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Subaru drivers’ experiences with the DriverFocus driver monitoring system

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ABSTRACT

Introduction: Driver monitoring systems have the potential to reduce crashes and injuries from driver distraction and drowsiness. This study measured the use and acceptance of Subaru's DriverFocus, a camera-based system that can monitor drivers outside of automation use.

Methods: An online survey was conducted in September 2024 among 3,475 United States-based owners of Subaru models equipped with DriverFocus.

Results: Most owners were knowledgeable about DriverFocus and 87% said they drove with it on most or every time they drove the vehicle. Drivers who used the system were more likely to have received at least one distraction alert than to have received a drowsiness alert (97% vs 37%) in the previous 30 days. Drivers perceived some alerts as false positives, and the perceived false negative rate was low. Most drivers agreed that they would want the system again (70%), and those who drove with it on agreed it made them a safer driver (64%) and helped them avoid distractions (63%). Receiving too many alerts and annoyance were the top reasons cited by the 4% of drivers who turned the system off under their profile settings.

Conclusion: Most Subaru owners of vehicles equipped with DriverFocus appear to see safety benefits from the system. Drivers indicated experience with some false positive alerts, but misconceptions about what behaviors should trigger a distraction alert appears to have distorted this perception. Because drivers who receive many alerts are likely the ones to benefit most from the system, we offer suggestions for improving its acceptability to make it more effective.

Practical Applications: Manufacturers using camera-based monitoring during use of partial automation could expand this functionality for use during normal driving. Helping drivers better understand the behaviors that the system is designed to detect may increase acceptance.

Keywords: driver monitoring system; distracted driving; drowsy driving; ADAS

INTRODUCTION

In the United States in 2023, distraction-affected crashes killed an estimated 3,275 people and an additional 633 fatalities involved a drowsy driver (National Center for Statistics and Analysis, 2025). While these numbers are grim, both distraction (Blincoe et al., 2023; McCartt et al., 2006; Ranney, 2008) and drowsiness (National Highway Traffic Safety Administration, n.d.; Tefft, 2014, 2024) are difficult to confirm as crash contributors, and thus related crashes and injuries are likely underreported. Studies have estimated that the actual number of distraction-affected fatalities is about 3 times the official count (Blincoe et al., 2023) and the number of drowsiness fatalities is about 9 times the official count (Tefft, 2024). This yields a combined estimate of about 16,000 annual fatalities.

Driver monitoring systems are in-vehicle technological countermeasures designed to detect indicators of distraction/inattention and fatigue/drowsiness in real time and alert drivers when their engagement in the driving task is insufficient (Fredriksson et al., 2021; Palao, 2023). These systems can further improve safety by combining this information with increased sensitivity of other advanced driver assistance systems (ADAS) like front crash prevention or lane departure prevention (Fredriksson et al., 2021), as distraction and drowsiness are disproportionately factors in single-vehicle road departures and rear-end crashes (Liu & Jianqiang Ye, 2011; Owens et al., 2018). Rudimentary systems sense patterns of alertness through driving behavior such as steering inputs and the number of lane deviations detected by the forward-facing camera (Ford Motor Company, 2025; Volvo Cars, 2024). More advanced driver-facing camera systems monitor the driver's face and eyes (Subaru Corporation, 2024) and are more common in vehicles equipped with Level 2 automation. Driver monitoring that detects when drivers are looking away from the road is one component considered under IIHS's partial automation safeguard ratings program (Insurance Institute for Highway Safety, 2024). However, in the United States, these camera-based monitoring systems usually cannot be turned on outside of partial automation even though distraction and drowsiness still occur when partial automation is not engaged.

Manufacturers must design safety systems so that driver acceptance and use is high; otherwise, their benefits will go unrealized. Camera-based driver monitoring systems are tasked with accurately identifying hard-to-detect behaviors ranging in complexity (Fredriksson et al., 2021). Variation in environmental lighting (Fredriksson et al., 2021; Palao, 2023), the driver's body position (Palao, 2023), appearance between and within individuals (Fredriksson et al., 2021; Palao, 2023), and even driving-related roadway glances (Kircher et al., 2020) can challenge these systems and lead to false positives. Too many false positives can result in annoyance (Fredriksson et al., 2021), a factor associated with lower use of other ADAS technologies (Eichelberger & McCartt, 2014, 2016; Marshall et al., 2007; McDonald et al., 2018).

