proposes three main hypotheses:

1. People will leave the NED earlier following legislation shutting the pubs and clubs earlier;
2. The exit BrAC levels before and after the Queensland legislation change will not be significantly different;
3. Fear of harm, from before to after the Queensland legislation, will not significantly change.

Method

Participants, recruitment & procedure

To realistically test the research hypotheses, an *a priori* power analysis was undertaken. To correct concerns regarding our earlier studies we needed to be able to detect at least a small effect size ($d = .02$; Cohen, 1992). For comparison group means (two-tailed testing) using 80% confidence intervals, a minimum of 393 participants per group would be required to achieve this.

All research procedures were cleared by the University Human Research Ethics Committee (ref: 2015/704).

Researchers consisted of a group of Griffith University students and Academics who were selected for work based upon availability. Researchers wore black Griffith University polo shirts and had their university identification on visible display.

We collected data from Brisbane's NEDs. A group of Sunday afternoon/evening drinkers that were assessed before the legislation were omitted for this study as we did not have a similar sample from after the legislation change.

Data was collected between 4.30 pm and 5.30 am. It is noted that recruitment did not occur during the Christmas holiday period and no police were present during any of our exit testing. The pre-legislation sample was collected from 1st November 2015 to 3rd April 2016 (comprising n=2,670 participants). The post-legislation sample was collected from 17th September 2016 to 9th March 2019 (comprising n=1,926 participants). This time period allows for approximately three months either side of the legislation for patrons to adjust to the new laws without affecting this data. Demographics are presented in Table 1.

Participant engagement ostensibly followed the procedure of Devilly et al. (2017). Patrons who were obviously very inebriated were not avoided in our sample collection. Participants were recruited near train stations and bus stations that lead away from Brisbane CBD and Fortitude Valley, adjacent to taxi ranks, outside major nightclubs and bars, and on walkways which lead away from the entertainment districts.

Before the legislative change, 79.64% of our sample came from near taxi lines, 13.63% came from outside pubs and clubs, and 5.94% from the train station. After the legislation only 50.99% came from near taxi lines, but 24.97% came from outside pubs and clubs, and 23.99% came from the train station. This was not a result of an inconsistent method, but the result of: 1. the rise of Uber (i.e., standing outside nightclubs to pick up the Uber ride) and; 2. changes

to train timetabling and the earlier time of night that clubs stopped selling alcohol. In effect, after the legislation, people could pay less by traveling away from the NED either by train or by catching an Uber ride rather than queuing up outside a taxi rank. Our method allowed us to adapt to these changes and, as demonstrated in Table 1, our sample demographics were consistent across the legislation. Other than adapting to where people were leaving, the methodology for data collection was uniform across the legislation.

Refusal was extremely rare at exit. In comparison with the SmartStart entry study (Deville, 2018), we found people exceedingly willing to be breathalyzed and complete a short survey. As we recorded refusals for people on their way into the NED and out of the NED on the same clicker counters, it was not possible to look only at exit refusals. However, we estimate the refusal rate much lower than the approximate 15% of the Big Night Out study (Deville, Hides, et al., 2019) and likely below 5%.

As can be seen in Table 1, our samples (from before to after the legislation change) were similar for age and gender. However, night of study was significantly different, with a greater number coming from Thursdays after the legislation change. However, this demonstrated an exceedingly small effect size ($\Phi = .09$). The researchers noted a cultural change in day of week that people attended the NED with a spreading out of the 'weekend' from Thursday to Sunday, inclusive.

Measures

Participants completed anonymous *in situ* surveys on an iPad or Android tablet that was presented to them by the researchers. This study is only concerned with time of night, their level of intoxication, questions relating to their

Table 1. Demographics and results from the exit samples.

