

Young drivers' perceptions of in-vehicle alcohol devices

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INTRODUCTION

General context

🔴 Alcohol misuse

- ✦ One of the important factors associated with fatal crash risk (about 30% in Canada)

🔴 Males vs. females

- ✦ Higher involvement in alcohol-related arrests and severe injury and fatal crashes
- ✦ More favorable attitudes, perceptions, and opinions about alcohol-impaired driving

🔴 Young drivers at higher risk

- ✦ Crashes = 1st cause of death for 15-29 years old

Technology to reduce alcohol-impaired driving

- Effectiveness demonstrated for laws and reinforcement
 - ◆ But hundreds of thousands of km of roads
 - ◆ Rates of arrests and crashes are quite high
 - ◆ Room for improvement?
- Can 'new' technology help reduce risks associated with alcohol-impaired driving?
 - ◆ Estimation of lives saved in the US with alcohol ignition interlocks
 - 10 000 lives in 2010 Lund et al. 2012
 - ↓ 85% injury and fatal crashes Carter et al. 2015

What kind of 'new' technology?

🔴 Different types of devices

- ✦ Control: Vehicle does not start, users can't override device

- 🔴 Ignition interlock (used with offenders)

- ✦ Feedback-control with extra steps necessary to override device

e.g., speed limiters,
safety belt reminders,
some in-vehicle
active alcohol devices

- ✦ Feedback only

Public support for different devices

- Opinions of representative US sample on alcohol ignition interlocks
 - ◆ 84% for offenders
 - ◆ 64% in all vehicles
 - ◆ 42% in their own vehicle
- To prevent impaired driving in general population
 - ◆ What about 'active' feedback-only or feedback-control devices?
 - ◆ What about 'passive' devices?
 - E.g., Driver Alcohol Detection System for Safety (DADSS)

Support for different devices

- ❖ Support from population is an important factor in implementation of interventions aimed at the general population
- ❖ Can prior exposure to technology and sex play an important role?

Hypothesis

- Young drivers' perceptions of in-vehicle alcohol passive feedback devices will be more positive
 - ◆ with prior exposure
 - ◆ for females

METHODS

Participants

• Main inclusion criteria

- ✦ 20-21 years old for current analysis
- ✦ Provisional or full driving licence
- ✦ Experience with drinking at least 2 drinks at same occasion
- ✦ Driving at least one day per week in past months

