

## Effect of Crashes on Driving Behavior

### Background

Driver behavior is a critical contributing factor to traffic safety. It is estimated that more than 90% of crashes are associated with driver errors.

This recent NSTSCE study investigated the influences of crashes on driving behavior and driving risk. The hypothesis was that drivers are more cautious after a crash, which is reflected in the following two aspects:

- (1) a reduction in the probability of distraction, and
- (2) a reduction in the intensity of safety-critical incidents (SCIs) and/or near-crashes (NCs).

Researchers also explored how the observed effects change over time and they evaluated whether the potential reduction differs by demographic factors such as gender and age.

It is hypothesized that crash experience would lead to

reduced driving risk. The rationale is that drivers will learn from their collision events (crashes) and change their behavior correspondingly, thus reducing driving risk. From a psychological point of view, the study *Drivers' Psychological and Physical Reactions after Motor Vehicle Accidents* (Lucas, 2013) showed that drivers who had been involved in a motor vehicle accident reported significantly greater worries driving than did drivers who had not been in an accident.



### Safe Behavior & Driving

This study suggests that crashes do have positive effects on drivers' behavior in terms of both distraction and aggressive driving. However, the effect diminished quickly after crashes; i.e., at about 50 hours. Further study of how to prolong this improvement in safe behavior will benefit both safety education and efforts to develop corresponding safety countermeasures.

# NSTSCE

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## *NSTSCE Study: Evaluating the Influence of Crashes on Driving Behavior using Naturalistic Driving Study Data*

The results indicate that drivers' engagement in moderate and complex secondary tasks tends to be lower after crashes, especially within a 15-hour driving time window. This decreasing effect tends to diminish over time. Crash impact on near-crashes is similar for both males and females. This study confirmed that crashes have a positive effect on driver behavior. Drivers either learn from the crash experience or are more cautious while driving, which is reflected in the reduced SCI intensity within a short window after crashes. In addition, the results also indicate that female and male drivers showed different responses to crashes. Male drivers responded to both the first crash and the second crash with a lower SCI intensity after each crash. Females showed no significant response to the first crash but did show a decreased SCI intensity after the second crash. These findings provide crucial information for understanding drivers' responses to dramatic driving events and can be critical for developing safety education programs and safety countermeasures.

A few limitations of this study should be noted. First, the individual driver risk variation might be confounded with the observed effect. Second, the study is based on a relatively small number of crashes with mild crash severity. With larger Naturalistic Driving Study (NDS) data sets becoming available, such as the Second Strategic Highway Research Program (SHRP 2) Naturalistic Driving Study, more concrete evidence will be available on the impacts of crashes on driver behavior and, potentially, the impact of crashes by severity.

**Final Report:** Guo, F., & Chen, C. (2015, July 16). *Evaluating the Influence of Crashes on Driving Behavior using Naturalistic Driving Study Data*. Retrieved from <https://vtechworks.lib.vt.edu/handle/10919/54560>

**References:** Curry, A. E., Hafetz, J., Kallan, M. J., Winston, F. K., and Durbin, D. R. (2011). Prevalence of teen driver errors leading to serious motor vehicle crashes. *Accident Analysis & Prevention*, 43(4), 1285–1290.

Lucas, J. L. (2003). Drivers' psychological and physical reactions after motor vehicle accidents. *Transportation Research Part F: Traffic Psychology and Behavior*, 6(2), 135–145.

### Did You Know?

**A study by Curry, Hafetz, Kallan, Winston, and Durbin (2011) indicated that 95.6% of all teen-involved serious crashes were due to driver error.**



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