What drives people crazy about self-driving cars and what they think others should do: A survey approach*

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This exploratory study analyzes acceptance of different automated systems used in partly and fully autonomous cars, and whether there is a difference between the level of acceptance for someone's own use and desire for others to use them. The survey reports answers from 199 respondents to an online questionnaire run on Amazon Mechanical Turk (Amazon MTurk). The majority of respondents express high or very high acceptance of partly automated systems; however, when it comes to full automation, the acceptance rate drops significantly. Moreover, the acceptance rate for roughly half of the systems does not differ significantly for the respondent's own use and use by others.

Keywords: Autonomous Driving, Questionnaire, Survey, Acceptability
JEL classification: C99, 03

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1. Introduction

The rapid technological progress made by automotive and tech companies has brought automation technologies to the forefront of public interest. Self-driving cars – also known as autonomous cars, personal automated vehicles, or robotic cars – that guide themselves to a specific target autonomously without any human intervention, are by far the most discussed autonomous technology. The ongoing discussion reveals that the expectations about self-driving cars are immense. For example, the European Commission (2011) expects self-driving cars to make driving cheaper, to reduce pollution and to lower congestion rates. The U.S. National Highway Traffic Safety Administration (NHTSA) (2016) even sees the technology as the greatest safety innovation in automotive history, as it eliminates from the road the leading cause of motor vehicle accidents: the human driver.

The technology for the self-driving car, however, is still in its infancy. To achieve the environmental, congestion and safety improvements mentioned above, widespread acceptance of autonomous systems is necessary. The current debate is primarily about how self-driving cars should react in case of an impending accident. To this end, nearly every discussion considers some version of the so-called *Trolley Problem* by Foot (1967) – a thought experiment about whether to act or not to sacrifice or save certain people in the event of a runaway trolley.

The *Moral Machine* experiment by Awad et al. (2018), an experiment that empirically investigates different versions of the trolley problem, recently gained worldwide attention. Awad et al. asked 2.5 million people from 233 countries who to spare in 13 accident scenarios inspired by the trolley problem. The survey revealed that there is no global preference when it comes to whether young or old, rich or poor, more or fewer people should be sacrificed in an accident. Preferences can rather be classified by region, i.e. Western, Eastern and Southern clusters. The study also revealed an ethical paradox: participants prefer an autonomous vehicle to sacrifice the passengers to protect pedestrians, but stated that they would not purchase such a car. Bonnefon et al. (2019), however, point out that the trolley problem is mainly a single discrete case of a statistical problem and, thus, is technically irrelevant to solve the problem about how an autonomous car should be programmed to behave in the event of an accident.

As investments in the new technology are mainly influenced by the (expected) demand for partly and fully autonomous cars, end users' attitudes toward and acceptance of self-driving systems will actually determine the success of the technology on the market. Thus, it is not only important to debate a few selected aspects of the new self-driving technology – namely, the moral challenges caused by self-driving cars – but also to assess acceptance of various types of autonomous driving systems.

Today, a growing number of vehicles are already equipped with more-or-less autonomous systems that assist the human driver – a practice that certainly helps to accustom drivers to self-driving technologies. However, as a recent study by Schoettle and Sivak (2014) shows, people hesitate to use highly or fully automated systems. Given that self-driving cars are not single devices but rather a collection of different technologies applied in a novel way, it does not follow that, if a person accepts the different individual systems, (s)he will also support the use of those systems all at once.[1]

While there is a vast literature on the moral implications of self-driving cars, the current research into attitudes toward new technologies is rather small. According to the technology acceptance model by Davis (1986), one's feelings and attitudes toward a new technology are crucial for its actual use. Thus, assuming that customers' aversion to a new technology might vanish over time is obviously very dangerous. A study by Epprecht et al. (2014) indicates that experts do not assume that user acceptance of novel technologies can be ensured only by the maturity of the technologies or regulations.

Thus, it is not only important to distinguish between acceptance of a range of cars, from fully to non-autonomous, but to look at exactly which technologies people do not like. In spite of the lack of studies dealing with acceptance of different self-driving car systems, as well as acceptance of such systems as a whole, we examine people's willingness to accept varying levels of automation. We also study whether people show different levels of acceptance when thinking about using the systems on their own, compared to when they consider if they would like other people to use specific systems.

Our results show that respondents' acceptance is higher for partly automated than fully automated systems. We also find respondents to be just as willing to use highly automated systems as they are for other people to use them.

We organize the remainder of the paper as follows. Section 2 provides a literature review focusing on studies about the general acceptance of self-driving cars, as well as about people's major concerns about them, and about separate autonomous systems. In Section 3, we describe the survey design. We present the results in Section 4. Section 5 concludes the paper by summarizing the main findings and discussing their implications, as well as further research ideas.

2. Related literature

In this section, we first present studies on general acceptance of self-driving cars and then turn to studies examining acceptance of different autonomous systems used in self-driving cars.

2.1. Acceptance of different levels of self-driving cars

The recent literature mainly focuses on examining acceptance of autonomous vehicles as a whole. Payre et al. (2014) conducted a paper and pencil survey of 421 drivers, describing features of a fully automated car along with use-cases. The results show that 68.1% of the participants *a priori* accepted fully autonomous driving. Zmud et al. (2016) surveyed 556 respondents and conducted 44 qualitative interviews to find out how likely people are to use self-driving vehicles. According to the results, 14% of respondents stated that they would be extremely likely to use self-driving vehicles; however, the majority of the respondents

[1]For example, self-driving cars sense their environment by using a number of different sensor sets and localization techniques, as well as validation and verification systems. An advanced control system then interprets the information from those systems to identify the appropriate driving behavior of the car.

seemed to be in a wait-and-see position, as 36% reported being only somewhat likely to use them.