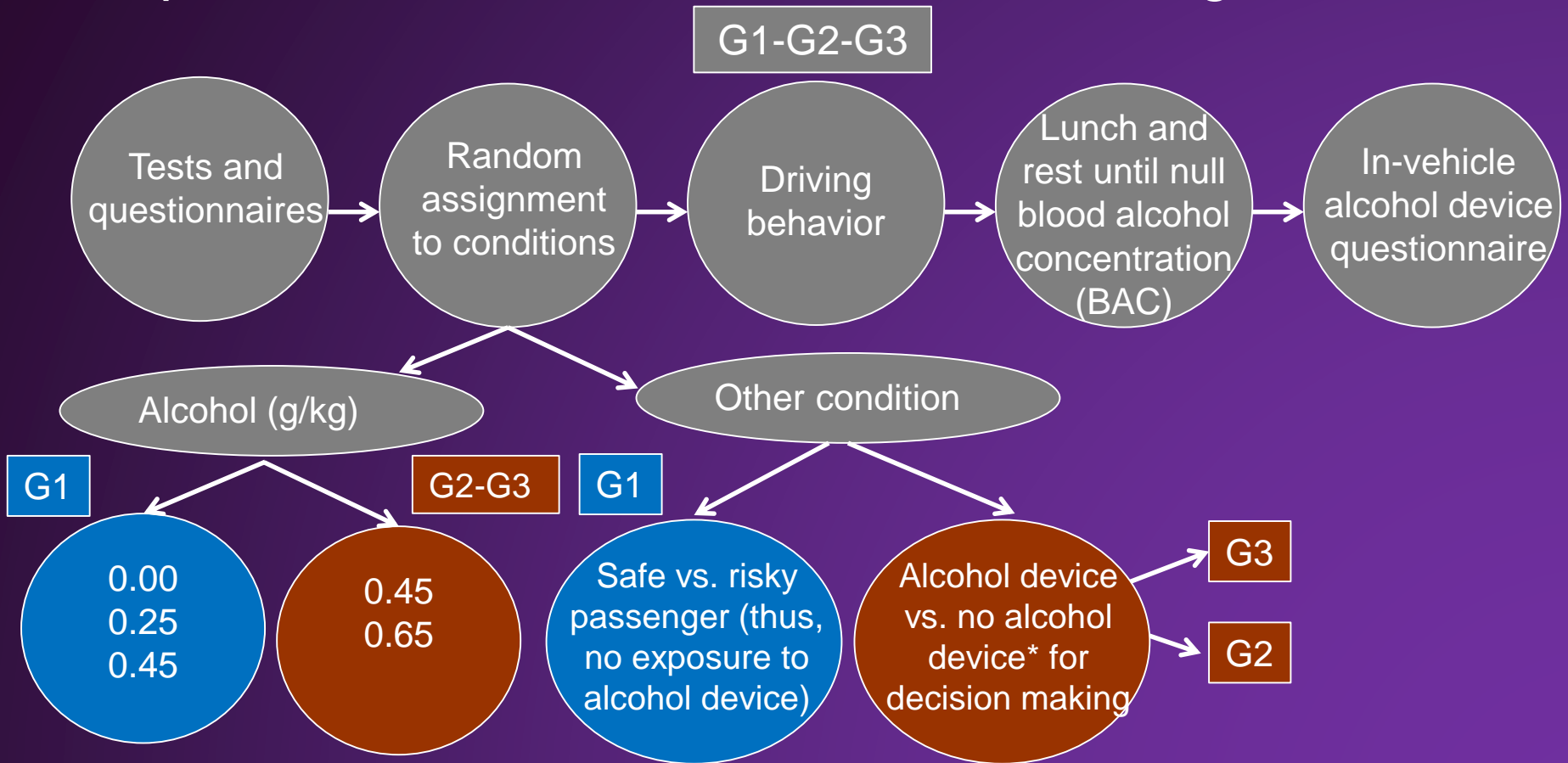
• Main exclusion criteria

- ✦ Alcohol dependance
- ✦ Health problems
- ✦ Consumption of alcohol or drugs (past 24 hrs)
- ✦ Being pregnant or breastfeeding



Study design

- Secondary analysis; two randomized controlled experiments on effects of alcohol on driving behavior



*Exposure to device for both groups during practice

Exposure to alcohol device (procedure)

G1 ✦ No exposure to device

G2-G3

✦ Exposure to device during training session (alcohol-free)

✦ Participants had to decide to drive (or not) the simulator
(under alcohol)

● They had to select and performed one action among 3 risky (e.g., drive and arrive earlier) and 3 low risk scenarios (e.g., wait for taxi 15 minutes and then sit in passenger seat during drive)

G2 ✦ Control group: no exposure to device for decision making

G3 ✦ Experimental group: exposure to device for decision making

G1-G2-G3

✦ Written description of device before filling out questionnaire

Driving simulator

● Driving simulation software developed at *Université de Sherbrooke* and implanted in our MamaSim

- ✦ Smart Fortwo 2005
- ✦ 150 degrees, semi-circular screen
- ✦ 3 projectors
- ✦ One computer: Intel Core i7 Quad-core i7-930 - 2.8GHz



MamaSim is located on the 13th floor of the Longueuil Campus,
Université de Sherbrooke

In-vehicle alcohol feedback device

- ❶ Mock electronic device designed by research team to mimic characteristics of an alcohol passive device that could be installed in vehicles to measure driver BAC

- ◆ Tissue spectrometry (touch-based system)

- ❷ For G2 and G3 (during training when participants were alcohol-free) device indicates: BAC lower than limit

