

# Traffic Safety Facts

## Vehicle Safety Research Notes

DOT HS 811 069

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## Use of Advanced In-Vehicle Technology by Young and Older Early Adopters: *Survey Results on Sensor-Based Backing Aid Systems and Rear-View Video Cameras*

### Background

Many large vehicles such as SUVs have been added to the U.S. passenger vehicle fleet in recent years, and drivers of these vehicles may not appreciate the full extent of blind spots to the rear of their vehicles. Often there is a substantial blind spot to the rear of a smaller vehicle as well.

Backing may be especially difficult for some older drivers who develop reduced flexibility and reduced mobility of the head and neck. One in eight Americans is 65 or older now, and this concern will continue to grow as the American population ages. Many new vehicles are equipped with “convenience” systems designed to make backing easier. These systems include rear-view cameras and sensor-based backing aids. Although these systems were not developed as safety systems, this study explores several of the safety implications of the technologies.

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

### The Study

- Questionnaires were mailed to 10,000 owners of vehicles known to offer backing aids or rear-view cameras as standard or optional features.
- Half the surveys were mailed to people 65 or older, and half were mailed to people between 25 and 64.
- Completed questionnaires were returned by 1,087 backing aid owners and 1,069 rear-view camera owners.
- Questions addressed driver acceptance of the systems, perceived system effectiveness and usability, awareness and understanding of system



*Rear-view cameras show a wide angle view of the area behind the vehicle.*



*Some backing aids use sensors placed on the rear bumper which alert drivers if there are obstacles behind the bumper.*

capabilities and limitations, and behavioral adaptations that may occur with system use.

- Follow-up phone interviews were conducted with 88 participants.

## Key Findings

### ***Many drivers are not aware of the limitations of their sensor-based backing aids***

There were several scenarios in which respondents reported their backing aid systems would help them to avoid collisions “fairly well” or “perfectly,” when in reality it would be likely to work poorly or not work at all.

These included:

- Backing up to a narrow sign post (87%).
- Backing out of a parking space and there is a pedestrian standing 10 feet behind the rear bumper (78%).
- Backing quickly down a long driveway, going about 10 mph, and there is a bicycle behind the vehicle (68%).
- Backing out of a garage when there is a child immediately under the bumper (53%).
- Backing out of a driveway onto a street and into the path of an oncoming car (53%).

### ***Drivers understand the camera field of view***

- When asked to plot the range of vision, drivers were fairly accurate.

### ***Usability of the backing aids***

- Most respondents (89%) said their systems give a good idea of distance to an object.
- Most respondents (92%) said their systems give them enough time to avoid hitting obstacles.

### ***Usability of the rear-view cameras***

- Most respondents (96%) found the cameras easy or very easy to use.
- Some drivers thought their rear-view cameras worked poorly or not at all during bright sun (10%), darkness (9%), and fog (5%).

### ***Changes in driving behavior***

- Some respondents reported using their backing aids (12%) or rear-view cameras (17%) without checking their mirrors or turning to look out the rear window.
- Some respondents with backing aids (23%) claimed to look over their shoulders less often with the system than without the system.
- Some respondents claimed that they would back much more slowly if they did not have backing aids (40%) or rear-view cameras (27%).

***“The distance graphics on my screen seem well thought-out and they are accurate.”***  
– (Male, 56)

***“The screen is washed out in the sun. That needs to be better.”***  
– (Female, 44)

- Nearly one in five respondents who owned a vehicle with a backing aid system reported experiencing a backing collision or “close call” while they were driving another vehicle—without a backing aid system—because they expected to receive a warning (18%).

**Compared to younger respondents, older respondents with backing aids were:**

- More likely to say they would want to get the systems again.
- Less likely to be aware of the warnings and limitations of their systems.
- More likely to rely more on mirrors and glances over their shoulders if their systems broke down.

**Compared to younger respondents, older respondents with rear-view cameras were:**

- More likely to say that there were things especially difficult to learn (e.g., judging distance).
- More likely to be bothered by sun glare on the cameras’ video displays.
- Less likely to say that having rear-view cameras makes them safer.

**Drivers like the systems**

- The majority (98%) of respondents with backing aid systems would want one on their next vehicles.
- The majority (93%) of those with rear-view cameras would want one on their next vehicles.

## Conclusions

Owners of backing aid systems and rear-view cameras generally said that their systems work well and make them safer. However, many respondents were not aware of system limitations and believed that their systems would help them to avoid collisions when in fact they would have been unlikely to have helped; this was especially the case with backing aid systems. Some evidence also suggested that drivers tended to become overly dependent on their backing aid systems and rear-view cameras. Some respondents actually stated this explicitly in follow-up interviews. More research is needed to determine the overall safety impact of both sensor-based and camera systems.

**“...you become too dependent on [the backing aid]. On a car without it, you lose your sense of distance. It took a few months to get used to it.”**  
**– (Female, 36)**

This Vehicle Safety Research Note is a summary of the technical research report: *Use of Advanced In-Vehicle Technology by Young and Older Early Adopters. Survey Results on Sensor-Based Backing Aid Systems and Rear-View Video Cameras* (DOT HS 810 828). This report can be downloaded free of cost on the Vehicle Safety Research section of NHTSA’s Web site ([www.nhtsa.gov](http://www.nhtsa.gov)).



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