

Survey Report
November 2016

Public Perceptions of Driverless Cars

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GOVERNMENT

Executive Summary

- **Between 30-40% would definitely consider riding in a vehicle with autonomous/self driving capabilities...if:**
 - The vehicle was in an area with few or no other vehicles
 - In low speed areas
 - For very short rides, under 10 minutes
- **While some are willing to try, most are not completely at ease with the concept**
 - Less than 20% would definitely consider riding in an autonomous vehicle in heavily congested or high speed areas (65 mph+)
 - Respondents said they would be most comfortable with autonomous/self-driving vehicles that they own or lease
 - There is less comfort with autonomous/self-driving buses, shuttles, taxis or ride sharing services (Uber, Lyft, etc.) compared to other autonomous/self-driving vehicles
- **Autonomous vehicles are not yet considered a solution for those unable to drive**
 - This is particularly true of those too young to drive – only 14% are very comfortable with sending younger (non-drivers) in an autonomous vehicle
 - Respondents consider it slightly more acceptable to have the physically disabled or the elderly travel in this manner
- **Over half are very concerned about the possibility of dangerous outcomes due to autonomous/self-driving vehicles such as:**
 - Computer system malfunctions, especially if they cause the vehicle to crash
 - The potential for hacking, taking over the vehicle
 - Sensors not operating optimally in certain weather conditions or at night

Executive Summary

- **Only about a third believe these dangerous outcomes are very likely to occur**
- **There are a number of potential benefits that make autonomous vehicles attractive, including the possibility of:**
 - Lower accident rates
 - Lower insurance rates
 - Being able to travel while drowsy
 - Reduced traffic congestion
- **Demographics are best at explaining comfort with autonomous vehicles. Those most predisposed toward autonomous vehicles tend to be:**
 - Male
 - Under the age of 40
 - Have a college degree
- **The amount of time an individual spends in a vehicle is also positively related to interest. However, those that are rarely passengers are LESS interested in trying an autonomous vehicle**
- **Seeing an autonomous/self-driving vehicle operate first hand and/or being exposed to research demonstrating their safety will go a long way toward appeasing consumer concerns**



Consumers are intrigued, but also a little wary of autonomous/self-driving vehicles

11% have tried some form of autonomous vehicles; between 30-40% would definitely consider riding in one, but only under the safest scenarios:

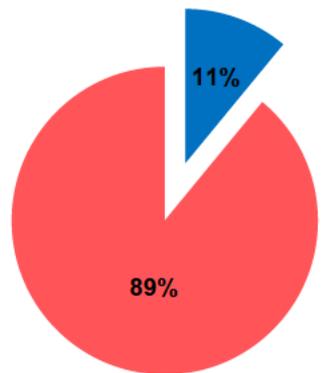
- In an area with few or no other vehicles
- In low speed areas
- For very short rides, under ten minutes

*An autonomous/self-driving vehicle is a vehicle that is capable of sensing its surroundings and navigating without human intervention.

Autonomous vehicles use hardware such as radar, GPS, computer vision, and advanced control systems to survey the vehicle's surroundings, identify traffic patterns and potential obstacles, and steer the vehicle from one location to another without driver involvement. Autonomous vehicles also use sensors and wireless technology to communicate with other nearby vehicles (even those out of the driver's view), as well as nearby signage and roadway.

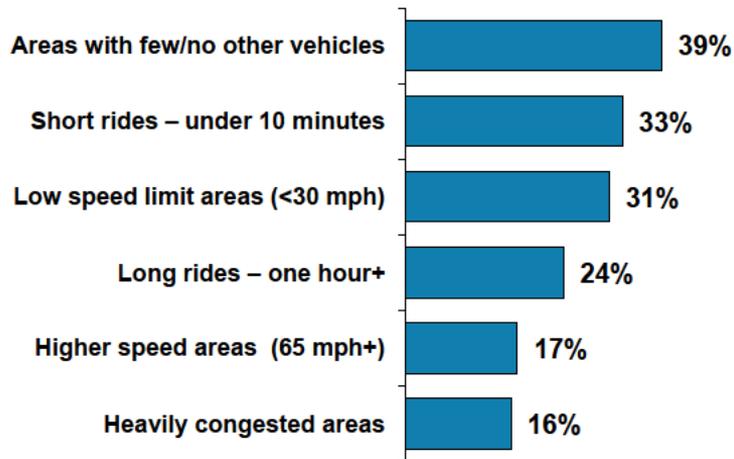
All questions were asked within the context of the vehicle driving itself .