- ❸ For G3 only (when participants were under alcohol) the device indicates: BAC higher than limit

Prototype presented
by Ferguson in 2010



Mock electronic
device designed by
research team

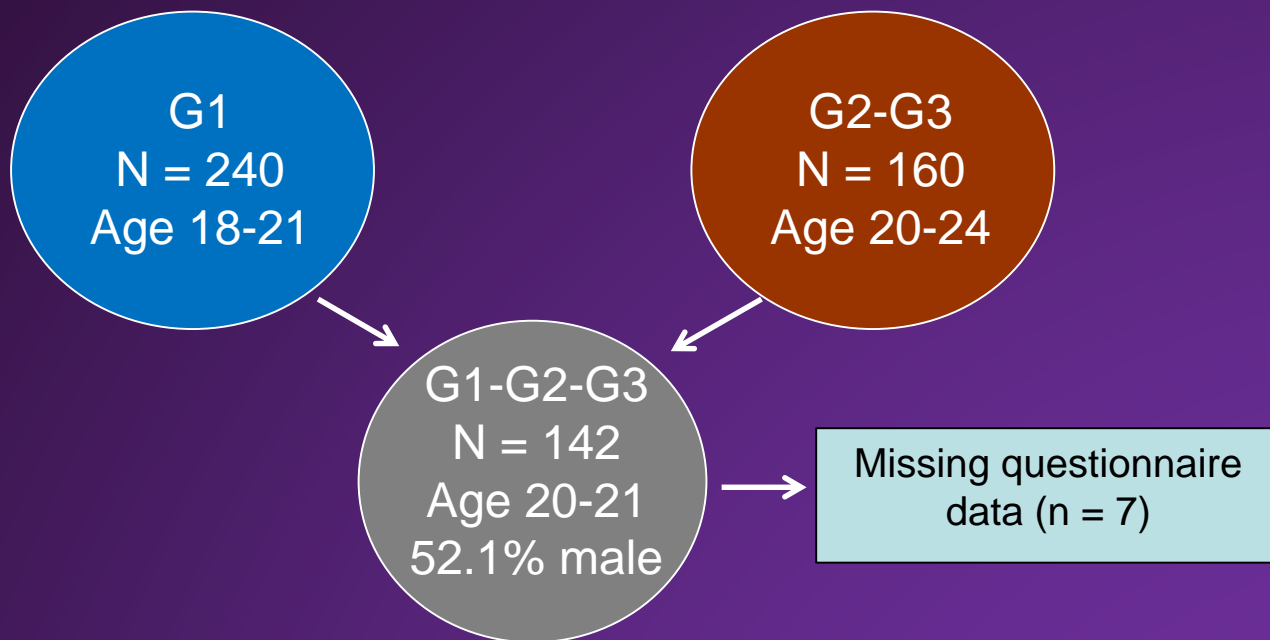


Questionnaire and analyses

- Acceptability and efficacy of in-vehicle alcohol feedback devices
 - ◆ Adapted from a questionnaire by McCartt et al. (2009)
 - ◆ Written description of device followed by questions
 - ◆ Responses ranged from 1 'totally disagree' to 7 'totally agree' further dichotomized into
 - 1-4: do not agree; 5-7: agree
- Demographics compared by exposure to device and sex
 - ◆ Anova, chi-square, and Kruskal Wallis
- Logistic regression
 - ◆ Exposure, sex, and interaction term

RESULTS

Participants



Variable	M or (%)	SD
Age at provisional licence ^a	17.93	1.14
Regular (or full) licence	(81.70)	
Kilometers driven in past week	112.47 ^b	166.77
Number of days driven in past week	3.54	2.51

Note. ^aMinimal licensing age in Quebec = 17; Significant sex difference with females licensed about 3 months earlier than males. ^bMedian = 47.5.

In-vehicle alcohol feedback devices...

