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Buick Lucerne Drivers' Experiences with Ultrasonic Rear Parking Assist

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ABSTRACT

Objective: Rear parking sensors may have the potential to reduce property damage caused by some low-speed backing crashes, but their effectiveness depends on drivers' acceptance and proper use. It is of interest to monitor older drivers' experiences with new collision avoidance technologies, given that they may benefit from the technologies but are more likely to have age-related limitations that can affect their use of the systems. This study examined owners' experiences of Buick Lucerne models with Ultrasonic Rear Parking Assist systems.

Methods: Mail surveys were conducted in May 2013 with 426 owners of model year 2010-11 Buick Lucerne sedans equipped with the optional Ultrasonic Rear Parking Assist feature.

Results: Respondents were primarily older drivers, with 95 percent older than 60 and 70 percent older than 70. Nearly all owners reported they always leave the system on, do not find it distracting, and would want it in their next vehicle. Slightly more than half (56%) said they had heard an alert and noticed something behind their vehicle they did not expect, which most commonly was a person or animal. Owners who said their behavior had changed while using the system mostly reported positive changes (e.g., increased alertness or confidence). Systems on model year 2010 vehicles provide information on the distance to rear objects via lights located near the rear windshield, in addition to an audible alert; 26 percent of owners whose systems included lights reported never seeing the lights illuminate while backing up, and the percentage increased with age.

Conclusions: Acceptance of Ultrasonic Rear Parking Assist was high, which is consistent with prior research on early adopters of rear parking sensors. Few owners reported problems using the system, and most problems were likely not attributed to age-related impairments, with the exception of those who did not see the 2010 model's lights. Use and acceptance of collision avoidance technologies should continue to be assessed among drivers of all ages as the systems become more widely available.

Keywords: Crash avoidance technology; Driver behavior; Older drivers

INTRODUCTION

Collision avoidance technologies that monitor the driving environment and alert drivers when a potential crash is detected have become increasingly common in vehicles. It has been estimated that forward collision warning, lane departure warning, side view assist, and adaptive headlights could potentially prevent 1 in 3 fatal crashes and 1 in 5 nonfatal injury crashes per year in the United States if they were installed in all vehicles (Jermakian, 2011). Other collision avoidance technologies are designed to prevent or mitigate low-speed crashes that primarily result in property damage. One such technology is rear parking sensors, which alert drivers through audible, haptic, and/or visual means to objects behind their vehicles while backing up at low speeds. Rear parking sensors are among the most common collision avoidance technologies available on newer model vehicles. According to information on 2013 passenger vehicle models in the database of collision avoidance feature availability maintained by the Highway Loss Data Institute (HLDI, 2012a), rear parking sensors are available as standard equipment on 133 models and as optional equipment on 373 models.

The effectiveness of collision avoidance technologies depends on drivers' acceptance and use. For example, when drivers find a technology annoying, they are more likely to turn it off (Braitman et al., 2010; Eichelberger & McCartt, 2012). Similarly, alerts must be seen or heard, and responded to appropriately, to enable drivers to avoid crashes. A few studies have examined acceptance of and experiences with rear parking sensors, primarily among owners of the first vehicles with the technology or volunteers who drove vehicles with the technology in closed-course experiments. In an experimental study involving a small sample of volunteer drivers, McLaughlin et al. (2003) examined opinions of rear parking sensors, rear parking cameras, and both systems combined following the performance of parking tasks with the systems. Drivers said they were more comfortable backing into and out of parking spots with rear parking sensors than without. Jenness et al. (2007) surveyed early adopters of various rear parking sensors, the majority of whom were ages 65 and older. Vehicle owners overwhelmingly said they would want the technology if they purchased the same vehicle again. Very few reported that the system failed to alert them when there was an obstacle behind them or gave unnecessary warnings. Some owners reported they engaged in potentially more dangerous behaviors with the system than they would

without it; for instance, 61 percent of respondents said they would look in their mirrors or over their shoulder more often while backing up if they could not use the system.

