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Final Findings

Driver habits & behaviors

Client & challenge

Final Presentation Agenda

- Recap of client challenge and methodologies
- Phase 1 (secondary research + qualitative interview) findings
- Phase 2 (quantitative survey) detailed findings
- Conclusions and key takeaways
- Appendix
- Questions?

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Client & challenge

About Cedar Electronics

- Designs technologies for driver awareness and communication on the road

- Two sub-brands, Escort and Cobra

- Both brands' primary offerings include devices: dash cameras, radar detectors, and mobile applications that allow drivers to alert each other of the location of red lights, speed cameras, and other hazards

Client challenge

- Radar detector/driver technology market faces stagnant growth and entry by new competitors, creating a challenge to maintain Cedar's market share

- Cedar aims to combat these encroachments in two ways:

  - Develop new, compelling product innovations / combinations of features to better address driver needs

  - Align innovations with marketing strategies that will appeal to customers outside of the traditional market

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Research phases overview

Phase 1: Preliminary Research	Phase 2: Driver Survey

Phase 1: Preliminary Research

Approach:
- 13 one-on-one interviews, targeting convenience sample of adult Drivers, focusing on those who currently use some form of driving technology
- Supplemented interviews with additional secondary research (e.g., industry data/trends, review sentiment analysis, etc.)

Objective:
1. Probe the joys and pain points of the driving experience
2. Broadly identify potential areas of improvement and innovation in driver technology

Phase 2: Driver Survey

Approach:
- Sampling plan: ~300 respondents in target market
- ~10-12 minute online Qualtrics survey
- Screened respondents for car ownership, driver's licensure, drive at least a few times a month, ownership of smartphone

Objective:
1. Understand patterns among U.S. drivers related to demographics, car ownership, driving habits
2. Gain granular understanding of drivers' behaviors behind the wheel and more emotional aspects, including fears and frustrations
3. Test and stratify potential features (including alerts) that drivers want int their vehicles

PHASE ONE:
Interview Insights & Secondary Research

Secondary research findings

Emptier roads are not necessarily safer
- NHTSA report found that decrease in traffic during the pandemic correlated with riskier behaviors (DUI, speeding, failing to wear seatbelts)
- Our findings: drivers feel freer and less inhibited with less traffic on the roads

"Culture of Speeding"
- Government is seeking solutions to curb speeding; GHSA, IIHS, and NRSF have proposed Speed Management Pilot Program to implement this year
- This would include "traffic calming" and increased law enforcement presence

Distracted driving
- NHTSA data found that fewer phones are on ears, but distractions are still fatal; 2800+ were killed and 400,000 were injured in distracted driver crashes in 2018
- TL and iAM RoadSmart study: Android Auto and Apple CarPlay distracted drivers and made them less reactive, especially when using the touch screen

Autonomous driving
- Consumers are nervous, but become more comfortable upon exposure to partially autonomous (ADAS) features
- Gap in understanding about how much driver assistance systems should be doing to control car
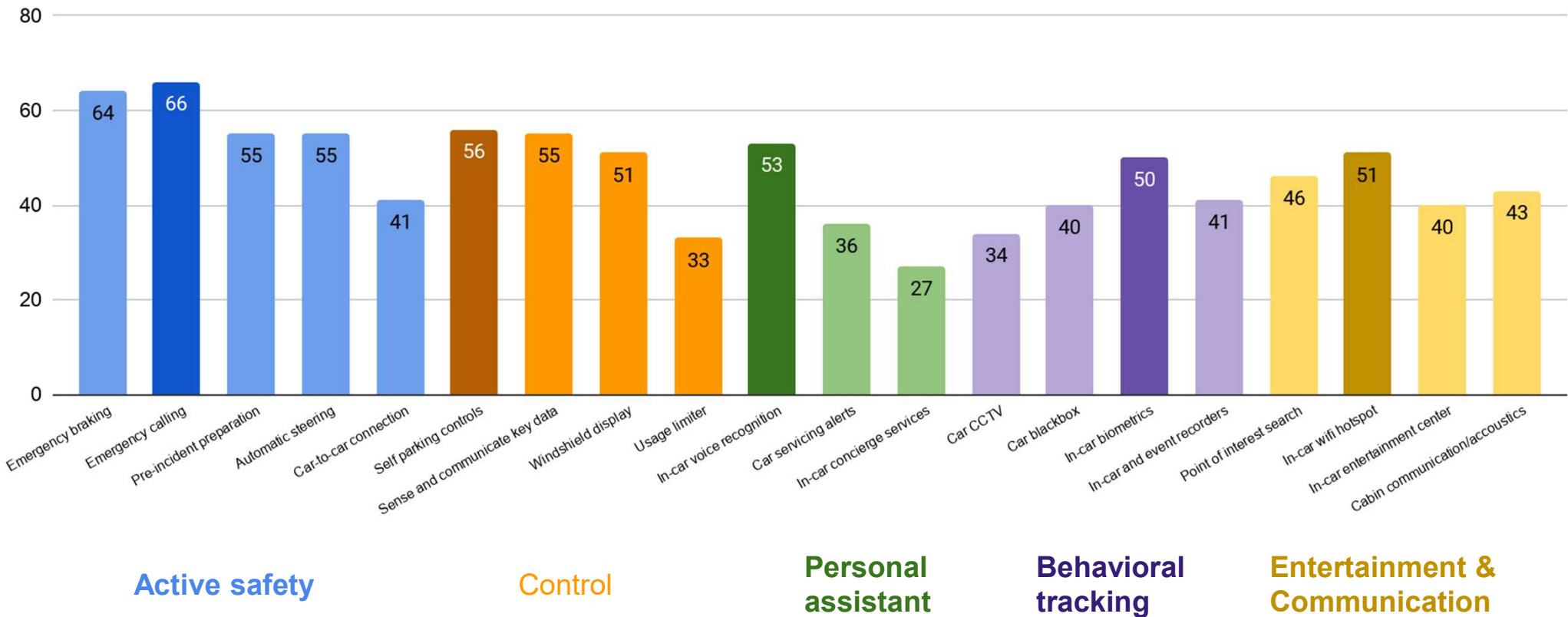
Secondary research findings

Consumers value safety, but may be looking to spend less

- A 2021 Deloitte study found that consumers value blind spot warnings, emergency braking, lane departure warnings, and navigation systems as features
- They are less enthusiastic about entertainment, touchscreens, autonomous
- 16% of US consumers said they changed their car buying plans because of COVID-19; half of those said they would by a cheaper car than they had planned to.