Variable	Before Legislation (n=2,670) 1 st Nov 2015 to 3 rd Apr 2016	After Legislation (n=1,926) 17 th Sep 2016 to 9 th Mar 2019	Statistical Indicators
Age \bar{x} (SD; N)	24.38 (6.43; 2654)	24.68 (7.26; 1926)	$t = -1.49, p = .14, g = .04$
Gender % (N)			
Male	58.30 (1549)	59.71 (1150)	χ^2 (df = 1, n=4583) = .92, p = .34, $\Phi = .14$
Female	41.70 (1108)	40.29 (776)	
Night of the week % (N)			
Thursday	12.40 (331)	17.91 (345)	χ^2 (df = 2, n=4583) = 32.74, p = .00, $\Phi = .09$
Friday	35.17 (939)	29.85 (575)	
Saturday	52.43 (1400)	52.23 (1006)	
Time of Night (hours and minutes) \bar{x}	2.33 a.m.	1.34 a.m.	$t = 23.73, p < .001, g = .71$
People with a BrAC > 0%; % (N)			
All-yes/no	90.52/9.48 (2416/253)	87.68/12.32 (1686/237)	χ^2 (df = 1, n=4592) = 9.49, p = .002, $\Phi = .046$
Males-yes/no	92.19/7.81 (1428/121)	89.21/10.79 (1025/124)	χ^2 (df = 1, n=2698) = 7.10, p = .008, $\Phi = .051$
Females-yes/no	88.26/11.74 (977/130)	85.40/14.60 (661/113)	χ^2 (df = 1, n=1881) = 3.30, p = .07, $\Phi = .042$
BrAC of those with a BrAC > 0% \bar{x} (SD; median; N)			
All	.098 (.049; .096; 2416)	.099 (.054; .095; 1686)	$t = -.62, p = .54, g = -.02$
Males	.102 (.05; .099; 1428)	.102 (.054; .097; 1025)	$t = -.38, p = .71, g = .00$
Females	.094 (.048; .091; 977)	.095 (.053; .089; 661)	$t = -.38, p = .71, g = .02$
Estimated No of Standard Drinks Consumed Inside NED \bar{x} (SD; median; N)			
All	6.87 (6.74, 6, 462)	6.49 (5.55, 5, 1370)	$t = 1.21, p = .23, g = .07$
Male	7.69 (5.36, 7, 238)	7.09 (6.22, 6, 836)	$t = 1.35, p = .18, g = .1$
Female	5.70 (6.73, 5, 216)	5.53 (4.11, 5, 534)	$t = .42, p = .67, g = .03$
Fear of Harm % (N)			
No	86.26 (270)	80.74 (1555)	χ^2 (df = 1, n=2239) = 5.45, p = .02, $\Phi = .05$
Yes	13.74 (43)	19.26 (371)	

drinking before leaving and their fear of attack inside the NED. Fear of attack was measured by asking: “At any point tonight were you concerned that someone might hurt/attack you”? Possible answers were: 1. Not at all; 2. Maybe a little, in general; 3. Yes, I had a verbal argument; 4. Yes, I was physically touched against my will. These four answers were then combined into ‘No’ (answer 1) or ‘Yes’ (answers 2 to 4).

Participants were breathalyzed using the Alcolizer LE5 fuel-cell breathalyzer, the only hand-held breathalyzer device to have demonstrated good reliability and validity in NED field trials (Sorbello et al., 2018).

Results

Approach to analyses

Six cases were removed from the data set for being multivariate outliers and/or unbelievable (e.g., answering “no” to every question, and age = 0, 1, or 93). Null hypothesis significance testing was utilized but, considering such a large data set and the problem of too much power, much more weight was put on effect size analysis (partial eta squared η^2_p ; Phi; and Hedges’ g) and meaningful equivalence testing. Hedges’ g effect sizes (Hedges, 1981) are interpreted similar to Cohen’s d effect sizes (Cohen, 1992; rule of thumb 0.2 = small, 0.5 = moderate, 0.8 = large) but includes corrections for the two sample sizes, as well as the overall sample size, utilizing a pooled sigma divisor and total sample size correction to more accurately estimate effect size (Hedges & Olkin, 1985). Phi is interpreted similarly to the correlation (r) statistic. Squaring Phi and multiplying by 100 gives the % of the results that are explainable by the relationship between the group memberships. Equivalence testing (e.g., Schuirmann, 1987) is utilized particularly when large samples lead to trivial differences becoming statistically significant. This analysis takes an external metric as what would be a meaningful difference and then looks at the probability that people, as a whole, have generally changed by this amount. Analyses also take gender into account (as argued above).