An analysis of insurance claim rates for model year 2008-09 Buick Lucerne sedans found that models equipped with Ultrasonic Rear Parking Assist had lower property claim rates than the same models without it (HLDI, 2011). Ultrasonic Rear Parking Assist uses ultrasonic sensors in the rear bumper to detect objects at low speeds and provides drivers with audible and visual alerts. All Lucerne models with the system were equipped with electronic stability control, and some were equipped with Lane Departure Warning and Side Blind Zone Alert, a side-view assist technology; models without the system had no other collision avoidance features. The study examined rates per insured vehicle year of collision claims, which cover damage to the at-fault driver's vehicle, and property damage liability claims, which cover damage to the other vehicles and property hit by the at-fault driver. Controlling for driver and vehicle features, including Side Blind Zone Alert and Lane Departure Warning, collision claim rates were 5 percent lower and property damage liability claim rates were 17 percent lower for Buick Lucerne models with the system. Both reductions were statistically significant. However, similar reductions in the rates of collision claims and property damage liability claims were not seen for Mercedes-Benz Parktronic, a different parking aid that uses ultrasonic sensors to detect objects in front of and behind the vehicle while parking and warns the driver with audible and visible alerts (HLDI, 2012b).

To extend the knowledge of how drivers use and accept rear parking sensors, owners of Buick Lucerne models with Ultrasonic Rear Parking Assist were surveyed about their experiences with the system. The current study builds on previous surveys of owners of vehicles with rear parking sensors by not limiting its focus to the earliest adopters of the technology. In addition, it was hoped that learning about the experiences of drivers with Ultrasonic Rear Parking Assist would assist in understanding why the system appears to be reducing insurance claim rates when other rear parking sensor systems are not.

METHODS

System Description

Owners of model year 2010-11 Buick Lucerne sedans equipped with the optional Ultrasonic Rear Parking Assist system were included in this study. Ultrasonic Rear Parking Assist uses ultrasonic

sensors on the rear bumper to detect objects that are at least 10 inches off the ground up to 8 feet behind the vehicle, when the vehicle is in reverse and moving at speeds of less than 5 mph. The system is activated automatically when the vehicle is started, and can be turned on and off by altering vehicle settings that can be viewed in a display in the instrument panel and changed by pressing a button next to the instrument panel.

In the 2010 model, beeping sounds and three color-coded lights located on the shelf below the rear window provide additional information on the distance to the detected object. A single beep sounds and one amber light illuminates the first time the sensors detect an object that is between 40 inches and 8 feet behind the vehicle. When the object is within 40 inches of the vehicle, a second amber light illuminates, which then is joined by a third red light and a series of beeps that sound continuously for up to 5 seconds when the object is within 23 inches. The series of continuous beeps sound again for up to 5 seconds, and all three lights flash when the object is within 1 foot. The 2011 model uses only beeping sounds, and not lights, to alert drivers when an object is detected. Beeps become more frequent as the vehicle moves closer to the object, and the rapid beeps are continuous for up to 5 seconds when the object is within 1 foot.

Questionnaires

Separate pen-and-paper mail questionnaires were prepared for owners of model year 2010 and 2011 Lucerne sedans. Surveys included questions about system use, experiences receiving alerts, opinions about the system, general driving habits, and demographics. Other than questions regarding the system's lights that were asked only of model year 2010 owners, the questionnaires for model year 2010 and 2011 owners were identical. Survey recipients were asked to give the survey to the primary or a frequent driver of the Lucerne for completion, and recipients who no longer owned their Lucerne or who were unsure if their Lucerne was equipped with Ultrasonic Rear Parking Assist were asked not to return the survey.

Survey Participants

General Motors provided the names and addresses of customers who had purchased model year 2010 or 2011 Buick Lucerne models equipped with the optional Driver Confidence package that includes

Ultrasonic Rear Parking Assist. In May 2013, surveys with cover letters from General Motors were mailed to 600 randomly selected owners of vehicles of each model year. Postage-paid envelopes were enclosed for returning completed surveys. Reminder postcards were sent to owners 1 week after the initial mailing. This study was approved by the Westat Institutional Review Board.

Surveys were completed by 184 (31%) owners of 2010 models and 245 (41%) owners of 2011 models. Three respondents reported that their vehicle was not equipped with the system or that they did not know if it was, and their responses were not considered further.

Analyses

Chi-square analysis was used to examine relationships between experiences with the system and characteristics such as vehicle model year and driver age. The Mantel-Haenszel chi-square statistic was used to test the statistical significance of linear trends involving driver age, and the Pearson chi-square statistic was used in other analyses.

RESULTS

Characteristics of the 426 Buick Lucerne owners with Ultrasonic Rear Parking Assist who responded to the survey are summarized in Table 1. Nearly all owners were older than 60, and 70 percent were older than 70. Most owners said they back out of a parking spot or driveway several times a day (44%), about once a day (22%), or a few times a week (29%). Characteristics of model year 2010 and 2011 owners were remarkably similar, with the exception of how long they had owned their vehicles. There were few differences in other survey responses between model year 2010 and 2011 owners. Results from the samples were combined, with important differences highlighted.