Advanced vehicle feature	United States
Blind spot warning/alert	70%
Automatic emergency braking	60%
Lane departure warning	59%
Built-in navigation system	59%
Physical knobs/buttons for controls	56%
360-degree camera system	54%
Automatic/dual-zone climate control	53%
Heated/cooled seats	52%
Adaptive cruise control	52%
Electronic parking assist	43%
Built-in Wi-Fi hotspot	41%
Over-the-air software updates	40%
Apple CarPlay/Android Auto interface	35%
Semi-autonomous drive mode	32%

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GfK Connected Car Study (2014)

Interview Research Findings

Most drivers are assertive to some degree; few report being slow, tentative

- Most err toward "cautiously aggressive" (5-10 mph over speed limit, keeping mostly with pace)
- More assertive are more confident in their own skills
- Drivers tend to think they are better than others on the road; prefer when roads are clearer during off-peak times

Driving provides unique time for thought, connection, enjoyment

- Driving brings pleasure as an uninterrupted, devoted time in the day; like "showering"; a contemplative moment
- With passengers, you can spend time together that feels more organic/less forced
- Enjoyable driving: picturesque views, open windows, music playing, catching green lights (flowing traffic), involves some variety to keep interest

… But that peace is fragile

- Traffic, especially inconsistent/stop-and-go is difficult to predict, requires attention; annoyance compounded by navigation apps giving unclear estimates
- Other drivers being unskilled or inconsiderate is a major thorn; disobeying "rules" (signaling, merging, speed) interrupt course and cause frustration more than fear for safety
- Many enjoy driving when they can be self-absorbed/exceptional, but are annoyed by other selfish drivers
- Those who enjoy speeding heed traps and are wary of being pulled over
- Other hazards (potholes, debris) were mentioned, pedestrians and bikers only when probed

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Interview Research Findings

No current offering is a "silver bullet"; there is room to solve pain points

These ideas were prominent in discussion of features that might be appealing:

- Head up display vs. phone, console: Allow drivers to keep eyes on road while seeing info on windshield

- Hands-free: Disagreement on voice alerts, but general appeal of voice control; ties to desire for overall integration with car's existing systems

- Combine features of navigation apps: Google Maps and Waze have respective advantages, and some use both; combine simple interface of Google Maps with real-time information of Waze
  - Dislike of some UI/UX aspects of Waze, e.g. pop-up ads

- Inserting stops along a route: Improve apps' ability to easily search for categories of things (gas, restaurants) with limited interference/information; adding via points without having to restart overall navigation.

- Manage spatial awareness: Easy detection of cars/objects around them, e.g. blind spot detectors, lane detection; assessment of driving and cues to reduce traffic collectively (e.g. instruct to zipper at lane closure)

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Hypotheses for testing

Most drivers want tacit permission to improve their own experience, even by bending the rules
- Car features designed to increase safety in turn allow drivers to enjoy the experience more by removing some burden of awareness
- If drivers can go faster, move through space, avoid gridlock with fewer obstacles they will enjoy driving more

Drivers value convenience elements of features in addition to safety
- Traffic estimates, arrival times, and alternative route planning are ways to alleviate their biggest problems on the road
- When asked about "pain points" and "fears," drivers tend to think about annoyances vs. fears for physical safety

Drivers in older cars with lacking tech present a potential opportunity market
- Cedar may bridge a gap between older models and newer "standards" like lane assist, backup cameras, etc.
- Devices/apps present alternatives to replacing vehicles or opting for expensive add-ons at dealership

Drivers with less experience on the road are more receptive to tech help
- Older, more experienced drivers are more trusting of their own intuitions and are less likely to engage with a device or app
- Part of this may relate to privacy concerns

Drivers will be attracted to a well-functioning app that involves navigation vs. a "device"
- Younger, less tech-inclined drivers will gravitate toward an app over a mounted device

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PHASE TWO: Quant Survey

Research phases overview

Phase 1: Preliminary Research

Approach:
- 13 one-on-one interviews, targeting convenience sample of adult Drivers, focusing on those who currently use some form of driving technology
- Supplemented interviews with additional secondary research (e.g., industry data/trends, review sentiment analysis, etc.)

Objective:
1. Probe the joys and pain points of the driving experience
2. Broadly identify potential areas of improvement and innovation in driver technology

Phase 2: Driver Survey

Approach:
- Sampling plan: ~300 respondents in target market
- ~10-12 minute online Qualtrics survey
- Screened respondents for age (18-60), car ownership, driver's licensure, drive at least a few times a month, ownership of smartphone

Objective:
1. Understand patterns among U.S. drivers related to demographics, car ownership, driving habits
2. Gain granular understanding of drivers' behaviors behind the wheel and more emotional aspects, including fears and frustrations
3. Test and stratify potential features (including alerts) that drivers want int their vehicles

Quantitative Research Findings

If pre-COVID was any indication, drivers will soon be back on the road several times a week

- Most drivers are behind the wheel daily, if not several times per week
- Longer haul driving is somewhat split – about half of drivers make a two-hour trip at least once a month
- About 1 in 5 drivers operate theirs or another vehicle as a part of their occupation/supplemental income

Most drivers think they're great on the road

- Drivers tend to think very highly of their own skills; most think they are better drivers compared to others
- Drivers overwhelmingly view themselves as good road citizens – both observant of their own safety and conscious of others'

Drivers' biggest foil on the road: other drivers

- Drivers claim that others stopping short or tailgating them would be the most nerve-wracking and frustrating things that could happen
- Other hazards like school zones, pedestrians, bicycles, and pulled over cars create less negativity for drivers

Drivers who have experienced newer cars gravitate toward new features

- Our analysis found relationships between having a newer car, going on longer trips and rating potential new features as more important
- Certain newer technologies are seen as important but are less ubiquitous in cars on the road, presenting a market gap opportunity for Cedar

Driver preferences in devices are pragmatic

- Drivers would prefer alerts within a quarter mile for situations involving potential obstructions to their travel – either for safety or convenience's sake
- Drivers want devices that are out of sight and blend with their car's overall aesthetic