Subaru first introduced a camera-based driver monitoring system designed to operate outside of partial automation to continually check for signs of both distraction and drowsiness on the 2019 model year Forester. This study set out to measure Subaru owners' experiences with using the system and their opinions of it. Subaru's early implementation in the consumer market makes it an ideal system to explore drivers' early experiences with it.

METHODS

The Insurance Institute for Highway Safety (IIHS) contracted with Opinion America Group, LLC, to program the online survey instrument. The instrument was designed by IIHS in cooperation with Subaru to measure driver attitudes and behaviors surrounding their branded driver monitoring system, DriverFocus[1].

System description

The DriverFocus infrared camera is positioned above the infotainment screen. It monitors the driver's eyes and head position for signs of distraction and monitors eye closure and blinking for signs of drowsy driving. DriverFocus also uses facial recognition to automatically set a registered driver's preferred seat and mirror positions, climate, and display settings once they are recognized in the driver's seat. Registering a driver profile is not required for distraction and drowsiness monitoring. Turning the system on and off varies by the model. In some, a driver can turn the driver monitoring system on and off via the infotainment screen by navigating to "settings" and then "driver monitoring system" or by touching the car icon and then the "other" tab. The other configuration features an on/off switch with the driver monitoring icon to the lower left of the steering column. In most cases, the system defaults to its on setting with each ignition cycle. However, if a driver has registered as a user and turned the driver monitoring off under their profile settings, the system will turn off after successful recognition of the driver.

When the system senses a driver is distracted, the vehicle delivers three beeps paired with a "keep eyes on road" visual message displayed on the instrument cluster. Distracted driving warnings are inactive when the turn signal is operating or when the vehicle is in reverse to avoid false positive alerts due to sideways glances and head turns typical of changing lanes and navigating reverse maneuvers. If the vehicle detects an obstacle ahead, attention warnings may activate sooner.

[1] Registered in the U.S. Patent and Trademark Office.

The system offers three drowsy driving warnings that vary in intensity based on the length and percentage of time the eyes are closed. The lowest drowsiness level prompts a single beep paired with a "take a break" message on the instrument cluster. If the system senses increased drowsiness, the warning chime features five beeps paired with a "stay alert" message on the instrument cluster. The strongest warning features the same visual "stay alert" message on the instrument cluster paired with continual beeping until the system detects the driver's eyes are open.

Participant recruitment and eligibility criteria

The survey was conducted in the United States. Subaru had a database with email addresses for 200,000 owners of vehicles potentially equipped with DriverFocus. The vehicles included the 2023 Ascent, 2019-23 Forester, 2020-23 Legacy, and 2020-23 Outback. DriverFocus was standard equipment on some trim levels of these vehicles and optional on others. Subaru emailed invitations with unique links to owners. To be eligible to participate, drivers needed to be at least 21 years old and needed to confirm their vehicle was equipped with the system. They also had to drive the equipped vehicle DriverFocus at least once per week on average.

Drivers confirmed their vehicle had the system either by identifying their model year, model, and trim for vehicles on which the system was standard equipment or by recognizing images of the system's infrared camera if the system was optionally equipped on the trim they selected or if they were unsure of the trim of their vehicle. The survey was conducted in two waves of 100,000 during September 2024. The Advarra Institutional Review Board deemed the study exempt from oversight.

Subaru invited the full database of owners to participate, of which 5,657 visited the survey site. Of those, 1,657 did not advance to the questions and 525 were terminated for ineligibility because they were not old enough (n = 284), they could not confirm their vehicle was equipped with the system (n = 234), or they did not drive their Subaru (n = 7). This resulted in 3,475 completed surveys for a 1.7% response rate.

Data collected and analyses

Following eligibility screening, drivers were asked if they set up a user profile and if so, the driver monitoring setting under their profile. If drivers turned the driver monitoring off under their profile, they were asked why. Drivers with registered profiles were asked about how often their vehicle successfully recognizes them. All participants were asked questions designed to gauge their understanding of the system's purpose, how it works, and how to read the system icons.

Participants who indicated they at least occasionally (i.e., answered "rarely" in the survey) drive with driver monitoring on were asked about their experience receiving distraction alerts in the previous 30 days, if they felt they were alerted when they were not distracted, and their behaviors or states when those false positives happened. We also asked these drivers about their experience with drowsiness alerts in the last 30 days, how their behavior changed with the system, and if they feel like the system had helped them avoid a crash.