Demographics and time of night

As the legislation directly targeted the time of night that alcohol sales were allowed, one which led to an earlier cessation of sales, we tested time of night that we obtained our sample. Before the legislation the sample was obtained, on average, at 2.33 a.m. ($n=2,670$), and at 1.34 a.m. ($n=1,926$) after the legislation. As expected (Hypothesis 1), this was significantly different and represents a moderate to large effect size (Hedges’ $g = .71$).

BrAC of participants

Analyzing with ANOVA (2 x between factors [Pre- vs Post-legislation; Males vs Females]), there was no significant

difference in the BrAC (for those who scored above zero) from before to after the legislation ($F[1,4087] = .28, p = .60, \eta^2_p < .001$; Hypothesis 2), and no interaction between gender and legislative change ($F[1,4087] < .01, p = .96, \eta^2_p < .001$). There was a significant difference for gender overall ($F[1,4087] = 22.93, p < .001, \eta^2_p = .006$), with males ($x- = .102, sd = .052, n=2453$) being slightly more intoxicated than females ($x- = .094, sd = .05, n=1638$). This difference represents a very small effect ($g = .16$) and, assuming equivalence with a meaningful BrAC difference (on average) of .02, this difference is trivial ($df=4089, t_{upper} -7.34 < -1.65, t_{lower} 17.14 > 1.65$; Schuirmann, 1987).

There was a significant increase in the number of people who had a BrAC of zero, from pre- to post-legislation ($\chi^2 (df=1, n=4592) = 9.49, p = .002, Phi = .046$). In all, the percentage of participants with a BrAC of zero went from 9.48% to 12.32% and was mostly (and significantly) accounted for by males. However, only 0.21% of variance is shared between the variables of ‘change in legislation’ and having no discernible alcohol in patrons’ breath as they exited the NED.

There was not a significant difference in the number of drinks people reported to have imbibed whilst out in the NEDs, from before ($x- = 6.87; sd=6.74$) to after ($x- = 6.49; sd=5.55$) the legislation. Although the median number of estimated drinks dropped for males (from 7 to 6), this is a minor difference with a small effect size ($g = .1$).

Harm

Patrons were also questioned regarding their concern that someone might hurt or attack them at some point during the night in town (pre-legislation $n=313$, post-legislation $n=1926$). It was found that there was a significant difference across the legislative framework with more people being concerned following the legislation than before it was introduced. This is not consistent with our predictions under Hypothesis 3. However, a smaller sample answered this question before the legislation change than after, and the effect size was very small ($Phi = .05$).

Discussion

The purpose of this study was to clarify the results of earlier published studies as to whether the Queensland legislation (outlawing rapid intoxication drinks after midnight, refusing new off-sale applications and ceasing the sale of alcohol two hours earlier than previously) resulted in any change in: exit intoxication; number of drinks consumed within the NED; and fear of harm within the NED.

The legislation did not have a significant effect on the BrAC levels of patrons exiting the NED. Prior to the implementation of this legislation, the average BrAC for drinkers was .098 g/dl, which did not significantly change after the legislation implementation (.099 g/dl). For comparison, the drink-driving limit in Australia is .05 g/dl. These results support previous research (Coomber et. al., 2018; Devilly,

Hides et al., 2019) suggesting that patrons are remaining considerably inebriated following the legislation implementation. This finding further supports arguments suggesting that the legislation has had no effect in reducing the intoxication of patrons in the NED but has, rather, shifted the culture to more preloading (Devilley, Hides et al., 2019) and people being more impaired earlier in the night (Devilley & Srbinovski, 2019).