Driver habits
& behaviors

Driver statistics

- Most drivers own their cars; on average, our sample has been driving for two decades
- Drivers tend to be in newer cars – the average is 8 years old

5% lease

95% own
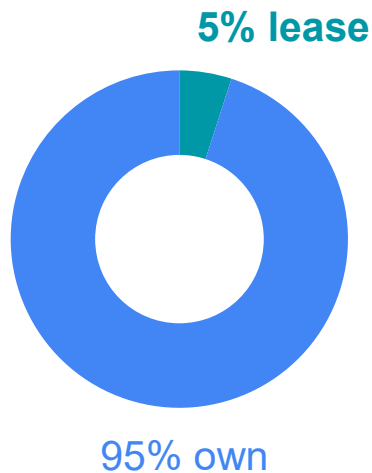
Years on the road

Age less year started legally driving

23 years

average

1-10	18%
11-20	30%
21-30	21%
31-40	19%
Over 40	10%
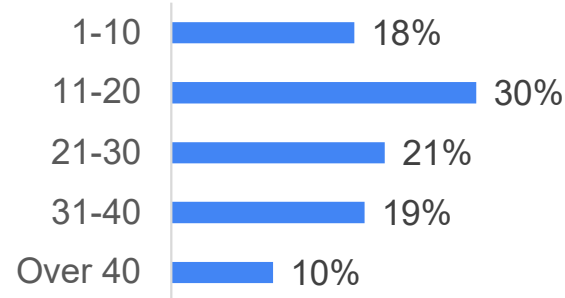
Car models

Year range: 1995 – 2021
Average year: 2013
39% between 2017 – 2019

Four-door / Sedan	42%
SUV	28%
Pickup truck	8%
Crossover or Hatchback	6%
Two-door / Coupe	5%
Minivan / Van	5%
Microcar or Compact	4%
Wagon	2%
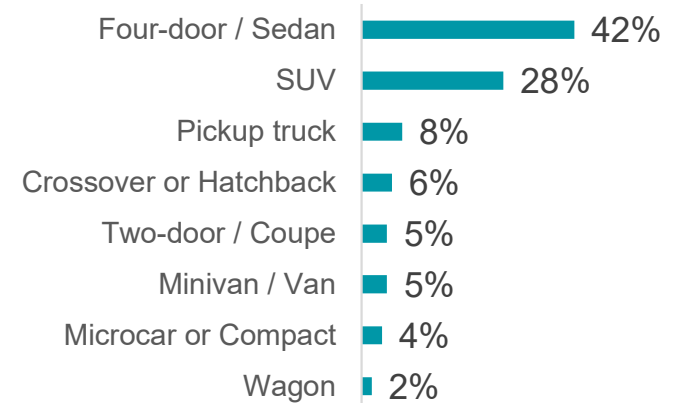
Driving and rental frequency

- Most drivers are typically on the road every day, and vast majority multiple times per week
- Long-haul driving is more distributed – 2 in 5 drivers make only a handful of long trips per year
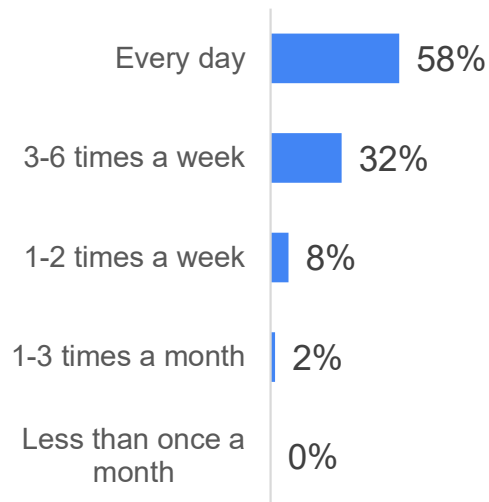- A small percentage rent cars often, most do not

How often do you drive your car? (Before COVID-19)

Every day	58%
3-6 times a week	32%
1-2 times a week	8%
1-3 times a month	2%
Less than once a month	0%

How often do you drive on trips longer than two hours? (Before COVID-19)

Once a week or more	23%
2-3 times a month	18%
Once a month	17%
A few times a year	30%
Once a year or less	12%
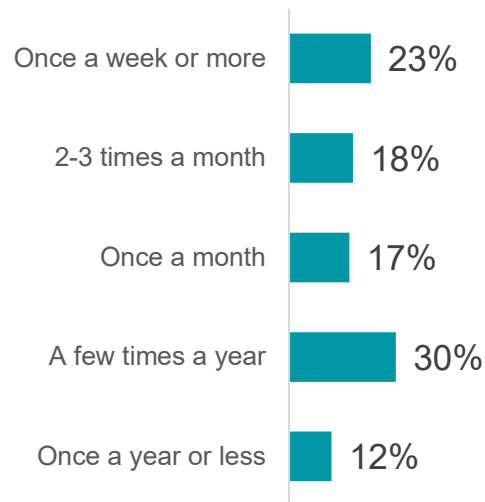
How often do you rent a car from a rental service? (Before COVID-19)

Once a week or more	10%
2-3 times a month	6%
Once a month	4%
A few times a year	19%
Once a year or less	60%
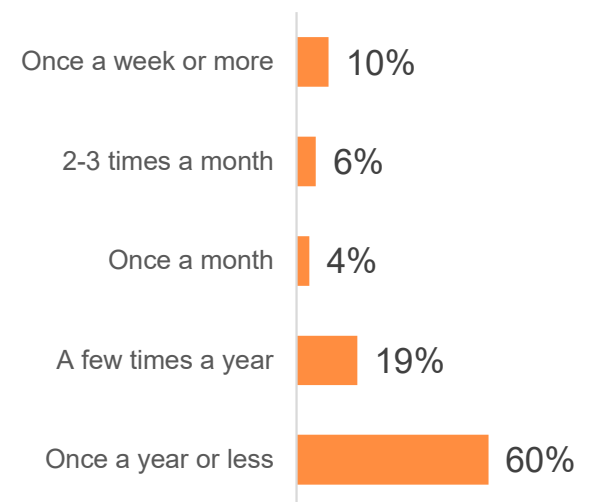
Driving for income

- Similar percentages – about 1 in 5 drivers – are rideshare drivers or commercial drivers
- Rideshare drivers, on average, drive more than a full workday per week