Schoettle and Sivak (2015) investigated what levels of vehicle automation people preferred by asking 505 licensed drivers in the U.S. The results show that completely autonomous vehicles are the least preferred choice and respondents preferred no self-driving capabilities over partially self-driving vehicles. Rödel et al. (2014) focused on users' acceptance of different levels of vehicle autonomy in their online survey of 336 respondents. Respondents were confronted with non-autonomous to fully autonomous car scenarios. The results show that acceptance and user experience are highest for cars that people are used to; highly autonomous cars are not as accepted as currently deployed cars.

There is also a study by the global marketing information service J.D. Power. J.D. Power (2012) conducted a survey of 17,400 vehicle owners about their interest in emerging automotive technologies. 37% of the respondents stated that they would purchase an automated driving system. In this study, respondents were nearly as likely to select fully autonomous driving systems as they were to select semi-autonomous driving systems. The results from a repeated online survey by J.D. Power (2017), however, show that all respondents except Generation Y were becoming more critical of self-driving technologies compared to previous elicitations.

2.2. Acceptance of separate autonomous systems

Less research exists that breaks down the general question about acceptance of self-driving cars into acceptance of different features of self-driving cars. The automotive supplier Continental (2013) asked people in Germany, China, Japan, and the U.S. whether they would welcome different advanced driver assistance systems and autonomous driving. The results revealed that 79% of respondents were generally open to automated driving systems. In particular, cruise control, parking sensors, and rear-view systems received high appreciation rates in all four countries.

Abraham et al. (2017) elicited the maximum level of automation that respondents would be comfortable with by having 2,976 individuals living in the U.S. answer an online questionnaire. The results showed that the majority of the respondents would be comfortable with features that actively helped the driver while the driver remained in control. In particular, while 88% of the respondents felt comfortable with a feature that reduced the potential for or severity of a collision, only around 64% of the respondents would feel comfortable with a feature that helped with speed control or steering and only 38% of the respondents stated that they would be comfortable with a feature that periodically took control of driving.

Bansal and Kockelman (2017) surveyed 2176 respondents across the U.S. regarding their preferences for specific connected and automated vehicle systems. According to the results, respondents were very interested in blind spot monitoring technology, as well as in emergency automatic braking systems. More than half of the respondents (50.4%) were also comfortable with transmitting information to other vehicles, and 42.9% were comfortable sending information to the vehicle manufacturer. However, only 19.5% of respondents stated that they would be comfortable sending an autonomous vehicle driving on its own.

The surveys by Continental (2013), Abraham et al. (2017) and Bansal and Kockelman (2017) are most similar to our study as they investigate participants' openness to the automation of specific functions. However, the studies mainly focused on a few single features and did not follow a structured approach. In our study, we fill this gap. We study attitudes toward key technologies for self-driving cars used along all six levels of autonomy identified in the classification by the NHTSA.[2]

3. Survey design

We conducted a survey to identify attitudes toward key technologies for self-driving cars. Our goal was to study acceptance of different technologies used along the entire range of automation.

3.1. Questions

The survey consisted of 25 questions about different systems used in partially to fully automated cars.[3] In the questions, we asked the participants about their attitude toward technologies that enable the car to autonomously conduct longitudinal and lateral control, perception and object analysis, vehicle-to-vehicle communication, cloud learning, and actuation. Each question contained a short description of the technology to control for differences in background knowledge. We chose the systems and compiled the descriptions based on publicly available information from car manufacturers, as well as governmental and non-governmental institutions. The order of the questions was randomly varied for each participant, to control for potential order effects. We also asked the participants about socio-demographic and mobility-related characteristics.

3.2. Treatments

We conducted two different treatments. In treatment *You*, participants were confronted with the statement *"I would like other drivers to use this system."* In treatment *Me*, participants were confronted with the statement *"I would like to use this system."* In both treatments, participants had to state whether they *"Strongly agree"*, *"Agree"*, *"Somewhat agree"*, *"Somewhat disagree"*, *"Disagree"*, or *"Strongly disagree"* to use a specific system. We used a between-subjects design so that observations for all statistical tests are independent for the two treatments.

[2]The National Highway Traffic Safety Administration (NHTSA) (2013) defines different levels of autonomy from non-autonomous to fully autonomous cars. In level 0 to level 2 cars, drivers are fully in control of driving. Level 2 cars, however, already include marginally autonomous systems, such as adaptive cruise control, lane departure warning and traffic sign recognition. In level 3 cars, drivers do not need to monitor the road but have to intervene occasionally. For level 4 and level 5 cars, human interventions are not necessary. Driving decision processes are carried out independently by the car, which makes decisions on the basis of various sensory data and predetermined and self-learning algorithms.

[3]We provide the wording of the questionnaire in Appendix A.1.