Ninety-seven percent of owners said they never turn the system off, and about three-quarters reported hearing beeping that they thought was from the system at least a few times a week during the past month (Table 2). One driver had never heard beeping from the system and was excluded from the remaining survey questions about the system.

Experiences with Alerts

The majority of owners (56%) said they had ever heard an alert from the system and noticed something behind their vehicle they did not expect; this was reported by a larger percentage of model

year 2011 owners than model year 2010 owners (60% vs. 50%, $\chi^2[1]=3.9$, $p=0.047$). These owners (N=236) were asked in an open-ended question what was behind their vehicle the most recent time this occurred. The 206 owners who responded said a person or animal (43%) or a vehicle (27%) or other inanimate object such as a tree or pole (31%) was behind them.

Owners were asked if the system ever beeps when there is nothing behind them. A total of 30 percent of owners said this has occurred either very often (10%), sometimes (10%), rarely (5%), or at an unknown frequency (5%). Model year 2011 owners were more likely than model year 2010 owners to report hearing beeping from the system when there is nothing behind them (35% vs. 24%, $\chi^2[1]=6.4$, $p=0.012$). Owners who said the system beeped when there was nothing behind them (N=128) were asked in an open-ended question to describe in what situations or circumstances this has occurred. The 105 owners who responded said it most frequently occurred when the system detected a garage door frame (33%), when backing out of a driveway (20%), and when the system detected uneven pavement (13%) or an object off to the side (10%). Drivers additionally reported hearing a beep from the system when the vehicle is first put into reverse (10%).

Model year 2010 owners (N=182) were asked a series of questions about the system's lights. The frequency and method by which these owners use the lights are summarized in Table 3. Most (64%) reported using beeps more often than lights to determine their distance to something behind them. About a quarter said they had never seen the system's lights illuminate while they were backing up, and the percentage increased significantly with age; no drivers ages 60 and younger, 20 percent of ages 61-70, 27 percent of ages 71-80, and 34 percent of ages 80 and older said they had never seen the lights illuminate ($\chi^2[1]=5.3$, $p=0.021$). Among the 125 owners who had seen the lights, 36 percent said they look at the light display every time they back up. Almost two-thirds (61%) of owners who ever look at the light display do so most often by looking in their rear view mirror rather than by looking over their shoulder. Of the 124 drivers who reported ever using the lights, most said they understand the meaning of the lights (86%) and that they are useful (89%) and easy to see (74%). Only 1 percent said the lights are annoying.

All of the owners of both model year Lucerne sedans were asked their opinions of the audible alert. Most drivers reported they understand the meaning of the beeps (92%) and that the beeps are useful (97%). Few said the beeps are too loud (1%), too quiet (5%), or annoying (4%).

Self-Reported Backing Crashes with System

Twelve percent of owners (N=50) said they had ever backed into something with their Lucerne. Of those who had crashed, 46 percent said they were alerted by the system beforehand, 38 percent reported they were not alerted, and 16 percent did not know or did not respond. All of the owners who reported they were not alerted indicated that Ultrasonic Rear Parking Assist was turned on at the time. Owners who had crashed were asked what they had backed into. The 42 owners who responded said they backed into another vehicle (36%) or another inanimate object (64%). No owners reported they backed into a person or animal. Most drivers who crashed (86%) said the object they backed into was stationary.

Ultrasonic Rear Parking Assist operates at speeds of less than 5 mph and detects objects that are 10 inches or more off the ground. Of the 50 owners who crashed, 4 (8%) reported they did so while traveling at a speed at which the system should not be operational and 4 (8%) reported backing into an object that was too short to detect; 4 owners reported each. Eighty-six percent of the drivers who crashed said the crash occurred outdoors. Among these 43 drivers, most (79%) reported that their crash occurred during the day and 19 percent said it was raining or snowing.

There were some modest differences in crash characteristics between drivers who reported they were alerted prior to their crash and those who were not, although the sample sizes were very small. Three of the 23 owners who heard an alert (13%) reported moving faster than 5 mph or backing into an object less than 10 inches off the ground, compared with 4 of the 19 owners who did not (21%). Among the drivers who crashed outdoors, 6 of the 19 owners who reported they had received an alert (32%) reported that it was raining or snowing when they crashed, compared with 1 of the 17 owners (6%) who said they were not alerted.