All participants were asked a series of questions regarding their opinions of the system to gauge perceived benefits and usefulness, opinions of alert volume and frequency, and how well the system works with clothing accessories or eyewear and in all environmental conditions. The survey ended with demographic questions. Participants were permitted to skip questions that were not used to establish eligibility.

We provided response options on a five-point Likert scale for questions that determined frequency (every time, most of the time, sometimes, rarely, or never) and level of agreement (strongly agree, somewhat agree, neither agree nor disagree, somewhat disagree, or strongly disagree). Response categories were collapsed where appropriate. Comparisons were made between drivers who used the system most or every time they drove, i.e., those who usually used it (n = 3,015), and those who drove with the driver monitoring system on sometimes, rarely, or never, i.e., those who used it irregularly or not at all (n = 419). Differences in categorical responses between drivers who usually used the driver monitoring system and those who didn't were tested using chi-square tests of independence. We excluded "no response" categories from statistical analyses. We considered results to be statistically significant at the $\alpha = 0.05$ level. SAS 9.4 was used for the analyses.

RESULTS

Table 1 shows the characteristics of the 3,475 respondents. Over 75% of participants drove the DriverFocus-equipped vehicle daily or most days per week. Most of the sample was male and over age 60.

Survey questions designed to capture participants' knowledge of the system are shown in Table 2. Over half (55%) of participants provided an accurate description of the DriverFocus system in response to an open-ended question, and another 15% provided an accurate description of the system and at least one other functionality that is part of the EyeSight suite (i.e., automatic emergency braking or lane departure warning). Approximately 93% were familiar with the DriverFocus icon when shown a picture of it, and 77% of those participants knew the status of the system (i.e., on, off, temporary stop, or warning) based on the icon's appearance. Participants most often said they had learned about the system at the dealership (59%), followed by trial and error (46%) and from the owner's manual (45%).

Eighty-six percent of drivers set up a driver profile (Table 3). Among those drivers, 81% believed the vehicle successfully recognized them most or every time they sat down in the driver's seat, and 89% had the monitoring system on under their driver profile setting. Eighty-seven percent of participants said they drive with DriverFocus on most or every time, and drivers who used the system at least rarely said they used it more on high-speed roads (94% most or every time) than on low-speed roads (91% most or every time). Drivers who used the system were asked to provide their opinions of it (Table 4). Eighty-four percent agreed the system could accurately detect when they were looking at the road. Most drivers agreed the system helped them avoid distractions and encouraged them to be safer drivers. Nine percent thought they did not get an alert when they could have. Nineteen percent believed a DriverFocus alert had helped them avoid a crash.

Drivers' experiences with the system's distraction alerts are shown in Table 5. Drivers were most likely to report either getting alerts infrequently, i.e., one to three times, in the past 30 days (29%) or getting many, i.e., 10 or more (28%). Most of the sample (56%) received six or fewer alerts. Few drivers said they were never actually distracted when they got an alert (12%), with most participants saying this was sometimes the case (37%). Regarding cases when drivers got an alert but felt they were not distracted, they were most likely to say they had been changing lanes (52%), adjusting or looking at the navigation, radio, or climate system (37%), or looking at the instrument cluster (24%). Seven percent of drivers said they were falsely alerted when making driving-related scans, though 6% said they were looking outside the vehicle in a way not related to the driving task, for example looking at scenery or birds or reading billboards. Among drivers who have gotten at least one alert, just over half said they were looking away from the forward roadway most or every time. Drivers who said they were alerted while rarely or never looking away from the roadway and while not distracted (n = 595) most often said they had been shifting their body in their seat (31%), followed by touching or scratching their face or head (13%).

When it came to the drowsiness alerts (Table 6), most participants never got either one alert (63%) or one to three (28%) in the previous 30 days. Of the participants who got at least one drowsiness alert (n = 1,163), roughly 60% received the next, more severe "stay alert" warning with five beeps at least once. Of those (n = 693), 21% received the most urgent "stay alert" warning with continual beeps. Twelve percent of the sample felt they were alerted when they were about to fall asleep, though most drivers said they have been alerted when they were not drowsy (81%).