Rideshare drivers (Uber, Lyft, etc.)
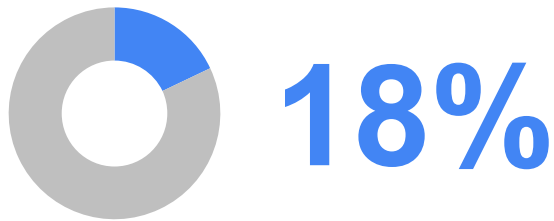
18%

Driving an average of 13.5 hours/week

Commercial drivers (for work)

19%

Driving an average of 16.3 hours/week

Driving confidence and characteristics

- Most drivers tend to give themselves high marks and think they are better than other drivers
- Drivers overwhelmingly view themselves as having positive attributes on the road; few admit to being risk-prone or upset

Own driving skills, scale from 1 to 7

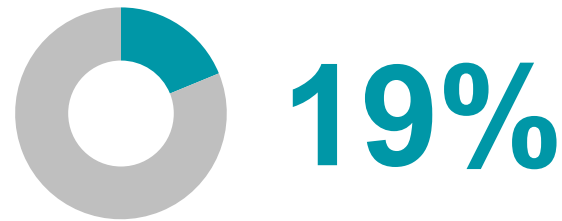- 7 – Extremely Good
- 35%
- 46%
- 14%
- 4% - 4 - Average
- 1%
- 3

Compared to other drivers

- 46% Much better
- 41% Somewhat better
- 13% About as good
- 1% Somewhat worse
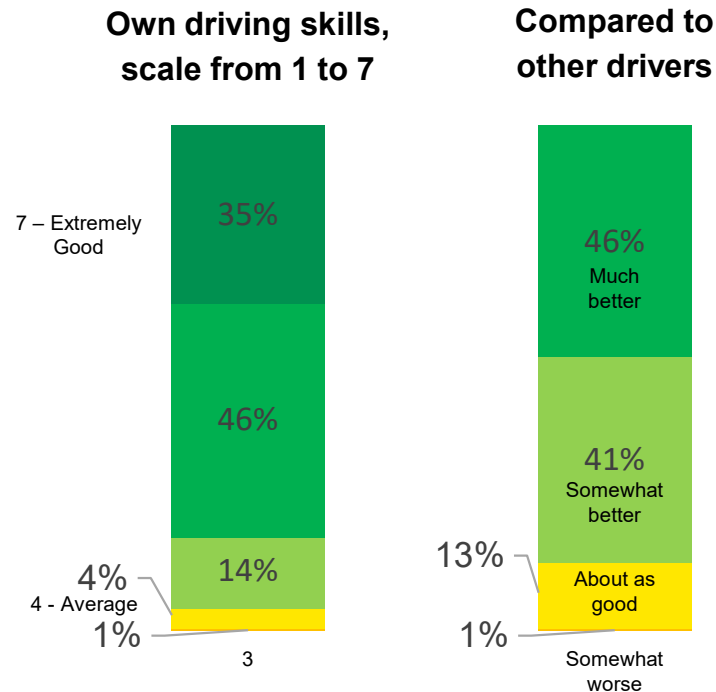
How well do each of these characteristics describe you as a driver?
Ranked by "Extremely well"

Characteristic	Extremely well	Very well	Moderately well	Slightly well	Not well at all
Observant	49%	37%	13%	2%	
Confident	39%	44%	12%	5%	
Considerate	37%	36%	21%	5%	1%
Cautious	36%	43%	15%	4%	2%
Calm	33%	40%	18%	7%	2%
Patient	29%	35%	22%	11%	4%
Assertive	15%	26%	30%	19%	11%
Risk taker	9%	11%	16%	16%	49%
Nervous	6%	8%	14%	24%	49%
Frustrated	4%	7%	17%	28%	44%

■ Extremely well ■ Very well ■ Moderately well ■ Slightly well ■ Not well at all
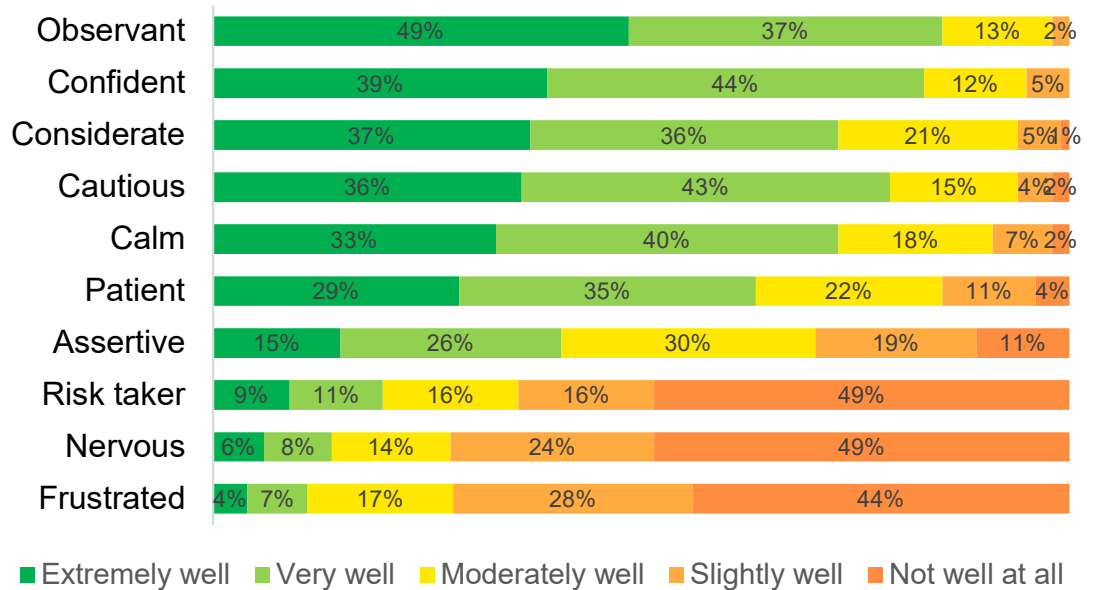
Speed

- Most drivers feel comfortable going slightly above speed limits, though 1 in 5 prefer to stay at the limit
- About 1 in 4 have received at least 3 tickets since they started driving

Comfort relative to speed limit

10+ mph ABOVE	6%
5-10 mph ABOVE	25%
0-5 mph ABOVE	35%
AT the limit	22%
0-5 mph BELOW	9%
5-10 mph BELOW	3%
10+ mph BELOW	0%