The number of estimated standard drinks consumed within the NED demonstrated high variability both before and after the legislation. Therefore, the small reduction in drinks was not significant. That said, this is a result which is consistent with the patrons preloading more since the legislation yet demonstrating similar intoxication levels when exiting the NED. The reliability and validity of patrons self-estimating their imbibing of standard drinks may be worthy of further investigation.

There was a significant increase in the percentage of our sample blowing a zero BrAC (mainly for males). However, this was a small increase and represented a shared relationship (between the legislation and zero readings) of only 0.21%. It is likely that this result is a statistical artifact of having such a large sample.

Fear of harm did increase from before to after the legislation. The Queensland legislation was, in part, a response to the tragic death of Mr Cole Miller, an 18-year-old boy who was killed in the Brisbane Valley NED by a group of four large males with a 'coward punch' (a forceful, unannounced hit, usually delivered from out of sight). There are two main possibilities explaining the current result. Firstly, people are now exiting night clubs and trying to leave the NED mainly at the same time. Rather than the usual ebb and flow of patrons through the NED, people are now mainly exiting at 3am, leading to a somewhat compressed and chaotic scene which may be perceived as an aggressive environment. Secondly, it is possible, and quite likely, that the legislative change has brought safety issues more to the fore of people's minds and patrons were more likely to fear violence after the changes. An earlier investigation into the new legislation did not show an increase or decrease in assaults (Devilley, Hides et al., 2019). We do not believe that this increase in fear of harm is due to an actual increase in violence within the NEDs of Brisbane, but a consequence of increased scrutiny into Queensland NEDs and operations of an availability heuristic in patrons when asked the question related to perceptions of threat (Tversky & Kahneman, 1973).

In this study we did not assess number of patrons within the NED or look at direct measures of harm. Kypri et al. (2011) in their seminal study found a decrease in assaults in Newcastle (Australia) following legislation to decrease alcohol availability, but they also did not assess crowd numbers. Anecdotal reports suggest that the night life in that city greatly reduced following fewer people visiting the NED. Indeed, the recent re-opening of Sydney NEDs was due to a perceived loss of city vibrancy. However, the number of people visiting the NED has been addressed elsewhere (Devilley, Hides et al., 2019), with no evidence of a reduction

in the number of people attending Brisbane NEDs or the number of patrons within the nightclubs themselves. Future studies may benefit from the long-term use of wireless people counting systems being installed in NED thoroughfares – before and after new legislation.

A possible limitation of our research is that there was a significant difference in the number of people who were assessed on different days of the week. After legislation there was a slightly higher proportion of patrons assessed on a Thursday night. The effect size for this was extremely small and may represent a natural shift in the drinking culture. This requires further exploration and a study on this has begun.

Our pre-legislation sample size for 'fear of harm' was much smaller than our post-legislation sample size. This occurred because we were not initially researching this specific issue. However, once the legislation was announced we started to include this question in our exit surveys. We would be interested to know whether this 'fear of harm' is illusory or related to actual risk of assault within NEDs, and whether it changes people's safety seeking and interpersonal behaviors while in the NED.

We do argue, however, that our sample is representative. We did not exclude people based upon intoxication, as has been done by other researchers; we collected data over a long time period and not just the two weeks before and two weeks after legislation; we selected every 4th person and, after a refusal, every next person; we collected data at various sites and from early until late; and we allowed people to enter their own data and did not interpret their answers through the prism of the researcher. In effect, we systematically collected data based upon an a priori method, and targeted multiple sites.

In agreement with other researchers, successful legislation designed to obviate social problems requires individualized approaches that are sensitive to the specific NED (Mazerolle et al., 2012). In the current case there was no effort made to entice people into the NEDs earlier. Devilly, Hides et al. (2019) provide a discussion of proposals to amend the current approach in Queensland, yet the current results emphasize the need to entice people into the NEDs earlier to reduce preloading. For people entering entertainment districts, the single best predictor of end of night intoxication is entry intoxication (Devilley, Greber, et al., 2019) and violence within intoxicated crowds is correlated with crowd density (e.g., Moore et al., 2008). Having people come into NEDs already intoxicated and have them leave the pubs and clubs at the same time appears to be an unwise initiative.