The opinions of the systems among drivers who usually used the system (i.e., most or every time) when they drive (n = 3,015) and those who do not (n = 419) are shown in Table 7. Differences in opinions were statistically significant with p-values <0.0001 for every comparison. Drivers who said they usually use the system generally viewed the system favorably, with most saying the timing and volume of the alerts were appropriate. More than 80% of drivers agreed that the system could help prevent crashes, would be a good idea for all drivers, and could help drivers pay attention. Three-quarters of drivers who regularly used the system said they want DriverFocus on their next vehicle, compared with 39% of those who did not use it regularly. A total of 70% of participants said they wanted it again. Drivers who did not regularly use DriverFocus were more likely to say the system was a good idea for some groups of drivers instead of all drivers (68% vs. 52%). Not only were drivers who do not regularly use the system more likely to say the system was annoying and distracting than those who usually use the system, annoyance and distraction were the second and third most common reasons given for turning the system off under the driver profile settings, behind receiving too many alerts (Table 8).

DISCUSSION

The goal of this study was to measure driver attitudes and opinions of Subaru's DriverFocus, a monitoring system that uses a driver-facing camera and is designed to operate outside of partial automation activation. This sample of drivers overwhelmingly drove their DriverFocus-equipped vehicle at least most days of the week, suggesting sufficient experience with the system to have formed opinions of it.

The nearly 90% of drivers in this sample who had the driver monitoring system on most or every time they drive appear to find value in the system and generally view it favorably, although these drivers indicated moderate annoyance with the system. This contributes to the evidence that drivers are willing to accept some annoyance from a system if they feel the system provides a benefit (Eichelberger & McCartt, 2014, 2016; Mueller et al., 2024). About two-thirds of participants who used the system believe that it makes them better drivers, and there is a sense of societal benefit among owners in that most agree the system can help prevent crashes and is a good idea for all drivers.

This study also provides some evidence that support for a camera-based driver monitoring system may increase following exposure to it. Three-quarters of drivers who drove with DriverFocus on most or every time (70% of the entire sample) said they would want it on their next vehicle. This is somewhat higher, albeit from a different sample, than the 61% of participants in an earlier survey who said they would hypothetically want a similar system on their next vehicle (Cox et al., 2024) and the 63% in another survey who supported such a system (Shoots-Reinhard et al., 2021). Increased support following exposure has also been found with another in-vehicle technology designed to curb unsafe driving behavior, intelligent speed assistance (Ryan, 2018). Majority support for driver monitoring, both with and without experience using it, suggests that manufacturers can add the technology to more vehicles without provoking a backlash from consumers, especially if drivers are provided the opportunity to turn the system off and can be convinced that it benefits them.

Far more drivers in this sample received distraction alerts than drowsiness alerts. This was expected, given that a large-scale naturalistic driving study found observable drowsiness or fatigue was present in less than 2% of baseline segments whereas observable distraction was present in nearly 52% (Dingus et al., 2016). Surveys have found similarly disparate prevalence for falling asleep while driving (Wheaton et al., 2014) and doing at least one secondary task on most or every drive (Cox et al., 2023) in the previous 30 days.

Though drowsiness may be less common, the risk of crashing while visibly drowsy is greater than the risk of crashing while engaging in some distracting secondary tasks (Dingus et al., 2016; Klauer et al., 2006). Drowsy driving could account for an estimated 6,000 roadway fatalities annually (Tefft, 2024). While most of the sample never received the "take a break" warning, most who did indicated that they got the "stay alert" warning with five beeps, and 1 in 5 of those drivers (4% of the entire sample) received the most aggressive drowsy alert. Although drowsiness detection may not be applicable to most drivers on a regular basis, 12% of the sample who received a drowsiness alert said they did so when they were about to fall asleep. Averaging less than five hours per sleep, male gender, and younger age are factors associated with increased risk of falling asleep while driving (Wheaton et al., 2014). While our sample leaned male, it also leaned older.

Drivers who used the system at least rarely overwhelmingly agreed that it can accurately detect when a driver is looking at the road, suggesting a high true negative rate. Furthermore, the rate of reported false negatives, or drivers not getting either alert when they could have, was low at just 9%. However, a low false negative rate comes at the cost of more false positives. Occasionally alerting drivers when they are not drowsy or distracted is minimally consequential, but too many false positives should be avoided to keep annoyance low and acceptance high (Fredriksson et al., 2021).