Ever Traveled in An Autonomous/ Self Driving Vehicle*?
(n=1,005)



■ Yes ■ No/Don't know
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Willingness to Consider Riding in an Autonomous/Self Driving Vehicle (% Who Would Definitely Consider) (n=1,005)



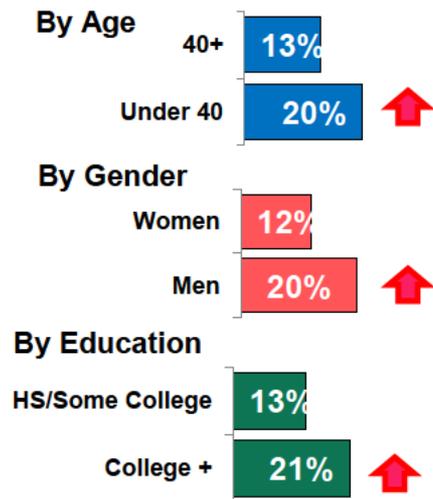
Attitudes about autonomous vehicles vary by age, gender and education

Consumers age 40+, women and the less educated are least likely to try an A/SD* vehicle, especially in heavily congested areas

In areas with few or no other vehicles, the same demographic tendencies emerge

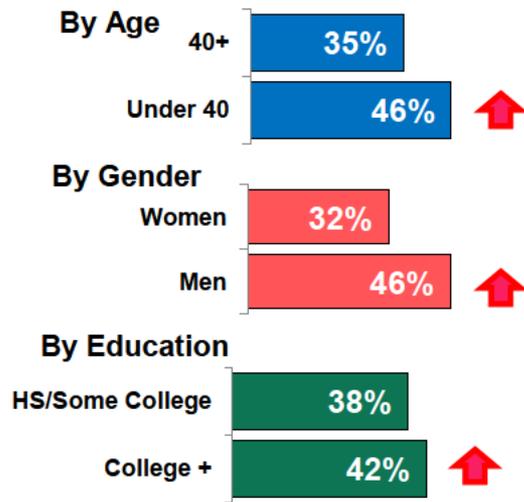
Heavily Congested Areas

% Who Would Definitely Consider Riding in A/SD* Vehicles (n=1,005)



Areas with Few or no Vehicles

% Who Would Definitely Consider Riding in A/SD* Vehicles (n=1,005)

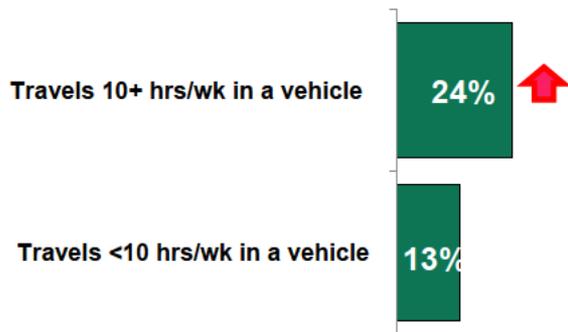


Time spent riding or driving can also be related to interest in autonomous vehicles

Those who spend a lot of time in vehicles are more willing to try an autonomous vehicle than others, especially in heavy congestion