Changes in Backing Behavior with System

Owners were asked how often they park in tight spots and back into parking spots compared with before they had the system. Few reported these behaviors more often with the system (10% and 14%, respectively). In an open-ended question, owners were asked to describe how they think their backing behavior has changed since they began using Ultrasonic Rear Parking Assist. Forty-five percent of drivers reported changes, including feeling more confident or safe (17%) and being more aware of what is behind them or more careful (11%). Very few drivers (2%) reported potentially less safe behaviors with the system, including that they stopped looking through the rear window or turning around when backing up, back up more quickly, or forget that they do not have the system when they drive other vehicles. More than half of drivers either said their backing behavior has not changed (26%) or did not respond to the question (29%).

General Opinions of System

Owners were asked with open-ended questions what they liked and disliked about the system. There were 296 owners (70%) that named something they liked. Among these owners, likes included the general concept (i.e., that it detects objects behind the vehicle; 52%), safety or reassurance (25%), back-up in case they miss something (7%), help in certain situations such as parking in tight spaces (5%) or with limitations such as restricted visibility or difficulty with turning their heads (4%), and keeping them more alert (4%).

A much smaller percentage (19%) said there was something they disliked. Among the 81 owners with dislikes, the most common complaints included that the system sometimes turns off on its own or is otherwise unreliable (25%), does not have a backup camera (21%) or other additional functionality such as detecting objects in front of the vehicle or vehicles approaching from the side in a parking lot (9%), and issues alerts perceived to be false or unnecessary (20%).

All owners were asked if there were important changes they would recommend for future Ultrasonic Rear Parking Assist systems. Of the 91 owners (21%) who made recommendations, the most common were adding a backup camera (30%) or sensors to detect objects in locations other than directly behind the vehicle, such as in front of the vehicle or to the side of the rear bumper (12%), and ensuring more reliability or fewer false alerts (20%). Of the 35 model year 2010 owners with recommendations, 17

percent suggested the lights be made more visible. Of the 56 model year 2011 owners with recommendations, 13 percent suggested adding lights to the alert.

Owners were asked how they learned how to use Ultrasonic Rear Parking Assist and could provide multiple answers. Owners reported learning from the owner's manual (85%), a dealership demonstration (36%), or by trying it out on the roadway (32%). When asked to rate their understanding of how the system works on a scale of 1 to 10, with 1 meaning not at all and 10 meaning they completely understand, 61 percent rated their understanding a 10. Most remaining owners scored their understanding an 8 or 9 (26%) or 5, 6, or 7 (10%).

Drivers answered several questions regarding their overall opinions of the system, which are summarized in Table 4. Almost all drivers said they would want the system again on their next car, and about half said it relieves stress. Only 1 percent found the system distracting.

DISCUSSION

Technologies such as rear parking sensors may have the potential to prevent some backing crashes and reduce property damage, but their effectiveness depends on drivers' consistently using them and responding appropriately. As more users have vehicles equipped with aids such as rear parking sensors, it is important to continue to measure their impact on driver acceptance and behavior. Age-related declines in cognitive, visual, and motor abilities can make driving more difficult for older adults (e.g., Anstey et al., 2005), and collision avoidance technologies have the potential to help mitigate these difficulties. For example, the ability to rotate the head diminishes with age (Isler et al., 1997), and rear parking sensors could be helpful to drivers who have difficulty turning around to view the area behind them while backing up. Drivers with diminished depth perception or spatial positioning abilities could also benefit from rear parking sensors. In the current survey of Buick Lucerne owners with Ultrasonic Rear Parking Assist, 95 percent of respondents were older than 60, and more than two-thirds were older than 70. Thus, the survey provides the perspectives of older drivers.

Ultrasonic Rear Parking Assist was well-accepted by Buick Lucerne owners. Virtually all said they would want the system again if they bought another vehicle. This is similar to early adopters of vehicles with rear parking sensors surveyed by Jenness et al. (2007), of whom 98 percent said they would want rear parking sensors again, and to the 93-97 percent of Volvo owners with collision avoidance

technologies such as forward collision warning with automatic braking, side view assist, adaptive cruise control, distance alert, and pedestrian detection who have reported they would want the technologies on their next vehicle (Braitman et al., 2010; Eichelberger & McCartt, 2012). Nearly all Lucerne owners also said they always keep the system on, and very few found the beeps and lights annoying.