4. Results[4]

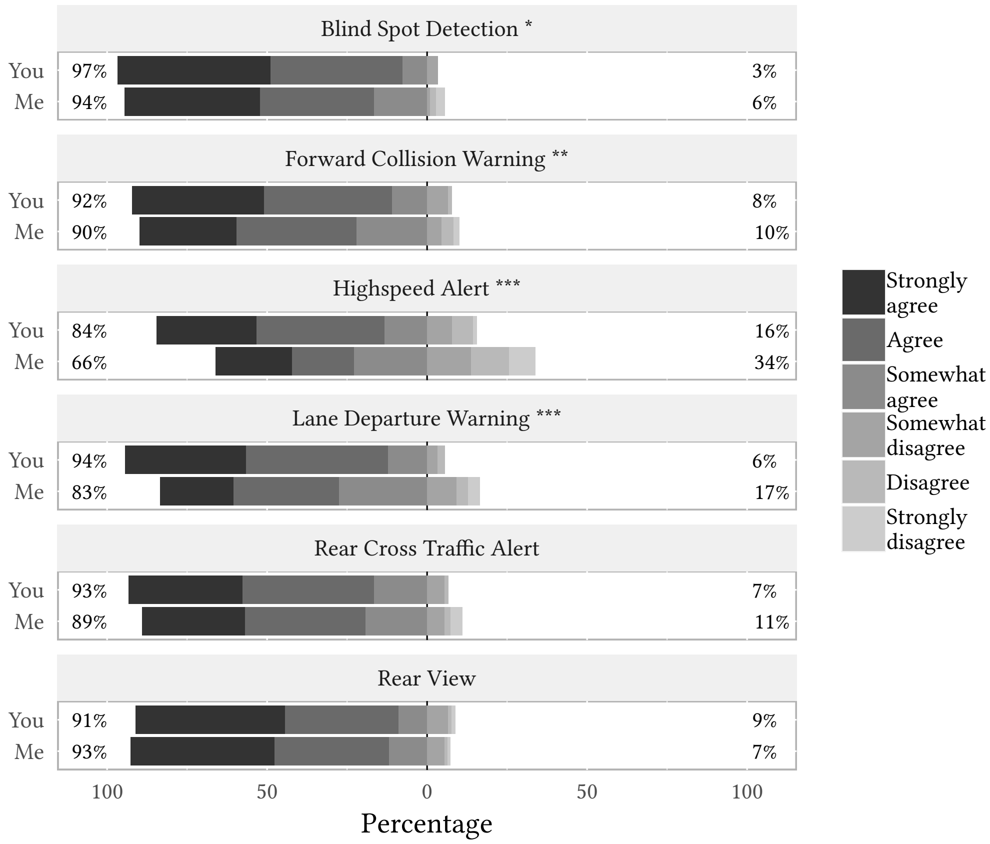
We conducted the survey in March 2018 via Amazon MTurk, using workers within the United States of America. The workers had to have completed at least 100 so-called Human Intelligence Tasks (HITs) on Amazon MTurk and had to have an approval rate of 99% for their completed HITs to be able to take part in the experiment. The entire experiment was computerized using Qualtrics (Qualtrics, 2014). A total of 199 participants (52.8% female) participated in the survey. In total, 109 participants (54.1% female) participated in treatment *Me*, 90 participants (51.1% female) participated in treatment *You*. The participants were on average 40 years old. Around one-third of the participants held a bachelor's degree (35.7%).[5] A large proportion of the participants also claimed to be moderately technology-aware (37.2%). The majority of the participants (86.9%) stated that they owned a car. The owned cars were on average 9 years old. Subjects who completed the questionnaire were paid, on average, $1.20 for 5 minutes.

[4] We use R version 3.4.1 (2017-06-30) for graphs and statistical analysis in all chapters.

[5] The number of participants holding a bachelor's degree corresponds closely to the number reported for the U.S. population. According to the U.S. Census Bureau (2018) Current Population Survey, about 35.0% of people 25 years and older have a bachelor's degree.

4.1. System acceptances

4.1.1. Warning systems



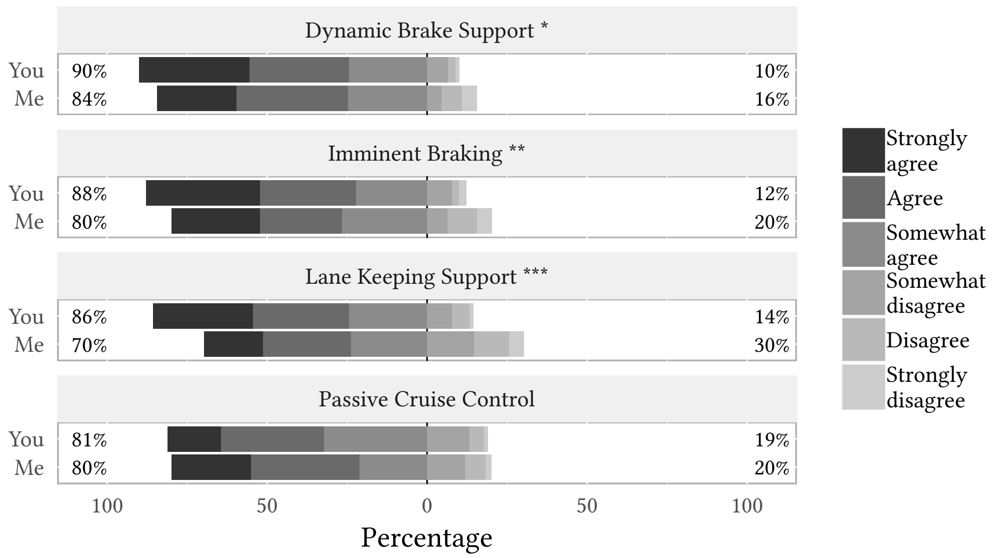
Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.
The asterisk indicates the range of the p-value for a two-sided t-test on the equality of means between the treatments. Exact p-values are shown in Table 2 in Appendix A.2.