Heavily Congested Areas

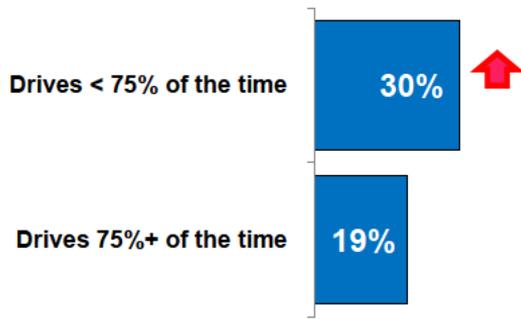
% Who Would Definitely Consider Riding in A/SD*
Vehicles (n=1,005)



Individuals who spend most of their travel time as drivers are less inclined toward autonomous vehicles, especially for rides lasting over an hour

Long Distance Driving

% Who Would Definitely Consider Riding in A/SD*
Vehicles (n=1,005)

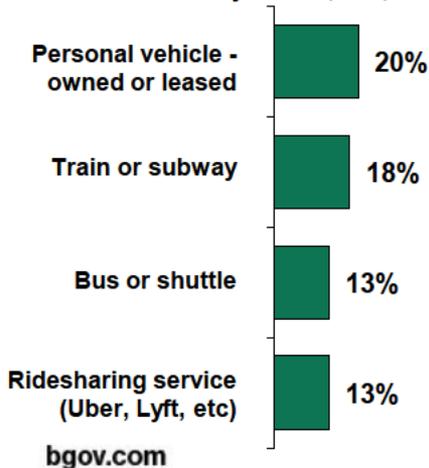


Autonomous buses, shuttles and ridesharing services have yet to be accepted

There is greater comfort with autonomous vehicles that are personally owned (compared to other types of autonomous vehicles)

But only 20% are very comfortable with the idea

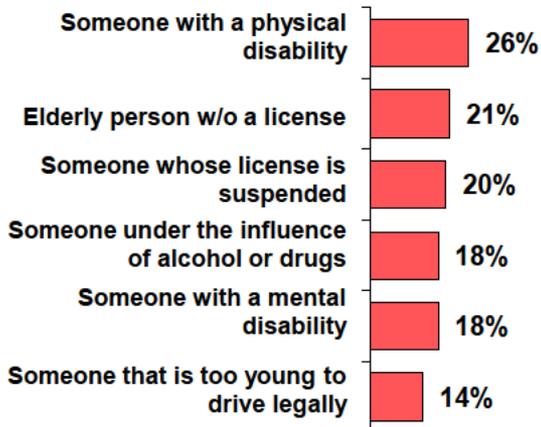
Comfort by Autonomous Vehicle Type
(% 5 on a 5 pt Comfort Scale, where 5=Very Comfortable ; n=1,005)



Few would be comfortable sending children in an autonomous/self driving vehicle

Respondents are a little more comfortable having those with physical disabilities or the elderly ride in an autonomous vehicle

Comfort in Having Non-Drivers* Ride in Autonomous Vehicles
(% 5 on a 5 pt Comfort Scale, where 5=Very Comfortable; n=1,005)