	Variable	% agreeing ^a	Comparison	AOR ^{b,c}
...will prevent crashes	All	87.4		
	G1	87.7	G2 vs. G1	ns
	G2	84.6	G3 vs. G1	ns
	G3	88.9	G3 vs. G2	ns
	M	87.1	F vs. M	ns
	F	87.7		
...should be installed in all new vehicles	All	62.2		
	G1	47.9	G2 vs. G1	ns
	G2	69.2	G3 vs. G1	7.67*
	G3	86.1	G3 vs. G2	ns
	M	55.7	F vs. M	ns
	F	69.2		

^a Agreeing = responses 5 to 7 to question; Not agreeing = responses 1-4 to question; ^b Analyses account for exposure, age, and interaction term. Second series of analyses including age at licensing did not change results (not shown here). ^c * $p < .05$.

In-vehicle alcohol feedback devices...

	Variable	% agreeing ^a	Comparison	AOR ^{b,c}
...should be installed in my vehicle	All	54.8		
	G1	38.4	G2 vs. G1	6.75*
	G2	69.2	G3 vs. G1	9.75*
	G3	77.8	G3 vs. G2	ns
	M	42.9	F vs. M	5.00*
	F	67.7		
...are not needed or necessary for everyone	All	51.1		
	G1	60.3	G2 vs. G1	ns
	G2	42.3	G3 vs. G1	0.23*
	G3	38.9	G3 vs. G2	ns
	M	57.1	F vs. M	ns
	F	44.6		

^a Agreeing = responses 5 to 7 to question; Not agreeing = responses 1-4 to question; ^b Analyses account for exposure, age, and interaction term. Second series of analyses including age at licensing did not change results (not shown here). ^c * p < .05.

In-vehicle alcohol feedback devices...

	Variable	% agreeing ^a	Comparison	AOR ^{b,c}
...will be inaccurate/ malfunction	All	52.6		
	G1	67.1	G2 vs. G1	0.09*
	G2	34.6	G3 vs. G1	0.14*
	G3	36.1	G3 vs. G2	ns
	M	60.0	F vs. M	0.24*
	F	44.6		
...raises privacy concerns for me				
	All	31.1		
	G1	43.8	G2 vs. G1	0.15*
	G2	11.5	G3 vs. G1	0.26*
	G3	19.4	G3 vs. G2	ns
	M	37.1	F vs. M	ns
	F	24.6		

^a Agreeing = responses 5 to 7 to question; Not agreeing = responses 1-4 to question; ^b Analyses account for exposure, age, and interaction term. Second series of analyses including age at licensing did not change results (not shown here). ^c * $p < .05$.



DISCUSSION

Limitations

- ❖ Secondary analysis of two randomized controlled experiments
- ❖ Measurement of short-term effects of exposure
- ❖ Only 20-21 years old

Alcohol device: Better for others?

- ➊ Almost all participants agreed that in-vehicle alcohol feedback devices would prevent crashes, but lower agreement was found with installation in all or own vehicles
 - ➋ Some similarities with survey on alcohol interlocks
 - ➌ Similar results found in general literature

McCartt et al. 2009

Importance of exposure

- Public opinions are important in implementation of interventions in the general population
- We found, however, that participants introduced to device had more positive opinions about it than those who were not
 - ◆ Therefore, results suggest that participants should be first exposed to new technology to facilitate acceptance and possibly adoption
 - ◆ These findings should be accounted for in future surveys to more accurately assess the opinions of the population on in-vehicle devices (e.g., 1 week trial before survey)

Sex differences

- ❖ Females had more positive opinions about the device than males
 - ❖ Similar to other studies on attitudes, perceptions, and opinions
 - ❖ Suggest that implementation of passive devices should be accompanied by targeted approaches for young males and females

Granting agencies



Programme de recherche en Sécurité routière FQRSC – SAAQ - FRSQ



Thank you! Merci! Questions?

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Internship, M.Sc., Ph.D. and post-doc opportunities at the
Faculty of Medicine and Health Sciences

Available funding?

Scholarships

Internship: according to duration

M.Sc.: \$15 000/year for 2 years

Ph.D.: \$19 000/year for 3 years

VDES-Med@USherbrooke.ca

Post-doc: to be determined

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