There have been concerns that older drivers may have more difficulties with in-vehicle technologies than younger drivers because of confusion, distraction, or longer reaction times. It has also been suggested that for systems to be most effective for older drivers, their design must account for potential visual and motor limitations (Hanowski et al., 1995; Perel, 1998). Generally, owners did not appear to find Ultrasonic Rear Parking Assist overly difficult to use. A total of 87 percent of owners rated their understanding of how the system works an 8 or above out of 10, and only 1 percent found the system distracting. Among owners who had seen or heard the system's lights and beeps, most understood their meaning. However, a notable proportion of model year 2010 owners reported they had never seen the system's lights illuminate while backing. The percentage who had never seen this increased with age, from none of the owners ages 60 and younger to 34 percent ages 81 and older, which suggests the lights may have been less visible to those with weakened vision or restricted ability to turn their heads, both conditions more prevalent with age. The Lucerne owner's manual instructs drivers that the lights can be viewed by looking over the right shoulder, but most owners who had seen the lights illuminate reported they most often looked at them in the rear view mirror; very few owners regularly viewed the lights by looking over the right shoulder.

Another potential concern is that collision avoidance technologies may have inadvertent negative consequences because drivers will be less attentive to the driving task, drive in riskier situations, or become overly reliant on the technology. Lucerne owners appeared to use Ultrasonic Rear Parking Assist to help them with their everyday backing needs, rather than to park in more challenging environments. Few owners said they back into parking spots or park in tight spots more with the technology than before. The lack of increase in challenging parking may be related to the older age demographic of the owners, who may not be as likely to take on more complex driving tasks. When asked how their behavior changed with the system, owners most often mentioned positive changes, such as being more attentive or feeling safer or more confident. A small number of owners reported increases

in potentially less safe behaviors, such as no longer turning around when backing up or backing up more quickly. However, it seems likely that some older drivers would turn around when backing up less often as they age even without the system. This finding differs somewhat from Jenness et al. (2007), who found that about 1 in 5 vehicle owners with rear parking sensors said they look over their shoulders and in the mirrors less with the parking sensor than they would without. It is possible that owners in this study would admit to higher rates of potentially less safe behaviors if asked about them directly.

Thirty percent of owners reported hearing beeping from the system when they believed there was nothing behind the vehicle. If drivers receive alerts that they perceive to be false or unnecessary, it could lessen their trust that an alert indicates a true hazard. However, some alerts that drivers heard when nothing was behind the vehicle may have occurred when the system was functioning correctly. For example, some owners reported the system beeped when their vehicle is first put in reverse; this occurs to signal the system is working. Others reported the system alerted them of objects that were not directly behind the vehicle but that potentially could be struck, such as garage door frames.

Few owners mentioned things they disliked about the system or made recommendations for future systems, but the owners who did frequently said they wished the Lucerne had a backup camera. Camera-based backing aids reduce blind zones, and research has found they hold the most promise to prevent collisions with people behind the vehicle, whereas research has shown that parking sensors are not sufficiently sensitive or reliable to consistently prevent these backing collisions (Mazzae & Garrott, 2006; National Highway Traffic Safety Administration, 2006). The ultimate effectiveness of these technologies, however, will be based not only on their capabilities but also on how drivers use them.

Ultrasonic Rear Parking Assist is intended to be used as a parking aid that help drivers assess how close they are to known objects while backing up; the Lucerne owner's manual cautions drivers that the system cannot detect children, pedestrians, pets, bicyclists, and objects below the bumper, underneath the vehicle, or "too close" or farther than 8 feet from the vehicle. When asked if they had ever heard an alert from Ultrasonic Rear Parking Assist and noticed something behind their vehicle they did not expect, 56 percent of owners said they had, and more than a third of these owners said a person or animal was behind their vehicle. It is unknown from this survey if drivers rely on their systems to detect animals and people, but it would potentially be dangerous if that were the case. In Jenness et al.'s (2007)

survey of early adopters of rear parking sensors, 53 percent erroneously thought their system would detect a child under the bumper fairly well or perfectly, which suggests early users overestimated the ability of rear parking sensors to eliminate blind spots.