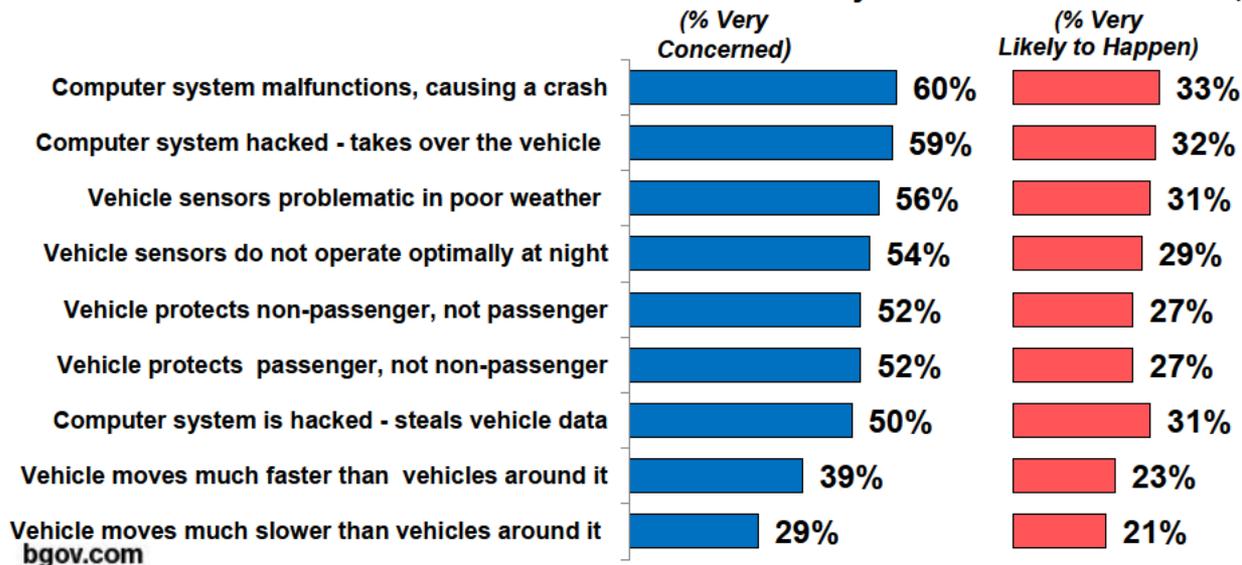
* Question refers to comfort in having family members or friends who are unable to drive that fall into the groups listed in the graph .

Significant concerns emerge about the possibility of malfunctions

Presented with an array of potential negative outcomes, computer malfunctions and hackers taking over the vehicle are most worrisome

- Sensor problems are also alarming. Less concerning are situations where the vehicle moves too fast or too slow
- However, most do **not** believe these problems are very likely to happen
- Respondents are equally concerned about autonomous vehicles protecting passengers as they are non-passengers (pedestrians, etc.)

Possible Outcomes Caused by Autonomous Vehicles (n=1,005)

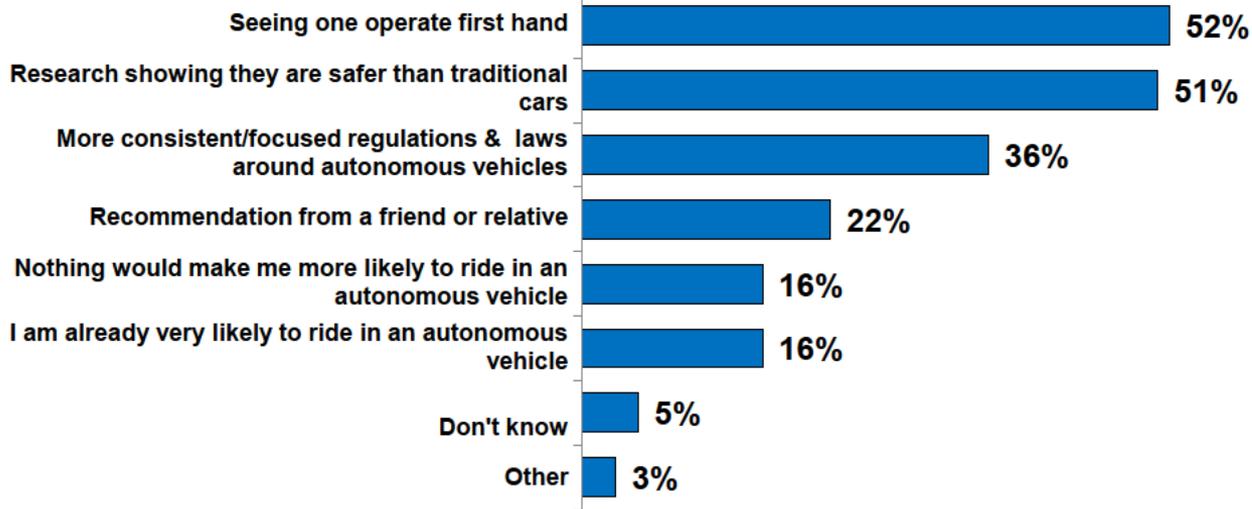


Seeing an autonomous/self-driving vehicle first hand could appease many concerns

Research that demonstrates improved safety compared to traditional cars would also be effective