Conclusion

With such a large and representative sample, the data show that, following legislation, people left the NED earlier, but the intoxication levels did not decrease. This is consistent with earlier predictions by other researchers, and then findings, that people preloaded more following the restrictive practices for alcohol sales within the NED. This would

suggest that people are spending less on alcohol within the NED over the shorter time period they are in attendance, yet they leave with the same level of inebriation as before the legislation due to preloading. In times of perceived scarcity (Lynn, 1989), people value the item more and will engage in other activities to obtain it or acquire its effects.

Competing interest

None. In particular, the authors have not received any funding during this research from local or state governments, political organizations, lobby groups, temperance societies and health based registered charities, or companies involved in the supply or sale of alcohol.

Declaration of interest

The authors declare that they have no conflict of interest. The author alone is responsible for the content and writing of the article.

Funding & support declaration

\$38,900, \$39,800 & \$28,000 National Drug Strategy Law Enforcement Funding Committee (SmartStart Project, Last Drinks Project & What's On-Board Project). Alcolizer Technology provided consumables for testing and calibrated the breathalyzers.

License to publish

Exclusive license to publish this article is given.

Transparency declaration

The author affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned have been explained.

Data sharing

All raw data is provided.

ORCID

Grant J. Devilly  <http://orcid.org/0000-0001-6740-186X>

References

Anderson, A. E., Cavenagh, D., Forder, P., Loxton, D., & Byles, J. (2020). Alcohol-related risk from pre-loading and heavy episodic drinking (HED) among a cohort of young Australian women: A cross-sectional analysis. *Australian and New Zealand Journal of Public Health*, 44(5), 382–389.

Babor, T. F., Caetano, R., Casswell, S., Edwards, G., Giesbrecht, N., Graham, K., Grube, J. W., Hill, L., Holder, H., Homel, R., Livingston, M., Österberg, E., Rehm, J., Room, R., & Rossow, I. (2010). *Alcohol: No ordinary commodity—research and public policy* (2nd ed.). Oxford University Press.

Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112(1), 155–159. <https://doi.org/10.1037/0033-2909.112.1.155>

Coomber, K., Zahnow, R., Ferris, J., Droste, N., Mayshak, R., Curtis, A., Kypri, K., de Andrade, D., Grant, K., Chikritzhs, T., Room, R., Jiang, H., Taylor, N., Najman, J., & Miller, P. (2018). Short-term changes in nightlife attendance and patron intoxication following alcohol restrictions in Queensland, Australia. *BMC Public Health*, 18(1), 1185. <https://doi.org/10.1186/s12889-018-6098-x>

Deville, G. J. (2018). "All the King's horses and all the King's men...": What is broken should not always be put back together again.... *International Journal of Drug Policy*, 51, 105–110. <https://doi.org/10.1016/j.drugpo.2017.11.020>

Deville, G. J., Allen, C., & Brown, K. (2017). SmartStart: Results of a large point of entry study into preloading alcohol and associated behaviours. *The International Journal on Drug Policy*, 43, 130–139.

Deville, G. J., Greber, M., Brown, K., & Allen, C. (2019). Drinking to go out or going out to drink? A longitudinal study of alcohol in night-time entertainment districts. *Drug and Alcohol Dependence*, 205, 107603. <https://doi.org/10.1016/j.drugalcdep.2019.107603>

Deville, G. J., Hides, L., & Kavanagh, D. J. (2019). A big night out getting bigger: Alcohol consumption, arrests and crowd numbers, before and after legislative change. *PLoS One*, 14(6), e0218161. <http://dx.plos.org/10.1371/journal.pone.0218161> <https://doi.org/10.1371/journal.pone.0218161>

Deville, G. J., & Srbinovski, A. (2019). Crisis support services in night-time entertainment districts: Changes in demand following changes in alcohol legislation. *The International Journal on Drug Policy*, 65, 56–64.