Figure 1: Acceptance rates for warning systems.

Figure 1 shows the acceptance rate for warning systems. Agreement is shown as a stacked bar to the left, disagreement as a stacked bar to the right. As Figure 1 shows, most warning systems reached higher than 90% acceptance rates, with the exception of the High Speed Alert system. Thus, warning systems are widely accepted in both treatments. Interestingly, participants supported the use of a High Speed Alert system, a Lane Departure Warning system, and a Forward Collision Warning system for other drivers significantly more than for themselves.

4.1.2. Assisted driving systems

Figure 2 shows the acceptance rate for assisted driving systems. Agreement is shown as a stacked bar to the left, disagreement as a stacked bar to the right. As Figure 2 shows,



Note: *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$
The asterisk indicates the range of the p-value for a two-sided t-test on the equality of means between the treatments. Exact p-values are shown in Table 2 in Appendix A.2.

Figure 2: Acceptance rates for assisted driving systems.

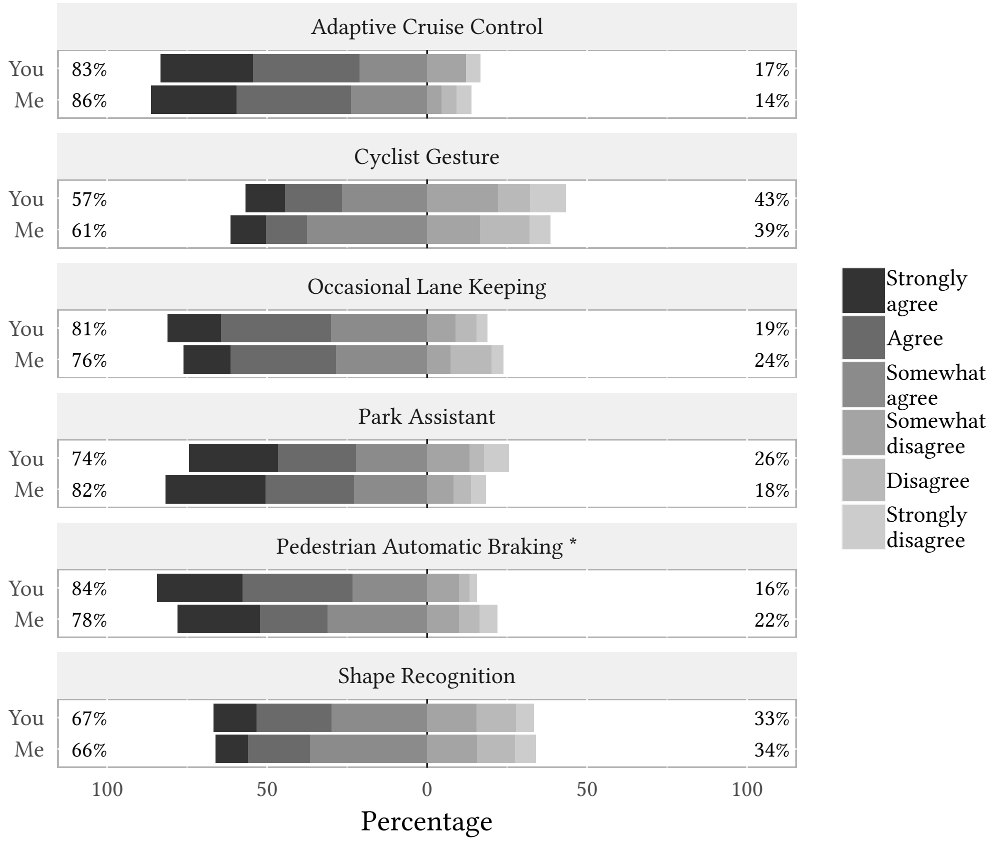
assisted driving systems are widely accepted. Most of the assisted driving systems reached an acceptance rate of more than 80%. Participants, however, supported the use of a Lane Keeping Support and an Imminent Braking system for other drivers significantly more than for themselves.

4.1.3. Occasional autonomous driving systems

Figure 3 shows the acceptance rate for occasional autonomous driving systems. Agreement is shown as a stacked bar to the left, disagreement as a stacked bar to the right. As Figure 3 shows, occasional autonomous driving systems are not as accepted as assisted driving systems but still reach acceptance rates between 74% and 86% with the exception of the Cyclist Gesture system and the Shape Recognition system. The desired use by others does not differ significantly from the participants' stated willingness to use the system themselves.