Tickets since they started driving

23% {
6%	5+ times
17%	3-4 times
46%	1-2 times
32%	Never

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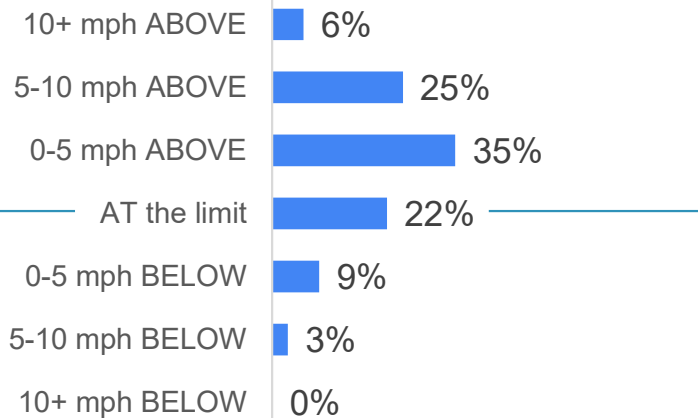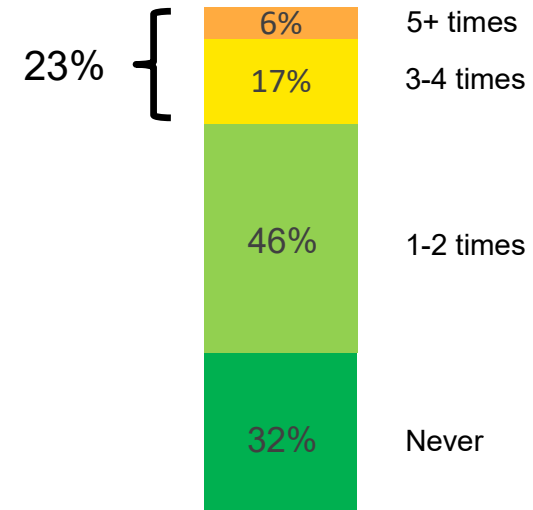
Sharing the wheel

- Most are the only drivers of their car
- Of those who share, most report sharing with their spouse or partner; few report sharing with children

31% have someone else driving their car regularly

69% are the only drivers of their car

N=94

Spouse / partner	80%
Parent or other older family member	19%
Children	11%
Friends	9%

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Driver emotions

What makes drivers nervous?

- Drivers are most unnerved by perceived rudeness, recklessness from other drivers
- Stationary and pedestrian dangers, e.g. school zones and pulled over cars, are less concerning
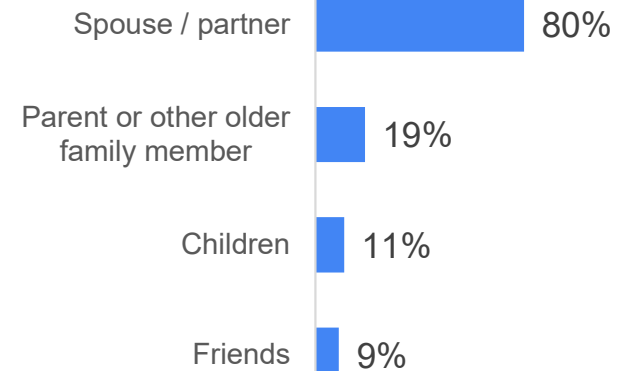
Showing very + somewhat nervous

Category	Percentage
A driver stopping quickly in front of you	59%
A driver following you closely ("tailgating")	53%
Running into a hazard (pothole, debris, etc.) in the road	42%
Becoming lost or losing a known route	41%
Passing a police officer using a radar gun	36%
Sharing the road with bicyclists	33%
Changing lanes in fast-moving traffic (50mph+)	32%
Merging onto / off of the highway	31%
Passing a red light camera	31%
Yielding to pedestrians	18%
Driving through a school zone	17%
Passing a car that is pulled off of the road	17%

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What makes drivers frustrated?

- Similarly, rudeness from other drivers is most frustrating
- However, other logistical concerns – such as wrong turns, traffic, and parking – are more frustrating than pedestrians and bicyclists

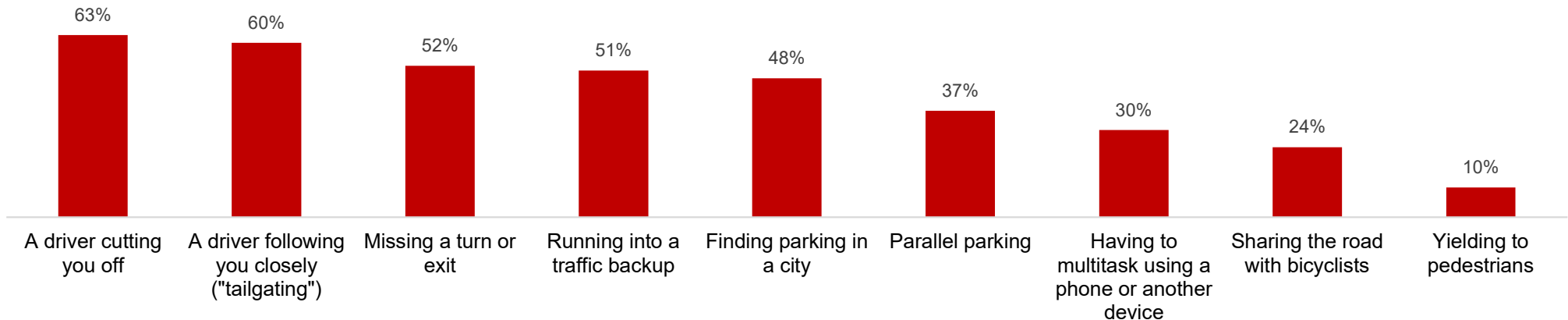*Showing very + somewhat frustrated*

Category	%
A driver cutting you off	63%
A driver following you closely ("tailgating")	60%
Missing a turn or exit	52%
Running into a traffic backup	51%
Finding parking in a city	48%
Parallel parking	37%
Having to multitask using a phone or another device	30%
Sharing the road with bicyclists	24%
Yielding to pedestrians	10%

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Decompressing – finding peace on the road

We asked:
How much do you agree or disagree with the following statement:
I use my time driving to think, reflect, and decompress.