Factors that Would Increase Adoption of Autonomous/Self Driving Vehicles

(Multiple Response; n=1,005)



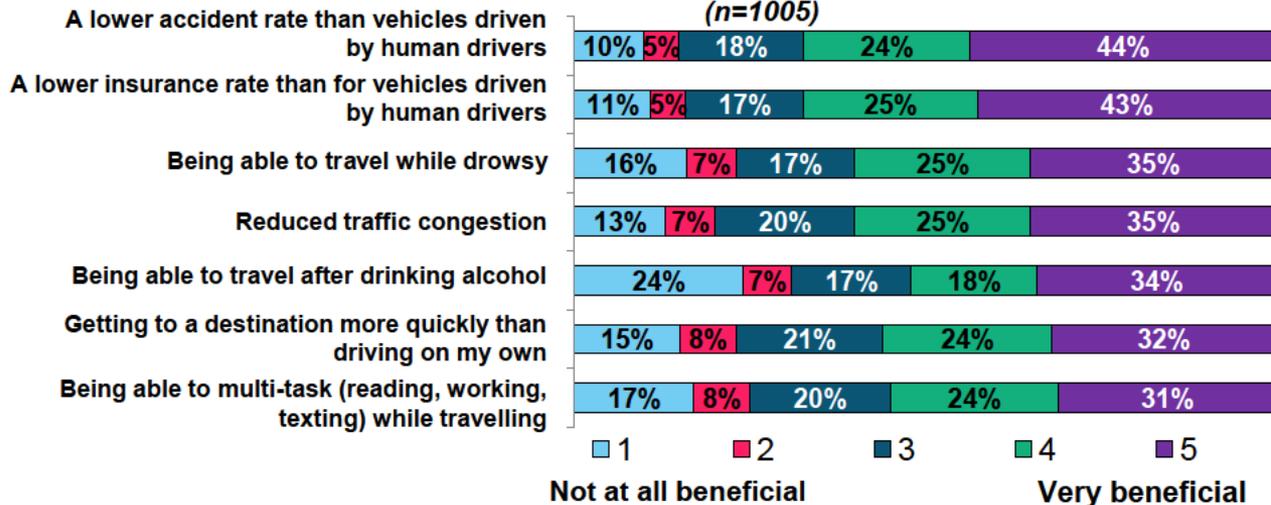
Consumers can envision many potential benefits of autonomous/self-driving vehicles

Lower accident and lower insurance rates compared to human driven vehicles are top potential benefits

- Less likely to be viewed as beneficial are impacts that enable drivers to pay less attention to driving, such as multi-tasking or traveling after drinking alcohol
- It should be noted that all benefits explored are “potential,” not yet proven

Potential Benefits of Using an Autonomous Vehicle

(n=1005)



Methodology and Scope

Objectives



- Establish a better understanding of the general public's attitudes and expectations around the acceptance of automated vehicle technologies
- Gain a better understanding of the public's impressions of these technologies and the knowledge gaps that may exist around their use
- Focus on how this new technology will impact consumer behavior, with a spotlight on safety

Audience



- Consumers in the United States, 18 years of age or older
- Quotas by age and gender to match the general population of consumers in the United States

Methodology



- Web survey of 1,005 consumers interviews, recruited using Federated Sample and their Fulcrum Exchange platform
- Provides an error margin of +/-3% at a 95% level of confidence
- Average (median) interview length – 7 minutes
- Fielding dates: September 23 – 27, 2016

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This survey was conducted in September 23-27, 2016, coinciding with numerous press articles about autonomous/self driving vehicles (regulation announcements, Uber 's pilot program etc. This may have increased awareness and interest. Also, the definition includes any kind of vehicle – including trains at airports – and may be interpreted to mean vehicles with capabilities for some form of self driving.