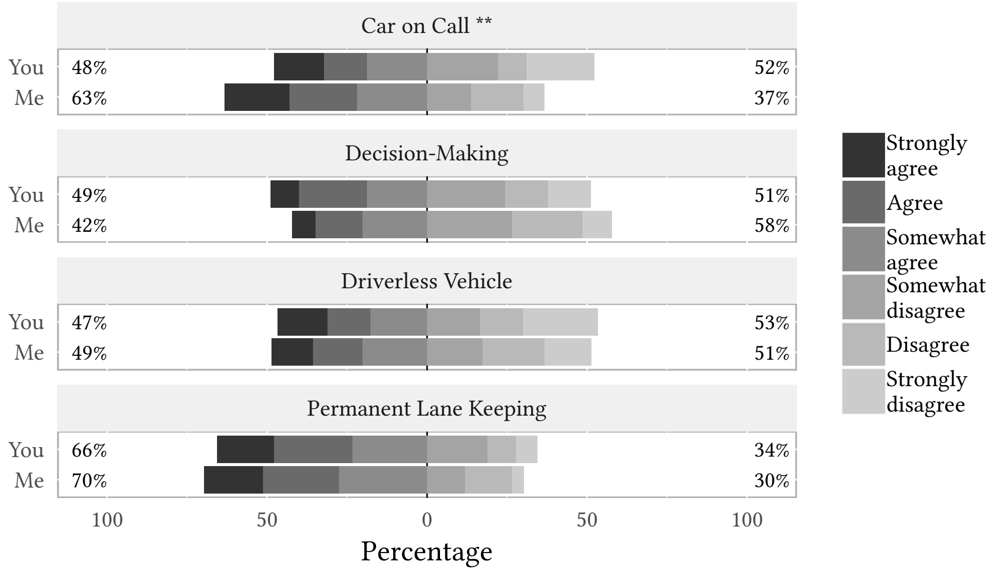
4.1.4. Autonomous driving systems

Figure 4 shows the acceptance rate for autonomous driving systems. Agreement is shown as a stacked bar to the left, disagreement as a stacked bar to the right. As Figure 4 shows, the acceptance rate drops when it comes to fully autonomous driving systems. While the majority of participants supported the other systems, they disliked autonomous driving systems. Unlike the warning systems, assisted driving systems, and occasional autonomous systems, participants stated that they would be happier to use most of the autonomous driving systems themselves than they would be for others to use them. However, the difference is only



Note: *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$
The asterisk indicates the range of the p-value for a two-sided t-test on the equality of means between the treatments. Exact p-values are shown in Table 2 in Appendix A.2.

Figure 3: Acceptance rates for occasional autonomous driving systems.



Note: $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$
The asterisk indicates the range of the p-value for a two-sided t-test on the equality of means between the treatments. Exact p-values are shown in Table 2 in Appendix A.2.

Figure 4: Acceptance rates for autonomous driving systems.

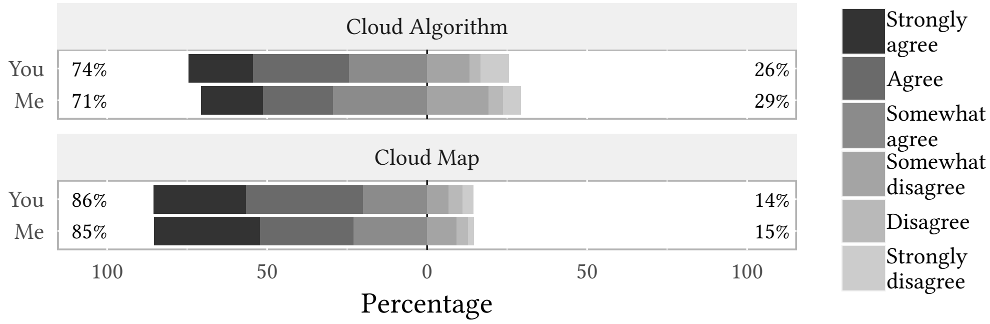
significant for the Car on Call system.

4.1.5. Cloud using systems

Figure 5 shows the acceptance rate for cloud-based systems. Agreement is shown as a stacked bar to the left, disagreement as a stacked bar to the right. As Figure 5 shows, cloud-based systems were widely accepted by participants, not only for their own use but also for use by others.

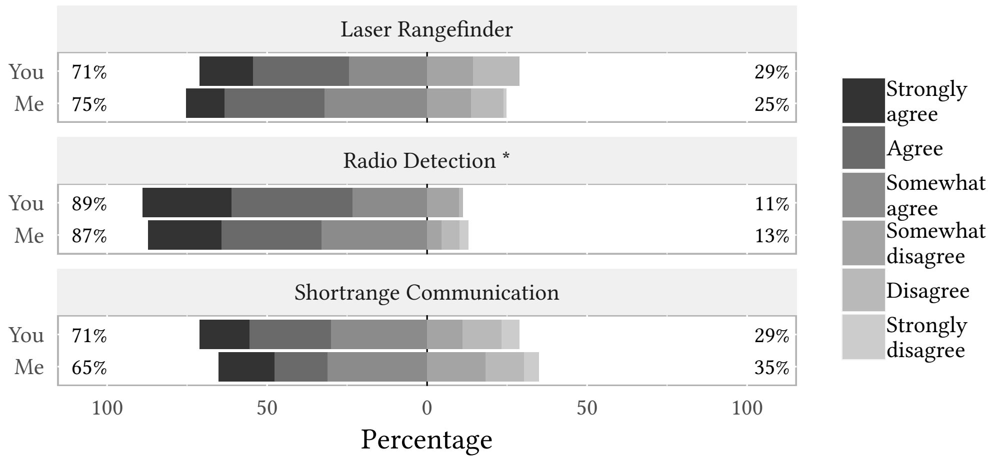
4.1.6. Perception and vehicle-to-vehicle communication systems

Figure 6 shows the acceptance rate for perception and vehicle-to-vehicle communication systems. Agreement is shown as a stacked bar to the left, disagreement as a stacked bar to the right. As Figure 6 shows, perception systems and communication systems are widely accepted. The perception technologies, however, have higher approval rates than the Short-Range Communication system.