Younger drivers are more likely to use their time behind the wheel to decompress; this decreases as they get older.

After ~30 years driving, these sentiments / practices are more likely to dissipate.

Men are slightly more likely than women to say that their time driving serves this purpose.

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Technology testing

Responsiveness to potential new tech features

- We examined potential response to new driving technology through two separate analyses:

General purchase inclination

We asked:
How likely are you to consider buying new technology to use while driving in the next six months?

Analysis of statistics underlying our responses shows that
- **Men** are slightly more likely to consider buying
- Likelihood peaks between **ages 30-40**
- Frequency of driving and length of drives contribute to willingness – those who **drive more often and on longer trips** are more likely to consider
- Slight negative relationship with rideshare driving

Feature-specific reception

We asked:
If you were buying a new car, how important would it be to have each of the following technologies included as part of your driving experience?

Analysis surrounding potential new features was not strongly conclusive in a granular way, however:
- Newer car models are associated with preferences for the tech features presented
- Length of drive – i.e. how often they take trips longer that two hours – is also associated with perceived importance → **those who drive on longer trips are more likely to want features**
- Slight relationship between more modern automated driving features and more frequent rentals

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What this means for Cedar

Customers that are the most enthusiastic about advanced tech features are **younger, high-income, urban-driving males with newer cars.**

Newer, tech-inclined car customers expect more. With the proliferation of new technologies, customers are drawn to (and accustomed to) advanced features. **Once they try these gadgets, they are more likely to rate the technology as important.**
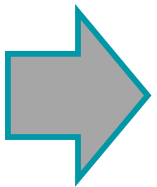
This presents a potential opportunity for Cedar: **offer drivers of older vehicles the chance to try new technology.** Once they try it, they will see its advantages and will be more likely to purchase an add-on tech gadget, as it gives them the same driver assistance as brand new cars without the heavy price tag.

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Tech features factor analysis

- Drivers tend to react to potential features in two loose categories:

"Automated driver assistance"
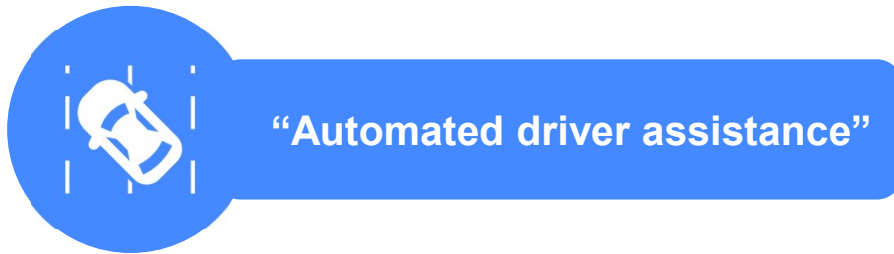
- Forward collision warning
- Automatic lane assistance
- Self parking controls
- Emergency automatic braking
- Emergency / "Mayday" call system
- Lane departure warning
- Radar detector
- Mounted dash camera
- Heads-up / windshield information display

"Driver convenience"

- Hands-free Bluetooth connection
- Cruise control
- Backup camera
- Navigation app(s) on a smartphone

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Testing tech features

- Convenience features – navigation, Bluetooth, backup camera, and cruise control – are critical
- Safety features and self-driving assistants are less familiar, but may represent potential

Ranked by top very + somewhat important in new car	Never use / do not have	Use at lease sometimes	Very + somewhat impt. in new car
Navigation app(s) on a smartphone	10%	73%	82%
Hands-free Bluetooth connection	27%	64%	80%
Backup camera	33%	61%	80%
Cruise control	14%	65%	78%
Car's built-in GPS or navigation system	40%	52%	76%
Emergency automatic braking	46%	37%	72%
Forward collision warning	52%	38%	68%
Emergency / "Mayday" call system	60%	27%	65%
Automatic lane assistance	59%	34%	57%
Dash camera*	52%	41%	56%
Lane departure warning	51%	40%	56%
Voice recognition / voice commands	44%	45%	55%
Heads-up / windshield information display	53%	39%	50%
Self parking controls	63%	30%	50%
Radar detector	59%	33%	49%

Tech features that drivers use most tend to be the ones they also view as most important in a new car, especially older technologies like **navigation apps, cruise control, and Bluetooth.**

There is a potential market gap in products that drivers don't use or don't have, but view as important – this intersection highlights newer technologies like **mayday systems, movement sensors, and dash cameras**

* Asked as just "Dash camera" in previous grid about which tech they currently use

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Driving App Usage and Satisfaction Ratings

- Drivers use Google Maps the most, and overall satisfied with the current app

Navigation apps used while driving

89% Google Maps
26% Apple Maps
22% Waze
22% MapQuest
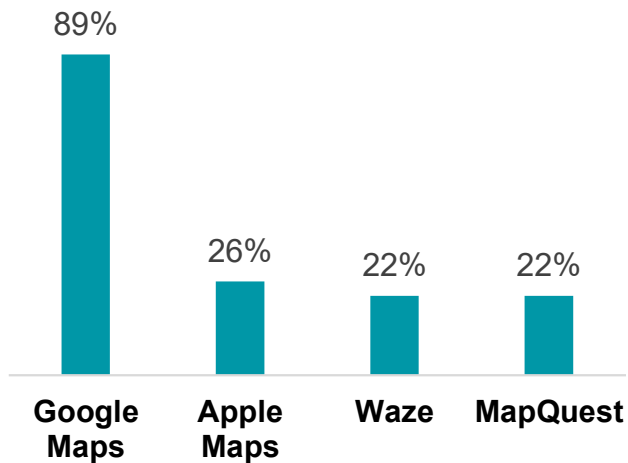
Among those who use a navigation app, N=271
One respondent used "Other" - Verizon Navigator

Satisfaction with each app

Google Maps
63% Very satisfied
34% Somewhat satisfied
1% Somewhat dissatisfied
1% Very dissatisfied

Apple Maps
59% Very satisfied
34% Somewhat satisfied
6% Somewhat satisfied
1% Very dissatisfied

Waze
61% Very satisfied
34% Somewhat satisfied
0% Somewhat dissatisfied
5% Very dissatisfied

MapQuest
59% Very satisfied
34% Somewhat satisfied
5% Somewhat dissatisfied
2% Very dissatisfied

