

# ★★★★★ Senior Safety & Mobility

## Use of Advanced In-Vehicle Technology by Young and Older Early Adopters: *Survey Results on Adaptive Cruise Control Systems*

### Background

Adaptive cruise control (ACC) is an in-vehicle convenience feature designed to maintain a set speed and, when applicable, adjust the set speed to maintain a specified distance from a lead vehicle. When following another vehicle, the ACC system will automatically slow down or speed up in responses to changes in the lead vehicle's speed. Adaptive Cruise Control systems are still relatively new technologies and are not widely available within the U.S. passenger vehicle fleet.

One in eight Americans is 65 or older, and this proportion will continue to grow as the American population ages. It is possible that new technologies such as ACC can assist older drivers to drive more safely with less stress, thus extending their safe driving years. It is also possible that ACC may cause unintended consequences such as over-reliance on the technology.

The research reported here was conducted as part of a broader study to learn more about driver experience with several emerging in-vehicle technologies. The focus of this study is on how these technologies are being used and how well their function and limitations are understood, with a particular emphasis on the experiences of older drivers.

### The Study

- Questionnaires were mailed to 10,000 owners of vehicles known to offer ACC as standard or optional equipment.
- Half of the surveys were mailed to persons aged 65 or older, and half were mailed to persons 25 to 64.
- Completed questionnaires were returned by 1,659 respondents including 370 who had ACC.
- Questions addressed driver acceptance of their ACC systems, perceived system effectiveness and usability, awareness and understanding of system capabilities and limitations, and behavioral adaptations which may occur with system use.
- Follow-up phone interviews were conducted with 17 participants.

### Key Findings

#### Drivers like their ACC systems

- A majority (76%) of those who currently have ACC said that if they purchased their same vehicle again, they would want to get the technology again.

#### How drivers learn to use ACC

- Drivers reported the two most common methods for learning to operate their system as the "Vehicle owner's manual" (67%), and "On-road experience and practice (trial and error)" (54%).



Rear-end crashes make up 30% of all police reported crashes. Some of the areas in which ACC may impact the rear-end crash risks are explored in this survey.



Adaptive cruise control systems make use of radar or laser sensors to determine the distance to vehicles ahead.

## Changes in driving behavior

- More than half of the respondents agreed that when they use ACC they tend to change lanes less frequently.
- Nearly half of the respondents agreed that using ACC relieves them of stress while driving.
- Many drivers are not aware of the limitations of their ACC systems.
- Many drivers incorrectly thought their ACC systems would help avoid a collision in situations outside of the capability of most systems including:
  - Encountering a stopped vehicle in the lane ahead (43%).
  - Following a vehicle in stop-and-go traffic (24%).
  - Following a vehicle on a curvy road (27%).

## ACC interface usability

- Most respondents thought that it was easy to understand the lights, symbols, and sounds (if present) from their ACC system.

## Perceived Safety

- 38% of ACC owners thought that using ACC made them a safer driver than using only conventional cruise control and 7% thought that it made them less safe.
- Twelve respondents (3.7%) reported that they had a close call with ACC turned on because they expected the vehicle to automatically slow down.

## Compared to younger respondents, older respondents with ACC were...

- More likely to have used the owner's manual to learn how to operate their ACC system.
- More likely to say that they would increase their typical following distance if they could no longer use ACC (they drive closer with ACC).

## Need for improvements

- Approximately 30% of respondents reported a need for improvements, and the most frequent suggested areas for improvement of ACC systems were related to the occurrence of unsafe/uncomfortable reductions or increases in speed, and the area of coverage or sensitivity of the system.

## Conclusions

Most drivers with ACC systems stated that they would want these systems on their next vehicle. This study suggests that there may be safety benefits from using this technology, such as reduction in stress, decreased lane changes and longer following distances for younger drivers. However, many drivers are not aware of the limitations of their systems, which raise safety concerns. The misunderstandings evidenced in the study, such as the false assumption that ACC systems will help avoid a collision with a stopped vehicle, are alarming. Drivers need to be better informed about situations in which their ACC is unlikely to react. Based on the potential safety benefits and problems more research is needed to determine the overall safety impact of these systems.

**“When the road curves, the system occasionally will pick up a car in a lane beside you. I would like a warning when it detects that situation.” (Male, 46)**