Note: *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$
The asterisk indicates the range of the p-value for a two-sided t-test on the equality of means between the treatments. Exact p-values are shown in Table 2 in Appendix A.2.

Figure 5: Acceptance rates for cloud-based systems.



Note: *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$
The asterisk indicates the range of the p-value for a two-sided t-test on the equality of means between the treatments. Exact p-values are shown in Table 2 in Appendix A.2.

Figure 6: Acceptance rates for perception and vehicle-to-vehicle communication systems.

4.2. Comparison between systems

Systems	*You*		*Me*	
Warning vs. assisted driving				
Lane Departure Warning vs. Lane Keeping Support	$\Delta = 0.4222$	$p = 0.0005^{***}$	$\Delta = 0.3762$	$p = 0.0006^{***}$
Warning vs. occasional autonomous				
Forward Collision Warning vs. Pedestrian Automatic Braking	$\Delta = 0.4889$	$p = 0.0002^{***}$	$\Delta = 0.4771$	$p = 0.0000^{***}$
Assisted vs. occasional autonomous				
Imminent vs. Pedestrian Automatic Braking	$\Delta = 0.1778$	$p = 0.0881^{*}$	$\Delta = 0.0917$	$p = 0.3637$
Passive vs. Adaptive Cruise Control	$\Delta = -0.2556$	$p = 0.0626^{*}$	$\Delta = -0.0826$	$p = 0.5399$
Occasional autonomous vs. autonomous				
Occasional vs. Permanent Lane Keeping	$\Delta = 0.3223$	$p = 0.0071^{***}$	$\Delta = 0.1009$	$p = 0.3885$
Communication and detection				
Shape Recognition vs. Cyclist Gesture	$\Delta = 0.2666$	$p = 0.0718^{*}$	$\Delta = 0.1284$	$p = 0.2102$
Cloud Map vs. Cloud Algorithm	$\Delta = 0.4556$	$p = 0.0001^{***}$	$\Delta = 0.5779$	$p = 0.0000^{***}$
Radio Detection vs. Laser Rangefinder	$\Delta = 0.6111$	$p = 0.0000^{***}$	$\Delta = 0.6111$	$p = 0.0005^{***}$
Radio Detection vs. Short-Range Communication	$\Delta = 0.7667$	$p = 0.0000^{***}$	$\Delta = 0.5782$	$p = 0.0000^{***}$
Laser Rangefinder vs. Short-Range Communication	$\Delta = -0.6111$	$p = 0.2214$	$\Delta = -0.3486$	$p = 0.0526^{*}$
Note:			$^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$	

The table shows differences in the average acceptance of different systems ($\Delta = \ldots$) and p-values for a two-sided paired-samples t-test where this difference could be zero.

Table 1: Comparison of acceptance of different systems.

Table 1 provides p-values for the difference in acceptance between the system types for each treatment. The values for treatment *Me* are shown on the right and the values for treatment *You* are shown in the middle.

As the upper part of Table 1 shows, participants in both treatments state a significantly higher willingness to use a warning system than an assisted system, as well as a significantly higher willingness to use a warning system than an occasional autonomous system. In contrast, the participants' level of acceptance in both treatments does not differ significantly when it comes to assisted vs. occasional autonomous systems. Occasional autonomous systems, however, are significantly more accepted than autonomous systems for others but acceptance of each system does not differ significantly for own use.

Furthermore, we compare the participants' level of acceptance for additional autonomous systems. As shown in the lower part of Table 1, participants in both treatments are just as willing to use a Shape Recognition system as a Cyclist Gesture system. The level of acceptance in both treatments also does not differ significantly for using a Laser Rangefinder system compared to a Short-Range Communication system. Acceptance of a Cloud Algorithm, however, is significantly lower than acceptance of a Cloud Map system in both treatments.

Furthermore, participants in both treatments are also less accepting of a Radio Detection system compared to a Laser Rangefinder system or a Short-Range Communication system.

5. Conclusion

In our exploratory survey, we study how people feel about different automated technologies used in (semi-)autonomous cars. We investigate the level of attractiveness of automated technologies for peoples' own use as well their desire for others to use those systems. Our results show that the distribution of acceptance levels for different systems varies significantly. Automated driving systems are not yet as accepted as advanced driver assistance systems. More specifically, while the vast majority welcome warning systems and assisted driving systems (acceptance rates between 66% and 97%), occasional and fully autonomous driving systems are met with skepticism (acceptance rates between 42% and 86%). In summary, participants accepted the automation of non-self-driving capabilities the most, followed by partially self-driving vehicles, with completely self-driving vehicles the least accepted choice.

Furthermore, participants' desire for others to use the systems is higher for many of the autonomous systems than their acceptance for own use. The difference between acceptance for own use and preferred use by others suggests that participants are most likely to know about the benefits of autonomous systems but are not yet willing to use them themselves.

Participants' willingness to use fully automated systems such as the Car on Call service, the Driverless Vehicle system and the Permanent Lane Keeping system, however, is higher than their stated preference about the use of those systems by others. Nevertheless, a driverless vehicle is a desirable option for barely half of respondents (49%) and only 42% of the participants stated that they would use a decision-making system.