Subaru took steps to reduce false positives due to driving-related glances away from the forward roadway by disabling inattention alerts when a turn signal is active or the vehicle is in reverse (Subaru Corporation, 2022). However, just over half of participants received a distraction alert when changing a lane. This implies a lack of turn signal activation more than a system flaw; an observational study that found only half of drivers activate their turn signal when changing lanes (Ponziani, 2012). Subaru also acknowledges some environmental conditions, such as strong glare from or shadows cast by strong sunlight, and driver appearances, like wearing some types of sunglasses or other accessories that can cover the face and eyes, can cause the system to operate incorrectly (Subaru Corporation, 2022). A small percentage of drivers in this sample indicated receiving false positives under these conditions.

Drivers mentioned receiving some false positive distraction alerts outside of the efforts made by Subaru to reduce them. This happened most frequently when drivers were adjusting in their seat or touching their face or head, which might obstruct or remove the driver's eyes from the camera's view but can be done while the driver's eyes are on the road. A small percentage of participants reported receiving a distraction alert when they were making driving-related roadway scans. These scans can be protective against crashes but only if the driver's eyes return to the forward roadway within 2 seconds (Klauer et al., 2006). It is possible these drivers may be scanning outside the forward roadway longer than what would be safe and protective, which would warrant an alert.

Most of the remaining behaviors that triggered a distraction alert when participants felt they were not distracted are true positive alerts because they are not necessary to the driving task. While many people primarily associate distracted driving with cellphones, any secondary task that diverts attention away from or competes with the driving task is a distraction (Ranney, 2008; Regan et al., 2011). Though secondary task complexity is positively correlated with crash risk (Dingus et al., 2016; Klauer et al., 2006), seemingly innocent behaviors that participants listed such as adjusting the radio, talking with passengers, and eating or drinking can increase crash risk (Dingus, 2014; Dingus et al., 2016) if the driver's eyes divert from the forward roadway longer than a few seconds (Klauer et al., 2006). These behaviors are also very common, with 60% to 85% of participants in a nationally representative survey saying they did those or similar secondary tasks while driving in the previous 30 days (Cox et al., 2023).

The lack of understanding about what should trigger an alert coupled with how prevalent some secondary tasks are may give the false impression that the system issues too many false positive or unwarranted alerts. Just like too many truly false positives, these misconceptions could result in system deactivation, especially among drivers who do not find value in the system. There is some evidence that this is happening: The top reasons given for turning the system off were receiving too many alerts and annoyance. This suggests that the small percentage of drivers who never drive with the system on could actually benefit the most from it. Many drivers said they learned about the system most at the dealership at purchase, though trial and error came in second. Providing vehicle buyers with examples of common behaviors the system is designed to flag and why may increase use by reducing misconceptions that result in erroneous identification of false positives.

Implementing a different alert scheme might be another way to increase use of the system among drivers who trigger frequent alerts. The move away from audible to haptic alerts was one of several factors that appeared to lead to increased use of lane departure systems (Cox et al., 2025), a system prone to issuing frequent alerts under typical driving conditions (Flannagan et al., 2016). Not everyone agrees on what should warrant an alert, and auditory alerts have been found to be annoying for driving scenarios perceived as low-urgency (Marshall et al., 2007). For these reasons, a hybrid or cascading alert design might be more palatable. A cascading scheme might first alert drivers haptically when distraction or slight drowsiness is detected and escalate to auditory alerts after repeated incidents or when the system senses the driver is asleep.

Several limitations are worth noting. This sample is not representative of the U.S. population primarily because most of the sample was over age 60. Older adults may have been more inclined to participate because they had more free time to do so. Older people are less likely than younger people to drive distracted (Cox et al., 2023; Rakotonirainy et al., 2012; Schroeder et al., 2018) and drowsy (Scarpelli et al., 2021; Wheaton et al., 2014), so this sample may the system more favorably than the general driving population if their behavior prompts fewer alerts. The response rate was low, which could have been a result of several factors. Email invitations may have been filtered as junk, some email addresses may have been unmonitored or defunct, and some contact information may have been for previous owners.

The system is designed so that drowsiness alerts escalate sequentially, and the survey questions were designed accordingly so that only drivers who received the first drowsiness warning were asked if they got the second, and so on. However, the system can skip the escalation pattern entirely and issue the strongest "stay alert" message with continual beeps if the system cannot detect the driver's eyes open. Thus, it is possible that some respondents received the third warning without previously receiving the first and second. Since drowsiness alerts were generally rare, we do not expect the number of drivers to have experienced this to be high.

