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A Randomized Field Trial of Smartphone-Based Feedback Designed to Encourage Safe Driving: Comparing Focused and Self-Chosen Goals to Standard Usage-Based Insurance Messaging

INTRODUCTION

Globally, motor vehicle crashes result in 1.2 million deaths and as many as 50 million non-fatal injuries each year. Many crashes can be prevented by reducing risky driving behaviors such as speeding, hard braking, rapid acceleration, and handheld phone use. Innovations in smartphone telematics enable these behaviors to be measured, paving the way for scalable behavioral interventions to help individuals improve their driver safety. This may already be happening: a growing number of U.S. drivers are enrolled in usage-based insurance (UBI) programs that price policies according to smartphone-measured risky driving behaviors. These programs provide feedback and incentives that should, in theory, lead to safer driving. However, this proposition has not been rigorously tested. Moreover, behavioral science would suggest that the way UBI feedback is typically delivered—multiple behaviors at once, without specific incremental goals or choice over what to focus on—is suboptimal. The primary goal of the present research was to experimentally test whether providing feedback and incentives typical of UBI improves driver safety, and whether greater improvements are possible by assigning or allowing drivers to choose more focused goals.

METHODOLOGY

Drivers were recruited nationally via social media advertisements for a 24-week randomized controlled trial. Their speeding, hard braking, rapid acceleration, and handheld phone use was measured with a smartphone app during a 6-week baseline period. Those who met a threshold for number of drives taken were randomly assigned to one of four groups for a 12-week intervention period. The Observation group served as the control; their driving was monitored during this period, but they received no feedback or incentive. The Standard Feedback group received weekly text message feedback on all four behaviors and could earn up to $100 at the end of the period depending on how safely they drove overall. The Assigned Goal group were asked each week to focus on a specific, low-scoring behavior and given an incremental improvement goal for it; they, too, could earn up to $100 for their overall safe driving. The Chosen Goal group were instead asked to choose a focus behavior and set an improvement goal for it; they, too, could earn up to $100 for their overall safe driving. After the intervention period, participants completed an exit survey and continued to be monitored for an additional 6 weeks.

TECHNICAL REPORT:

Ebert, J. P., McDonald, C. C., Xiong, R. A., Abdel-Rahman, D., Khan, N., Nelson, M., Lee, A., Patel, A., Friday, S., Aryal, S., Harhay, M. O., & Delgado, M. K. (2025). *A Randomized Field Trial of Smartphone-Based Feedback Designed to Encourage Safe Driving: Comparing Focused and Self-Chosen Goals to Standard Usage-Based Insurance Messaging* (Technical Report). Washington, D.C.: AAA Foundation for Traffic Safety.

DOWNLOAD REPORT

ABOUT THE AAA FOUNDATION FOR TRAFFIC SAFETY

Founded in 1947, the AAA Foundation for Traffic Safety in Washington, D.C., is a nonprofit, publicly supported charitable research and educational organization dedicated to saving lives by preventing traffic crashes and reducing injuries when crashes occur. Funding for this research was provided by voluntary contributions from AAA/CAA and their affiliated motor clubs, individual members, AAA-affiliated insurance companies, and other organizations or sources.

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The primary outcome was overall driver safety during the intervention period, measured both by a proprietary 0-to-100 score and a composite of underlying incident rates. Secondary outcomes were speeding, hard braking, rapid acceleration, and handheld phone use (proprietary scores and incident rates). Analyses controlled for baseline driving behavior and demographic characteristics and compared each treatment group to the control group and to each other. The 6-week post-intervention period was analyzed to test for sustained improvements in driver safety. Additional analyses tested whether improvements were greater for certain demographic groups.

RESULTS

A total of 1,449 participants were included in the 12-week intervention period. Results based on both proprietary scores and incident rates showed that participants in all three treatment groups drove significantly more safely overall than the control group. Assigned Goal participants showed non-significantly greater improvement than Standard Feedback participants. That is, there was some evidence that assigning participants a behavior to focus on and a goal to work toward led to greater improvements in overall safety, this difference was not statistically significant after adjusting for the number of statistical comparisons. There was no evidence in the overall sample that letting participants choose their focus behavior and goal led to greater improvements.

All three treatment groups exhibited improvements in speeding (11%–13% reduction relative to control), hard braking (16%–21%), and rapid acceleration (16%–25%) compared to the Observation group, but not in handheld phone use.

Drivers in the treatment groups improved by similar amounts regardless of their age, sex, and race/ethnicity. Urban and suburban drivers improved more than rural drivers in two of the treatment groups, but this may be explained by a small rural sample and chance differences in baseline driver safety.

Improvements persisted during the 6-week post-intervention period. That is, during the 6-week follow-up period, participants in the treatment groups generally continued to drive more safely than those in the control group, though some of the behavior-specific comparisons were no longer statistically significant. This finding of sustained safety improvements even after feedback and incentives stopped suggests that participants who improved their driver safety cared about doing so for reasons beyond the incentive money and had developed habits over the 12-week intervention period that enabled them to carry on without external feedback.

Across a range of self-reported and behavioral metrics, the interventions delivered to treatment groups were very acceptable to participants. Engagement with the weekly dashboard sent to treatment groups was relatively low; however, treatment participants who viewed more of the weekly dashboards sent to them via text message showed greater improvements in driver safety on most outcomes. Chosen Goal participants showed high engagement with the goal setting process, with a majority having a behavior chosen and a goal set for all 12 weeks of the intervention.

IMPLICATIONS

This trial experimentally demonstrated, for the first time, that the kinds of feedback and incentives offered by UBI programs can improve driver safety across a range of behaviors. It also showed that these safety improvements may persist beyond a driver's rating period, lessening concerns that UBI discounts reward risky drivers who only drive safely when monitored. In general, similar improvements were seen across key demographic groups, lessening health equity concerns about UBI programs. Counter to what was hypothesized, the three treatment groups experienced a similar degree of improvement, suggesting it may not be beneficial to modify existing UBI programs to focus drivers' attention on one behavior at a time. However, testing with a larger sample may reveal that assigning or allowing drivers to choose their goals offers meaningful benefits—either overall or for specific demographic groups. Regardless, the present results suggest that wider adoption of UBI and similar programs that provide active feedback via text or push notifications and incentives for safer driving would yield road safety gains.