Some business reports suggest that drivers are eager to use self-driving cars (e.g., Continental, 2013; J.D. Power, 2012, 2017). In contrast to the reports, we found considerable hesitations among car drivers toward the use of highly autonomous systems. However, while we asked about acceptance of specific systems, the reports mainly asked about general openness to self-driving cars and advanced driver assistance systems. Thus, the results of the reports draw a picture of the general desirability of the technology of self-driving cars, while our study presents results on the actual acceptance of automated systems. The survey shows that, when it comes to self-driving technologies, the majority does not yet support the technology.

Currently, there is a high degree of hesitancy toward autonomous systems. As highly and fully automated cars are not commercialized yet, it is important to note that the study results depend on people's imagination regarding the operation of automated cars in the future. Therefore, we controlled for differences in knowledge by offering a short explanation of each autonomous system. Nevertheless, re-examining acceptance of different automated systems through a follow-up study would allow differentiation between reservations toward autonomous systems caused by unfamiliarity and fundamental reservations caused by moral or ethical principles.

Our results can provide policymakers, as well as car manufacturers and tech companies, insights into the existing reservations about self-driving technologies. Based on our findings, people are reluctant to hand over control of their cars to technology, especially when it comes to complex automated systems with a wide range of actions, but are less afraid of using automated systems for specific tasks. People do not seem to have an aversion to automated systems in cars in general, but rather hesitate to use systems whose actions are not directly predictable and whose functionality is not easy to explain.

In other words, people seem to shy away from uncertainty when it comes to automated systems. For example, our results show that systems that reproduce an easily comprehensible function, such as ”seeing”, ”warning”, ”supporting” or ”alerting”, are generally more accepted than systems that reproduce a complex task, such as evaluating gestures and recognizing shapes, where it is not even clear how the human mind handles the task. Thus, aversion to the use of highly automated system could be reduced by providing stepwise explanations about the functions of those systems, and pursuing open and transparent communication about their functionalities.

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A. Appendix

This section contains additional information on the interfaces and questions used in the survey. Data and methods are available online.

A.1. Questions

1. Would you use a car with a *Rearview Video system*? Explanation: Allows you to see what's behind the car on a video monitor. (for an analysis of the answers given see Sections 4.1.1)
2. Would you use a car with a *Blind Spot Detection system*? Explanation: Beeps to let you know that a vehicle in another lane may be in the "blind spot" of vision. (for an analysis of the answers given see Sections 4.1.1)
3. Would you use a car with a *Radio Detection and Ranging system*? Explanation: Uses radar to tell you the position and/or movement of objects. It is used for example to determine the distance to the car in front of you in dim viewing conditions (such as fog, snow, etc.). (for an analysis of the answers given see Sections 4.1.6)
4. Would you use a car with a *Forward Collision Warning system*? Explanation: Warns you that a collision is imminent. (for an analysis of the answers given see Sections 4.1.1)
5. Would you use a car with a *Laser Rangefinder system*? Explanation: A laser rangefinder system detects and records information about road signs and traffic lights, which is then used by the car to make intelligent decisions about what to do next. (for an analysis of the answers given see Sections 4.1.6)
6. Would you use a car with a *Pedestrian Automatic Emergency Braking system*? Explanation: Will automatically brake the car if it thinks it will hit a pedestrian. (for an analysis of the answers given see Sections 4.1.3)
7. Would you use a car with a *Dynamic Brake Support system*? Explanation: Applies additional braking if it thinks you aren't stopping hard enough to avoid a crash. (for an analysis of the answers given see Sections 4.1.2)
8. Would you use a car with a *Crash Imminent Braking system*? Explanation: Brakes for you if it thinks you are not braking hard enough and a crash will happen. (for an analysis of the answers given see Sections 4.1.2)
9. Would you use a car with a *Rear Cross Traffic Alert system*? Explanation: Warns you that cars may cross your path while backing up. (for an analysis of the answers given see Sections 4.1.1)
10. Would you use a car with a *Passive Cruise Control system*? Explanation: When activated, tries to maintain a constant speed. (for an analysis of the answers given see Sections 4.1.2)

11. Would you use a car with an *Adaptive Cruise Control system*? Explanation: When activated, tries to maintain a constant speed but automatically adjusts to maintain a safe distance behind other vehicles. (for an analysis of the answers given see Sections 4.1.3)

12. Would you use a car with a *High Speed Alert*? Explanation: Alerts you that you are exceeding the speed limit. (for an analysis of the answers given see Sections 4.1.1)

13. Would you use a car with a *Lane Departure Warning system*? Explanation: Warns you when the car starts to leave its lane unless the turn signal is on. (for an analysis of the answers given see Sections 4.1.1)

14. Would you use a car with a *Lane Keeping Support system*? Explanation: Automatically adjusts the car if it starts to leave a traffic lane but only if the turn signal is not on. (for an analysis of the answers given see Sections 4.1.2)

15. Would you use a car with a *Dedicated Short-Range Communication system*? Explanation: Allows the car to communicate with other cars or infrastructure technology to share the position, speed and trajectory of nearby cars. (for an analysis of the answers given see Sections 4.1.6)

16. Would you use a car with a *Cloud system to update algorithms and functions*? Explanation: A cloud system allows the manufacturer to update the car's software continuously. (for an analysis of the answers given see Sections 4.1.5)

17. Would you use a car with a *Cloud system to update maps and traffic data*? Explanation: Allows the vehicle to automatically update maps and traffic data. (for an analysis of the answers given see Sections 4.1.5)