CONCLUSIONS

The first driver-facing camera-based driver monitoring system in the U.S. market designed to operate outside of partial automation was widely accepted among this sample of drivers. Despite some annoyance and experiences with false positives, most drivers use the system regularly and feel the system provides safety benefits.

PRACTICAL APPLICATIONS

Many vehicles with Level 2 automation capabilities from other U.S.-based manufacturers are already equipped with a similar camera-based driver monitoring system. Updating the software of these vehicles to give drivers the option to use driver monitoring outside of partial automation would increase its potential to reduce preventable crashes and injuries. Most participants learned about the system at their dealership, so Subaru could consider providing buyers with some examples of behaviors that the system is designed to detect as a means of lowering incorrect perceptions of false positive alerts.

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TABLES

Table 1

Characteristics of survey respondents (*n* = 3,475)

	%
Model year	
2019	5
2020	22
2021	20
2022	23
2023	31
DriverFocus-equipped vehicle drive frequency (per week)	
Daily	35
Most days	41
Some days	21
Rarely	3
Age	
30 or younger	1
31–40	5
41–50	11
51–60	14
61–70	30
71 or older	39
Gender	
Male	64
Female	34
Other/unknown	2
Marital status	
Married or living with domestic partner	77
Single, divorced, or widowed	20
Skipped	2

Note: Percentages do not always sum to 100% due to rounding errors.

Table 2

Drivers' knowledge of DriverFocus (asked of all participants, n = 3,475)

	%
How respondents described the system	
Correct description of DriverFocus	55
Correct description of DriverFocus, plus one or more other EyeSight system	15
Don't know, skipped, or no meaningful response provided	18
Wrong system described or missed key component	11
Familiar with DriverFocus icon	
Yes	93
No	4
Unsure	2
Skipped	0.1
Know the system's status based on the icon appearance (if familiar with icon, n = 3,248)	
Yes	77
No	11
Unsure	12
Skipped	0.1
How respondents learned to use the system (instructed to select all that apply)	
At the dealership at purchase	59
Trial and error	46
Owner's manual	45
Subaru corporate how-to videos	9
Non-Subaru branded videos, such as from another owner	7
Independent Subaru dealership videos	5
Skipped	1

Note: Percentages do not always sum to 100% due to rounding errors.

Table 3

Drivers' use of DriverFocus

	%
Set up a driver profile (*n* = 3,475)	
Yes	86
No	11
Unsure	3
Skipped	0.1
(If driver profile set) How often does the vehicle successfully recognize you? (*n* = 2,990)	
Most or every time	81
Sometimes or less	19
Skipped	0.4
(If driver profile set) What is the driver monitoring setting under your driver profile? (*n* = 2,990)	
On	89
Off	4
Unsure	6
Skipped	0.2
How often do you drive with driver monitoring on? (*n* = 3,475)	
Every time	54
Most times	32
Sometimes	5
Rarely	1
Never	5
Skipped	1
Use on high-speed roads (among drivers who at least rarely use it, *n* = 3,246)	
Most or every time	94
Sometimes or less	5
Skipped	1
Use on low-speed roads (among drivers who at least rarely use it, *n* = 3,246)	
Most or every time	91
Sometimes or less	9
Skipped	0.4

Note: Percentages do not always sum to 100% due to rounding errors.

Table 4

Drivers' opinions of DriverFocus (among drivers who at least rarely use it, n = 3,246)

	%
I agree that the system…	
Can accurately detect when the driver is looking at the road	84
Helps me avoid distractions	63
I agree that with the system on…	
I am encouraged to be a safer or better driver	64
Driving is less stressful	45
I look away from the forward roadway less	43
Have you ever not gotten an alert when you could have?	
Yes	9
No	72
Unsure	18
Skipped	1
Have you ever avoided a crash because of a DriverFocus alert?	
Yes	19
No, I have been in a crash that an alert may have helped me avoid	2
No, I have gotten alerts but not when at risk of crashing	63
I have never gotten an alert	6
Unsure	9
Skipped	1

Table 5

Experience with distraction alerts (among drivers who at least rarely use it, n = 3,246)