Of the owners who reported their rear parking sensors detected something behind their vehicle they did not expect, 27 percent said another vehicle was behind them. This is consistent with the HLDI (2011) finding that Buick owners with Ultrasonic Rear Parking Assist, compared with owners without rear parking sensors, had lower rates of property damage liability claims, which cover damage caused to other vehicles and property by the at-fault driver. Twelve percent of owners reported they had backed into something while the system was on, and nearly half said the Ultrasonic Rear Parking Assist had alerted them before the crash. It is possible that some drivers did not react quickly enough to the alert, or continued backing after hearing or seeing the alert because they did not see the object to which they were alerted. For example, one test of a rear object alert found that the majority of drivers who were distracted when they received an unexpected alert did not react quickly enough to avoid striking the object (Llaneras et al., 2005). About a third of drivers who reported crashing despite recalling that they received an alert said it was raining or snowing at the time, which could have reduced the driver's visibility. The Lucerne owner's manual notes that the system may turn off if the sensors are dirty with snow, ice, or mud, and that the maximum detection distance behind the vehicle may be less than the normal 8 feet during warmer or humid weather. However, rain and snow are not known to affect the system's functionality if it is operating.

A few limitations of this study should be noted. All the data are self-reported by drivers and therefore are necessarily subjective. In addition, recollection of the nature and sequence of past events can be inaccurate. This may be particularly true for events such as crashes that may have been startling or upsetting. For instance, it is possible that some drivers who reported they were not alerted prior to a backing crash were alerted but misremembered. The ages of the owners who were surveyed were not representative of all drivers. Owners chose Ultrasonic Rear Parking Assist as an optional feature, which means they may be more safety conscious or concerned about backing up than other drivers. The Lucerne models with the system were expensive, with suggested retail prices ranging from \$31,695 to \$45,225 (Automobile Invoice Service, 2010, 2011), and could have been more costly if additional options

were purchased. Because surveys were conducted by mail rather than over the phone, a nontrivial proportion of respondents did not respond to open-ended questions. Failing to answer questions regarding likes, dislikes, and changes to behavior with the system cannot be interpreted to mean the respondent had none to report.

As with many other collision avoidance systems, acceptance of Ultrasonic Rear Parking Alert by Buick Lucerne owners remains high. Use of collision avoidance systems should continue to be assessed as more users have systems and new systems enter the market. It is also prudent to continue to monitor the use of new technologies by older drivers, who have unique challenges that may affect their need for and responses to new vehicle systems.

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Table 1 Characteristics for each group of survey respondents (percentage)

	Model Year 2010 (N=182)	Model Year 2011 (N=244)
Age		
60 or younger	5	3
61-70	27	24
71-80	45	44
81 and older	23	27
Unknown	1	1
Gender		
Male	59	58
Female	39	40
Unknown	2	2
How often back into or out of parking space or driveway		
Several times a day	45	43
About once a day	23	20
A few times a week	27	31
Very rarely or never	4	5
Unknown	1	2
Miles driven in typical week in vehicle		
50 or less	22	19
51-100	27	30
101-200	25	25
201 or more	23	22
Unknown	4	4
Number of months vehicle was owned		
12-23	1	24
24-35	30	66
36 or more	69	8
Unknown	1	2

Note: Percentage do not always sum to 100 due to rounding.

Table 2 Drivers' use of Ultrasonic Rear Parking Assist

	Percent (N=426)
Use of Ultrasonic Rear Parking Assist	
Never turn system off	97
Rarely turn system off	1
Sometimes turn system off	<1
Always turn system off	0
Unknown	2
How often heard beeping they thought was from system in past month	
At least once a day	39
A few times a week	35
About once a week	10
At least once, but not every week	6
Did not hear in past month, but have heard before	2
Never heard	<1
Unknown	8

Note: Percentage do not always sum to 100 due to rounding.

Table 3 Use of system lights by model year 2010 owners

	Percent
Ever seen lights illuminate while backing up	(N=182)
Yes	69
No	26
Unknown	5
Make more use of beeps or lights to determine how close you are to something behind you	
Beeps	64
Lights	7
Both equally	23
Unknown	7
Among those who have seen lights illuminate...	
How often look at light display while backing up with system on	(N=125)
Every time	36
Sometimes	45
Rarely	13
Never	1
Unknown	6
Among those who ever look at light display...	
How light display is viewed most often	(N=124)
Look at rearview mirror	61
Look over shoulder	14
Both equally	17
Unknown	8

Note: Percentage do not always sum to 100 due to rounding.

Table 4 Drivers' opinions of Ultrasonic Rear Parking Assist system

	Percent
	(N=425)
Would want Ultrasonic Rear Parking Assist again	95
Ultrasonic Rear Parking Assist relieved stress while driving	55
Ultrasonic Rear Parking Assist was distracting	1