

The effects of driver feedback and financial incentives on driving behaviours: A randomised control trial.

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Abstract

A new strategy that may contribute to reducing the burden associated with road traffic injury is the use of driver feedback and financial incentives to change driver behaviours. The current study assesses the on-road efficacy of an optimised combination of feedback and incentives in changing risky driving behaviours. A total of 232 drivers were recruited to participate in the study. Following a baseline period, participants were randomly assigned to i) no intervention, ii) weekly personalised driver feedback, and iii) weekly personalised driver feedback plus a financial incentive. Data collection is complete and we will complete the analysis in April 2019.

Background.

Although much has been achieved in reducing road trauma in Australia over the past 4 decades, there are still more than 1100 deaths and 50,000 hospitalised injury cases from transport-related causes each year (Australian Institute of Health and Welfare, 2013; Bureau of Infrastructure, Transport and Regional Economics, 2015). The ongoing burden of road injury points to the need to consider new and or alternate strategies that target road traffic injury. A new strategy that may contribute to reducing the burden associated with road traffic injury is the use of driver feedback and financial incentives to change driver behaviours. To date, there is evidence that financial incentives have an effect on changing health risk behaviours such as smoking (Giles, Robalino, McColl, Sniehotta, & Adams, 2014) and a laboratory-based study undertaken by the authors also indicates that financial incentives moderate certain driving behaviours (Mortimer, Wijnands, Harris, Tapp, & Stevenson, 2018). Recent studies have also demonstrated that financial incentives can be more effective when combined with feedback, but further work is required to optimise their combined effects (Dijksterhuis et al., 2015). The current study is the first to assess the on-road efficacy of an optimised combination of feedback and incentives in changing risky driving behaviours. The design of our optimised intervention relies on use of in-vehicle telematics to monitor driving behaviour, transmit individualised feedback to drivers, and link driving behaviours with financial incentives (Horrey, Lesch, Dainoff, Robertson, & Noy, 2012).

Method, Results and Discussion.

A total of 232 drivers (aged 18-35 years) from across Australia, were recruited to participate in the study at the time they obtained their motor vehicle insurance through QBE Insurance. The consenting participants' driving behaviour was monitored for a 'baseline' period comprising 4 weeks. Following the baseline period, participants were randomly assigned to one of three intervention groups (no intervention, weekly personalised driver feedback, and weekly personalised driver feedback plus a financial incentive). Once allocated to an intervention group the drivers were observed for a 24-week period with the insurer's telematics software facilitating the weekly personalised driver feedback which was sent to the participant by SMS messaging to their smart phone.

Group 1, the control group received no-intervention. All drivers in this group were sent to their smart phone a brief weather alert that provided details on adverse weather that could affect their driving. Participants in Group 2 (the feedback only group) received trip-related feedback regarding safe and

unsafe driving behaviours and practices, as well as accessing a dashboard, which provided the participant with a driving score and more detailed information about their individual driving behaviour and practices namely, the proportion of trips exceeding posted speed limits, harsh braking and night-time driving. Group 3 participants received the weekly personalised driver feedback plus a weekly update on how their financial incentive was tracking. Based on the findings from our laboratory study [4], participants in this group were placed under a penalty-based incentive scheme whereby participants were informed that they would begin the 24-week intervention period with an initial balance of \$200, with the potential to lose \$25 every four weeks, dependent upon their driving behaviour from the previous month (i.e., a maximum of one day of risky driving was allowed).

Aside from the data obtained from the telematics device, a survey of all participants was undertaken at the beginning of the study to assess behavioural change and economic parameters including resource utilisation for a cost effectiveness evaluation. The insurer's telematics software provided the important outcome measures namely, i) the proportion (over a seven day period) of daily trips in which the driver exceeded the posted speed limits by 10km, ii) the proportion (over a seven day period) of trips in which sudden heavy braking was required (usually an evasive driving action).

Data collection was completed in February 2019 and at the time of writing, we have finalised the analytical protocol and will complete analysis in April 2019. If our *a priori* hypothesis is found to be supported namely, that feedback or financial incentives change driving behaviour, the implications will be highly significant to road safety policy, globally.

Acknowledgments.

This research is supported by ARC Linkage grant LP150100680, Insurance Box Pty Ltd. and the Transport Accident Commission. MS is supported by an NHMRC Fellowship (APP1136250).

References

- Australian Institute of Health and Welfare. (2013). *Pointer S. Trends in hospitalised injury, Australia: 1999–00 to 2010–11*. Injury research and statistics series no. 86. Cat. no. INJCAT 162. Canberra, ACT.
- Bureau of Infrastructure, Transport and Regional Economics (BITRE). (2015). *Road trauma Australia 2014 statistical summary*. Canberra, ACT.
- Dijksterhuis, C., Lewis-Evans, B., Jelijs, B., De Waard, D., Brookhuis, K., & Tucha, O. (2015). The impact of immediate or delayed feedback on driving behaviour in a simulated Pay-As-You-Drive system. *Accident Analysis & Prevention*, 75, 93-104. doi:10.1016/j.aap.2014.11.017
- Giles, E. L., Robalino, S., McColl, E., Sniehotta, F. F., & Adams, J. (2014). The Effectiveness of Financial Incentives for Health Behaviour Change: Systematic Review and Meta-Analysis. *PLoS ONE*, 9(3), e90347. doi:10.1371/journal.pone.0090347
- Horrey, W. J., Lesch, M. F., Dainoff, M. J., Robertson, M. M., & Noy, Y. I. (2012). On-Board Safety Monitoring Systems for Driving: Review, Knowledge Gaps, and Framework. *Journal of Safety Research*, 43(1), 49-58. doi:10.1016/j.jsr.2011.11.004
- Mortimer, D., Wijnands, J. S., Harris, A., Tapp, A., & Stevenson, M. (2018). The effect of 'smart' financial incentives on driving behaviour of novice drivers. *Accident Analysis & Prevention*, 119, 68-79. doi:10.1016/j.aap.2018.06.014