18. Would you use a car with a *Cyclist Gesture system*? Explanation: Automatically interprets cyclists' gestures and adjusts the car's course accordingly. (for an analysis of the answers given see Sections 4.1.3)

19. Would you use a car with a *Programmed Predetermined Shape and Motion Descriptor system*? Explanation: For instance, if the car detects a 2-wheel object and determines the speed as 10mph rather than 50mph, the car instantly interprets that it is a bicycle and not a motorbike and adjusts the car's course accordingly. (for an analysis of the answers given see Sections 4.1.3)

20. Would you use a car with a *Park Assistant system*? Explanation: When activated, allows the car to park itself. (for an analysis of the answers given see Sections 4.1.3)

21. Would you use a car with an *Occasional Lane Keeping Cruise Control system*? Explanation: On specific roads, tries to maintain a constant speed and steer the car to stay in its lane. (for an analysis of the answers given see Sections 4.1.3)

22. Would you use a car with an *Autonomous Car on Call system*? Explanation: When called by the driver, drives the car by itself to come get the driver. (for an analysis of the answers given see Sections 4.1.4)

23. Would you use a car with a *Permanent Lane Keeping Cruise Control system*? Explanation: When activated, the car drives itself but you must be in a position to resume control. (for an analysis of the answers given see Sections 4.1.4)

24. Would you use a car with a *Decision-Making system*? Explanation: Makes decisions of whether to go or wait, for instance if a pedestrian might cross the street but waves the car to go. (for an analysis of the answers given see Sections 4.1.4)

25. Would you use a car with a *Driverless Vehicle system*? Explanation: Car drives on its own without any human intervention at any time. (for an analysis of the answers given see Sections 4.1.4)

You have completed the main proportion of the study. We would just like to askt a few demographic questions:

1. What is your sex? (for an analysis of the answers see Sections 4)

2. What is your age? (for an analysis of the answers see Sections 4)

3. What is the highest level of school you have completed or the highest degree you have received? (for an analysis of the answers see Sections 4)

4. Do you own a car? (for an analysis of the answers see Sections 4)

5. How old is your car in years? (for an analysis of the answers see Sections 4)

6. How would you describe your attitude to technology? [Exteremely high liking, moderately high liking, slightly high liking, slightly low liking, moderatley low liking, extremely low liking, no liking of technology at all] (for an analysis of the answers see Sections 4)

A.2. Comparison of acceptance between treatments

As Table 2 shows, participants support the use of certain systems for other drivers more than for themselves. Participants especially prefer others to use warning systems and most of the assisted driving systems more than to use them themselves. However, when it comes to occasional and fully autonomous driving systems, there seems to be no difference between the respondents' own intention to use those systems and the desire that those systems be used by others.

System	*You-Me*	
Warning systems		
Blind Spot Detection	$\Delta = 1.9470$	$p = 0.0530^{*}$
Forward Collision Warning	$\Delta = 2.2099$	$p = 0.0283^{**}$
High Speed Alert	$\Delta = 3.6667$	$p = 0.0003^{***}$
Lane Departure Warning	$\Delta = 3.9632$	$p = 0.0001^{***}$
Rear Cross Traffic Alert	$\Delta = 1.5057$	$p = 0.1338$
Rear View	$\Delta = 0.0734$	$p = 0.9415$
Assisted driving systems		
Dynamic Brake Support	$\Delta = 1.8665$	$p = 0.0635^{*}$
Imminent Braking	$\Delta = 2.1511$	$p = 0.0327^{**}$
Lane Keeping Support	$\Delta = 3.0160$	$p = 0.0029^{***}$
Passive Cruise Control	$\Delta = -0.7806$	$p = 0.4360$
Occasional autonomous driving systems		
Adaptive Cruise Control	$\Delta = 0.2237$	$p = 0.8232$
Cyclist Gesture	$\Delta = -0.0601$	$p = 0.9521$
Occasional Lane Keeping	$\Delta = 0.9334$	$p = 0.3518$
Park Assistant	$\Delta = -1.0821$	$p = 0.2806$
Pedestrian Automatic Braking	$\Delta = 1.6935$	$p = 0.0919^{*}$
Shape Recognition	$\Delta = 0.6479$	$p = 0.5178$
Autonomous driving systems		
Car on Call	$\Delta = -2.3242$	$p = 0.0212^{**}$
Decision-Making	$\Delta = 0.7954$	$p = 0.4274$
Driverless Vehicle	$\Delta = -0.4202$	$p = 0.6748$
Permanent Lane Keeping	$\Delta = -0.2399$	$p = 0.8107$
Cloud using systems		
Cloud Algorithm	$\Delta = 0.3833$	$p = 0.7020$
Cloud Map	$\Delta = -0.2535$	$p = 0.8002$
Perception and vehicle-to-vehicle communication systems		
Laser Rangefinder	$\Delta = 0.0933$	$p = 0.9257$
Radio Detection	$\Delta = 1.7833$	$p = 0.0761^{*}$
Short-Range Communication	$\Delta = 0.4510$	$p = 0.6525$
Note:	$^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$	

The table shows differences in the average acceptance between treatments ($\Delta = \ldots$) and p-values for a two-sided independent-samples t-test where this difference could be zero. T-test results are in accordance with results from nonparametric Wilcoxon signed-rank tests.

Table 2: Treatment difference in the level of acceptance.