■ Very dissatisfied ■ Somewhat dissatisfied ■ Somewhat satisfied ■ Very satisfied

"It was laggy and inaccurate"
"It has gotten me lost, taken me in circles"
"Difficult to maneuvering while driving"
"Not as quick as I would like"

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Testing different alerts

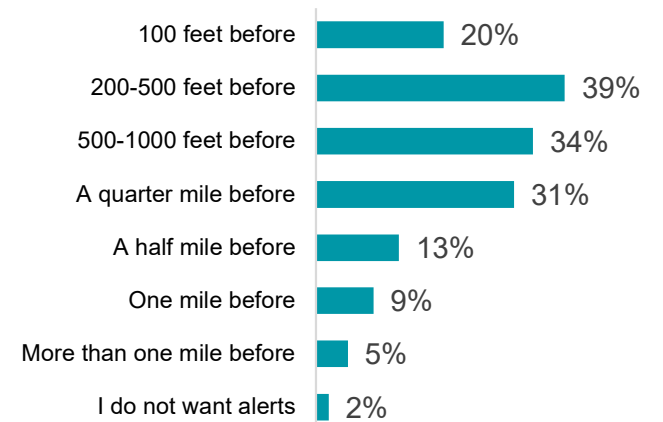- 1 in 2 think alerts for possible obstructions ahead would be very useful, though most see all alert types as at least somewhat useful
- Drivers tend to prefer alerts falling between a quarter mile and 200 feet before encountering the situation in question

If you were behind the wheel, how useful would you consider each of the following types of alerts? *Ranked by very + somewhat useful*	Very useful	Very + somewhat useful
Accident ahead	57%	93%
Traffic ahead	51%	92%
Road hazard ahead	56%	92%
Detour ahead	52%	88%
Construction zone ahead	50%	88%
Pothole ahead	49%	86%
Cyclist(s) ahead	39%	84%
Pedestrian or runner ahead (side of road)	43%	83%
Police ahead	44%	81%
Speed camera ahead	38%	80%
Radar detected ahead	36%	78%
Parked vehicle ahead	33%	77%
Red light camera ahead	35%	76%
You (as the driver) are drowsy based on facial recognition	37%	75%
Mobile traffic camera ahead	37%	75%
You (as the driver) are distracted	37%	75%
Approaching red light too quickly	37%	73%
Air control speed patrol nearby	32%	68%

Drivers are more likely to find an alert useful it if indicates a potential obstruction – either for safety or convenience reasons; they are less likely to want alerts based on speed or attention

Preferred distance(s) of alerts

100 feet before	20%
200-500 feet before	39%
500-1000 feet before	34%
A quarter mile before	31%
A half mile before	13%
One mile before	9%
More than one mile before	5%
I do not want alerts	2%

Aesthetics

- Drivers are split about positioning of a gadget; 2 in 5 would respectively prefer **embedded** or **attached but visible** systems
- Physical installment and overall aesthetic fit are more important than personalization or disguise

17%

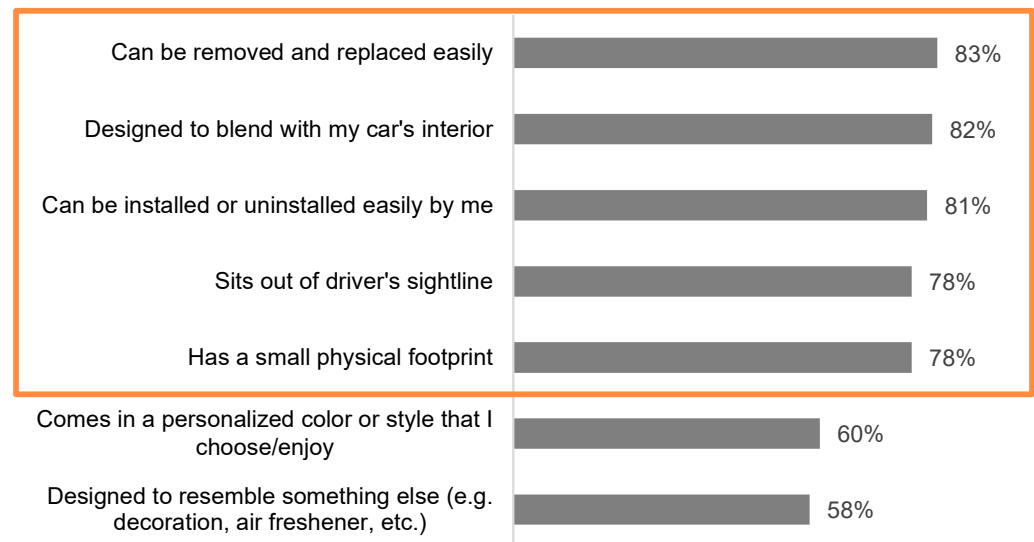Visible – detached and removable (sits or hangs, but can be stowed)

41%

Visible – attached to the interior (on the dashboard, ceiling, etc.)

42%

Not visible – embedded in the car's systems
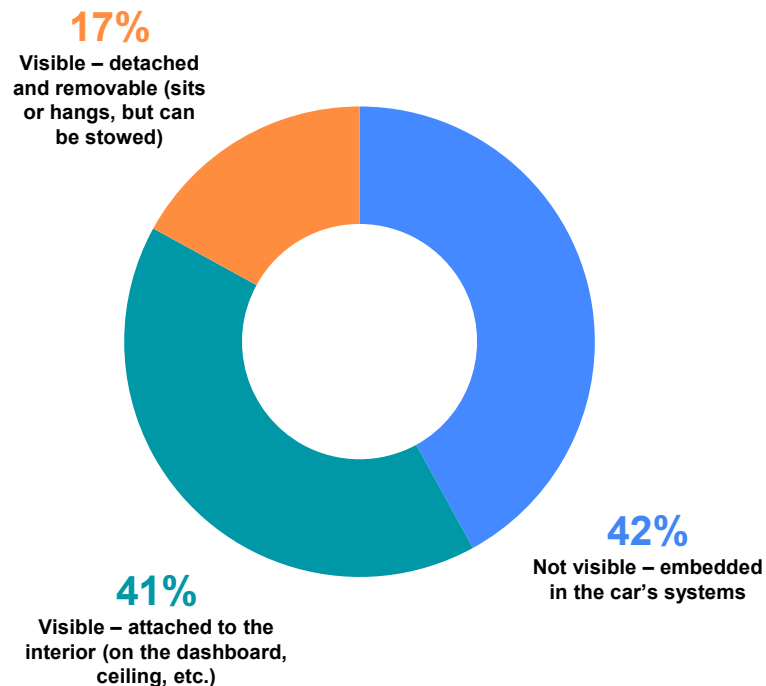
Importance in deciding to buy
Ranked by very + somewhat important