Foster, J. H., & Ferguson, C. (2014). Alcohol 'pre-loading': A review of the literature. *Alcohol and Alcoholism (Oxford, Oxfordshire)*, 49(2), 213–226. <https://doi.org/10.1093/alcac/agt135>

Hedges, L. (1981). Distribution theory for glass's estimator of effect size and related estimators. *Journal of Educational Statistics*, 6(2), 107–128. <https://doi.org/10.3102/10769986006002107>

Hedges, L., & Olkin, I. (1985). *Statistical methods for meta-analysis*. Academic Press.

Hughes, L. R. J., & Devilly, G. J. (2021). A proposal for a taxonomy of pre-loading. *Substance Use & Misuse*, 56(3), 416–423. <https://doi.org/10.1080/10826084.2020.1869261>

Kypri, K., Jones, C., McElduff, P., & Barker, D. (2011). Effects of restricting pub closing times on night-time assaults in an Australian city. *Addiction (Abingdon, England)*, 106(2), 303–310. <https://doi.org/10.1111/j.1360-0443.2010.03125.x>

Lynn, M. (1989). Scarcity effects on desirability: Mediated by assumed expensiveness? *Journal of Economic Psychology*, 10(2), 257–274. [https://doi.org/10.1016/0167-4870\(89\)90023-8](https://doi.org/10.1016/0167-4870(89)90023-8)

Mazerolle, L., White, G., Ransley, J., & Ferguson, P. (2012). Violence in and around entertainment districts: A longitudinal analysis of the impact of late-night lockout legislation. *Law & Policy*, 34(1), 55–79. <https://doi.org/10.1111/j.1467-9930.2011.00353.x>

Miller, P., Coomber, K., & Ferris, J. (2019, April). *Queensland alcohol-related violence and night time economy monitoring (QUANTEM): Final Report*. Geelong Australia. Prepared for the Queensland Government Department of Premier and Cabinet.

Moore, S. C., Flajšlik, M., Rosin, P. L., & Marshall, D. (2008). A particle model of crowd behavior: Exploring the relationship between alcohol, crowd dynamics and violence. *Aggression and Violent Behavior*, 13(6), 413–422. <https://doi.org/10.1016/j.avb.2008.06.004>

New South Wales Government. (2014). *Liquor Amendment Act 2014 No 3*. <https://www.legislation.nsw.gov.au/acts/2014-3.pdf>

Queensland Government. (2016). *Tackling Alcohol-Fuelled Violence Legislation Amendment Act 2016*. <https://www.legislation.qld.gov.au/view/pdf/asmade/act-2016-004>

Schuirman, D. J. (1987). A comparison of the two one-sided tests procedure and the power approach for assessing the equivalence of average bioavailability. *Journal of Pharmacokinetics and Biopharmaceutics*, 15(6), 657–680. <https://doi.org/10.1007/BF01068419>

Sorbello, J. G., Devilly, G. J., Allen, C., Hughes, L. R. J., & Brown, K. (2018). Fuel-cell breathalyser use for field research on alcohol in-

- toxication: An independent psychometric evaluation. *PeerJ*, 6, e4418 <https://doi.org/10.7717/peerj.4418>
- Sydney Morning Herald. (2019). *Sydney lockdown laws expected to be scrapped by the end of the year*. October 1st, 2019. Retrieved January 9, 2020, from <https://www.smh.com.au/politics/nsw/sydney-lockout-laws-expected-to-be-scrapped-by-the-end-of-the-year-20190930-p52wbb.html>
- Tversky, A., & Kahneman, D. (1973). Availability: A heuristic for judging frequency and probability. *Cognitive Psychology*, 5(2), 207–232. [https://doi.org/10.1016/0010-0285\(73\)90033-9](https://doi.org/10.1016/0010-0285(73)90033-9)