	%
In the last 30 days, how many times have you gotten the "keep eyes on road" warning?	
10 or more	28
7–9	16
4–6	24
1–3	29
Never	3
Skipped	0.2
How often have you felt you were not distracted? (among drivers who have gotten at least one alert, n = 3,151)	
Every time	12
Most times	31
Sometimes	37
Rarely	15
Never	5
Skipped	1
Actions when alerted but not distracted (n = 2,974, multiple responses allowed)[a]	
Changing lane [b]	52
Adjusting or looking at navigation, radio, or climate [b]	37
Looking at the instrument cluster [b]	24
Laughing or talking with passengers [b]	14
Scanning roadway, driving related (looking at car approaching from side, parking spot, address) [c]	7
External distraction, not driving related (looking at scenery, birds, billboard) [c]	6
Eating or drinking [c]	6
How often were you looking away from the road? (among drivers who have gotten at least one alert, n = 3,151)	
Most or every time	51
Sometimes	30
Rarely or never	19
Skipped	0.1
Actions when alerted but when rarely or never looking away from the forward roadway (and while not distracted, n = 595, multiple responses allowed)[a]	
Adjusting in seat [b]	31
Touching or scratching face or head [c]	13
Wearing sunglasses or glasses [c]	9
Glare from sun [c]	5
Tilted or leaning head on hand [c]	5
Navigating a turn [c]	3
Arm position on steering wheel blocked sensor [c]	2

Note: Percentages do not always sum to 100% due to rounding errors.

[a] The most common response themes are presented.

[b] Indicates response provided in questionnaire. [c] Indicates response provided by participants to open-ended "other" option.

Table 6

Experience with drowsiness alerts (among drivers who at least rarely use system, *n* = 3,246)

	%
In the last 30 days, how many times have you gotten the "take a break" warning?	
10 or more	2
7–9	1
4–6	4
1–3	28
Never	63
Skipped	1
In the last 30 days, how many times have you gotten the "stay alert" warning with five beeps? (among participants who got the "take a break" warning at least once, *n* = 1,163)	
10 or more	7
7–9	4
4–6	12
1–3	37
Never	40
Skipped	1
Have you ever received the "stay alert" warning with continual beeps? (among participants who said they at least once received the "stay alert" warning within the last 30 days, *n* = 693)	
Yes	21
No	63
Unsure	15
Skipped	1
Have you ever received a drowsiness warning when you were about to fall asleep? (among participants who at least once got the "take a break" or "stay alert" warning, *n* = 1,163)	
Yes	12
No	80
Unsure	7
Skipped	1
Have you ever received a drowsiness warning when you felt you were not drowsy? (among participants who at least once got the "take a break" or "stay alert" warning, *n* = 1,163)	
Yes	81
No	15
Unsure	4

Note: Percentages do not always sum to 100% due to rounding errors.

Table 7

Opinions of DriverFocus among entire sample, drivers who regularly use system, and drivers who use system irregularly or never

	Entire sample, % (n = 3,475)	Most or every time, % (n = 3,015)	Sometimes or less, % (n = 419)	p value [a]
The timing of the alerts is…				<0.0001
Too soon	29	26	51	
Appropriate	58	62	31	
Too late	1	1	1	
Unsure	11	11	16	
Skipped	1	1	2	
The volume of the alerts is…				<0.0001
Too loud	7	5	21	
Appropriate	87	90	68	
Too quiet	3	3	3	
Unsure	3	3	7	
Skipped	0	0	1	
Agree…				
System can help prevent crashes	82	85	58	<0.0001
System is a good idea for all drivers	79	83	52	<0.0001
Alerts help drivers pay attention	78	82	50	<0.0001
System is a good idea for some drivers (such as young, novice, or older)	78	80	68	<0.0001
Would feel safer if every vehicle on the road were equipped	74	77	48	<0.0001
Want it on next vehicle	70	75	39	<0.0001
System works well in all environmental and lighting conditions (like rain or snow, in bright sun, at night, dusk, or dawn)	46	49	23	<0.0001
System works well with clothing accessories (like sunglasses, scarves, hats, etc.)	40	43	18	<0.0001
Alerts are annoying	44	41	67	<0.0001
Alerts are distracting	28	25	57	<0.0001

Note: Percentages do not always sum to 100% due to rounding errors.

[a] *P* value from chi-square test comparing responses of drivers who regularly and irregularly use it.

Table 8

Reasons for turning DriverFocus off (among drivers who turned the system off under their driver profile and gave an explanation why, n = 133, multiple themes accepted)

	%
Too many alerts	41
Annoying	40
Distracting	21
Does not work well with glasses	9
Privacy concerns	8
Don’t need it (safe, experienced driver)	8

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