Can be removed and replaced easily	83%
Designed to blend with my car's interior	82%
Can be installed or uninstalled easily by me	81%
Sits out of driver's sightline	78%
Has a small physical footprint	78%
Comes in a personalized color or style that I choose/enjoy	60%
Designed to resemble something else (e.g. decoration, air freshener, etc.)	58%

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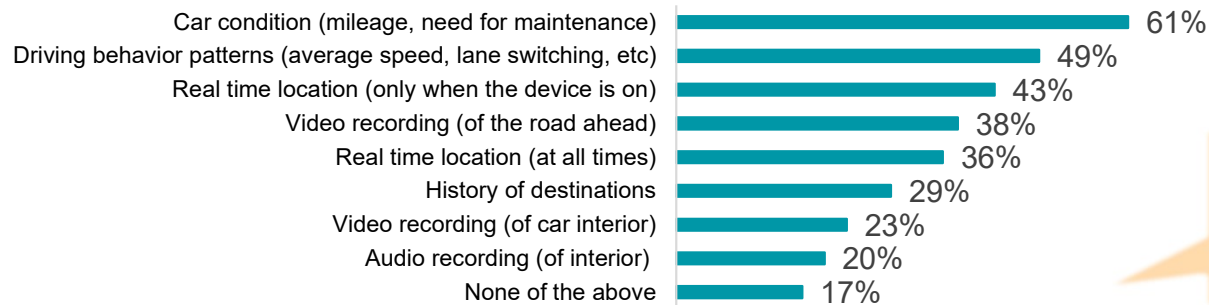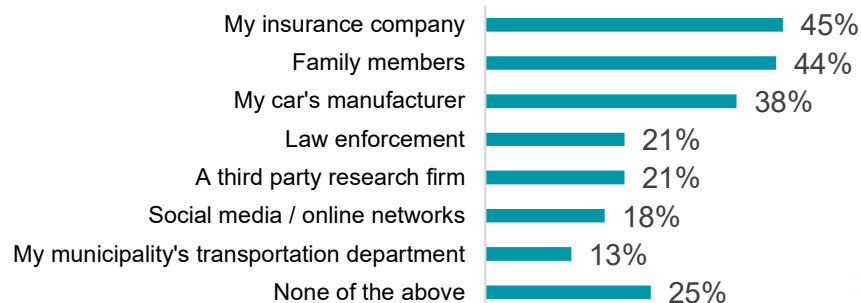
Data collection

- Most drivers are willing to share data in some form; half are comfortable relaying car conditions and driving patterns to third parties
- Drivers are less comfortable sharing this information widely – less than half would share with insurance companies or even family members, much less law enforcement or local government

What kinds of data they would share

Car condition (mileage, need for maintenance)	61%
Driving behavior patterns (average speed, lane switching, etc)	49%
Real time location (only when the device is on)	43%
Video recording (of the road ahead)	38%
Real time location (at all times)	36%
History of destinations	29%
Video recording (of car interior)	23%
Audio recording (of interior)	20%
None of the above	17%

Older drivers (36+) are more likely to say "none of the above" (24% vs. 7%) and be uncomfortable with any data sharing based on these choices

Parties with whom they would comfortably share it (with no financial incentive)

My insurance company	45%
Family members	44%
My car's manufacturer	38%
Law enforcement	21%
A third party research firm	21%
Social media / online networks	18%
My municipality's transportation department	13%
None of the above	25%

Older drivers (36+) are also much more likely to say "none of the above" (35% vs. 9%)

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Conclusions

Hypotheses revisited

Most drivers want tacit permission to improve their own experience, even by bending the rules

❌ → **Drivers assess themselves (at least outwardly) as very conscientious on the road**

Drivers value convenience elements of features in addition to safety

✅ → **Drivers did prioritize convenience features that improved their experience in addition to safety**

Drivers in older cars with lacking tech present a potential opportunity market

⋯ → **Drivers in older cars are not as exposed to technology and may need to "catch up"**

Drivers with less experience on the road are more receptive to tech help

⋯ → **Results of this were not very conclusive; those most interested tend tend to be 30s-40s**

Drivers will be attracted to a well-functioning app that involves navigation vs. a "device"

⋯ → **Drivers prioritize apps but do not seem averse to devices, including visible ones**

Conclusions and recommendations

Appeal to driver fears and frustrations by experimenting with devices that monitor other cars

- Drivers view erratic behavior from other cars as their biggest pain point
- Pride in their own driving may prevent them from seeing the "bigger picture" of situations on the road
- Assistive devices that monitor other car movements can alleviate some of the negativity of stopping short, tailgating, merging, etc.

Leverage drivers' knowledge of newer vehicles while introducing tech to older vehicles

- Drivers of newer cars are more accustomed to many of the features we tested, tend to view them as more important – leverage this industry trend toward certain features as "standard"
- Meanwhile, drivers in older cars can be introduced to more modern features a la carte

Drivers have room for both apps and devices, as long as they improve the experience

- Navigation apps still win as the biggest priority in a driving experience
- Seek to emulate UI/UX of Google Maps, but look to other apps for inspiration

Implement alerts that give drivers information about obstacles in their path

- Drivers what a moderate number of alerts a shorter distance from obstacles such as accidents, traffic, and detours

Appendix

Demographics *N=301*

Age

18-20 years old	3%
21-30	17%
31-40	34%
41-50	22%
51-60	25%

Race

White	84%
Black / African American	9%
Asian	3%
Native American	2%
Native Hawaiian or Pacific Islander	1%
Other	1%

*8% of sample identify as Hispanic or Latino

Income

$0 - $24,999	14%
$25,000 - $49,999	20%
$50,000 - $74,999	19%
$75,000 - $99,000	18%
$100,000 or more	26%
Prefer not to say	3%

Gender

- Male
- Female

41% Female
59% Male

Urban

- Urban
- Suburban
- Rural

40% Urban
41% Suburban
19% Rural

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