Q8. Have you ever traveled in an autonomous/self-driving vehicle?

Q9. If you had the opportunity, to what extent would you consider **riding in an autonomous vehicle** when it's driving itself under the following circumstances?

- In low speed limit areas (30 mph or slower)
- In higher speed areas (65 mph or faster)
- In heavily congested areas
- In areas with few or no other vehicles
- For very short rides – under 10 minutes
- For long rides – one hour or more

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Q9. If you had the opportunity, to what extent would you consider **riding in an autonomous vehicle** when it's driving itself under the following circumstances?

- In heavily congested areas
- In areas with few or no other vehicles

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Q9. If you had the opportunity, to what extent would you consider **riding in an autonomous vehicle** when it's driving itself under the following circumstances?...

- In heavily congested areas
- For long rides – one hour or more

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Q10. How comfortable would you be with the following forms of autonomous/self-driving transportation, assuming the vehicle would be driving itself? Using a scale from 1-5 where 1 means not at all comfortable and 5 very comfortable, how would you rate your comfort level with riding in

- An autonomous/self driving **vehicle that I own or lease**
- An autonomous/self driving **train or subway**
- An autonomous/self driving **bus or shuttle**
- An autonomous/self driving **taxi or ridesharing service** (Uber, Lyft, etc)

Q12. Please consider the following groups of people who may not be able to drive. How comfortable would you be with having a family member or close friend who falls into one of these groups travel in an autonomous/self-driving vehicle, when the vehicle is driving itself? Again, please use a scale where 1 is not at all comfortable and 5 means very comfortable.

- Someone who is **elderly and not licensed** to drive a vehicle
- Someone who is **too young** to legally drive a vehicle
- Someone with a **physical disability**
- Someone with a **mental disability**
- Someone whose **license** has been **suspended or revoked**
- Someone **under the influence** of alcohol or drugs

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Q13a. Please consider some additional outcomes of autonomous/self-driving vehicles. How **concerned** are you that each of the following situations would occur while the vehicle is driving itself? Use a scale from 1-5 where 1 means not at all concerned and 5 means very concerned.

- The vehicle makes a decision that **protects its passenger** but is **potentially fatal to a non-passenger** (such as hitting a group of pedestrians instead of a concrete wall)
- The vehicle makes a decision that is **potentially fatal to its passenger** instead of a non-passenger (such as hitting a concrete wall instead of a group of pedestrians)
- The vehicle's **computer system is hacked**, allowing the hacker to take control of the vehicle
- The vehicle's **computer system is hacked**, allowing the hacker to steal vehicle data
- The vehicle's **computer system malfunctions**, causing the vehicle to crash
- Vehicle **sensors do not operate optimally in certain weather** conditions
- Vehicle **sensors do not operate optimally at night**
- The vehicle **moves much more slowly** than the vehicles around it
- The vehicle **moves much faster** than the vehicles around it
- Q13b. Now please rate how **likely** you think it would be for each of the following to occur while the vehicle is driving itself, using a scale from 1-5 where 1 means not at all likely and 5 means very likely
- (options same as above)

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Q10a. Which of the following would make you more likely to ride in an autonomous vehicle that drives itself?

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Q11. The following have been identified as potential outcomes of using an autonomous/self-driving vehicle. Please rate how beneficial you feel each of the following outcomes would be when the vehicle is driving itself, using a scale where 1 means not at all beneficial and 5 means very beneficial?

- Being able to travel while **drowsy**
- Being able to travel after **drinking alcohol**
- Reduced traffic congestion
- Being able to multi-task (reading, working, texting) while travelling
- **Getting to a destination more quickly** than driving on my own
- A **lower accident rate** than vehicles driven by human drivers
- A **lower insurance rate** than for vehicles driven by human drivers