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Faculty Behavioral, Management and Social Sciences (BMS)

Partial automated driving: The influence of trust on drivers' awareness of the situation

Jule Landwehr

Bachelor thesis

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Supervisors:
Prof. dr. ing. Willem B. Verwey
Dr. ir. Arie Paul van den Beukel

Department of Cognitive Psychology & Ergonomics
Faculty Behavioral, Management and Social Sciences (BMS)
University of Twente
P.O. Box 217
7500 AE Enschede
Nederland

Abstract

Due to too much trust in the automated driving system, drivers often withdraw from monitoring the system, which causes a decrease in situation awareness. Trust seems to play a big role when it comes to a right use of an automated driving system. This study investigates the influence of trust that someone has in an automated driving system on situation awareness. Footage 1-3 was used to create high trust in the 'reliable system' group and footage 4-6 to create low trust in the 'unreliable system' group. For the main test the participants watched another footage. While watching the last footage participants were asked to monitor the system, which included pressing a button if they thought the system could not handle the situation and play a game on a tablet at the same time. Afterwards the participants saw eight pictures and were asked whether these represented situations they just had seen in the last footage. The results indicate that participants in the 'reliable system' group spent significantly more time playing the game compared to the 'unreliable system' group. There were no significant differences found in the number of times the button was clicked and number of recognized pictures between the 'reliable system' group and 'unreliable system' group.

Introduction

Driving is a fast and preferred way of getting from one place to another. Since the first cars were introduced, car producers kept developing new car designs to make driving as comfortable and safe as possible for the driver and other road users. Developments include integrated automatic systems called Advanced Driving Assistance Systems (ADAS). These systems are able to take over tasks of the driver to increase the safety and comfort and to support a time-saving and environment friendly transport network (Merat & Lee, 2012). Today, Advanced Driving Assistance Systems like the traffic jam assistant are on the market, that are able to completely take over control of the vehicle for a certain amount of time and for specific tasks (Gold, Damböck, Lorenz, & Bengler, 2013). If implemented correctly these systems cannot only benefit everyday car users but also car users who are most vulnerable to errors and accidents such as teen drivers who are overrepresented in car crashes, or elder people (Lee, 2017).

However, the ADAS only can handle specific tasks so it might come across a task which it is not able to handle on its own, that is to say the driver needs to be able to intervene quickly when the system fails. This is only possible if the driver is aware of the systems status and the traffic situation (Gold et al., 2013). Therefore, safety can only be guaranteed if the system is monitored and supervised at all times. Up till now the driver undertakes the duties of an operator who actively operates the system (Saffarian, Winter, & Happee, 2012; Merat & Jamson, 2009). The problem is that the duties of an operator do not include supervising the system, meaning drivers might not be aware that it is necessary to monitor the system at all times. Therefore, to assure safety the driver needs to adopt a new role. The new role is the one of a supervisor who monitors the system and actively intervenes when the system reaches its limits (Merat, Jamson, Lai, & Carsten, 2012). The problem is, that the driver is not sufficiently informed about this new role which can cause an overreliance on the systems capabilities. This means drivers may think, that the system can handle any situation, not knowing its boundary conditions (Gold, Körber, Hohenberger, Lechner, & Bengler, 2015).

As a consequence drivers often engage in other tasks like reading, working and a withdrawal from monitoring the system takes place (Kienle, Damböck, Kelsch, Flemisch, & Bengler, 2009). This is called the out-of-the-loop problem. Performance issues that arise from being out-of-the-loop are insufficient situation awareness, too high or too low mental workload and too much or too little trust (Parasuraman, Sheridan, & Wickens, 2008; Saffarian et al., 2012). These are associated with a slower reaction time and reduced take over quality and may eventually cause serious accidents when the system fails (Gold et al., 2013; Son & Park, 2017).

Endsley (1995), defined three levels of situation awareness (SA): The perception of elements in the environment (Level 1), a comprehension of their meaning in relation to goals (Level 2) and the projection of what might happen with them in the future (Level 3) (Son & Park, 2017). In the context of automated driving level 1 SA requires the driver to make certain that the partial automated driving system performs appropriately. Level 2 SA would include reacting to error messages provided by the automated driving system and Level 3 requires the driver to interpret the cues out of the environment and the automation to form a navigation plan (Ma & Kaber, 2005). Another important element of SA is system awareness. It refers to important information on the vehicle for example over the status of the automated driving system ((Ma & Kaber, 2005). In other words, sufficient situation awareness while using an automatic driving system not only means monitoring the traffic and reacting upon it, but also being aware of the status of the automated driving system and its boundaries. Reduced situation awareness can cause slow or even no reaction to a system failure.

Another factor is mental workload. When driving in a normal car the workload can be high. The automatic system is taking a big part of this workload away, just leaving the driver with the monitoring task. Some studies argue that too little mental workload comes with bad consequences like getting out-of-the-loop and sleepiness (Jamson, Merat, Carsten, & Lai, 2013). Other studies found that increasing the workload by giving the driver system feedback helps the driver to stay in the loop (Jamson et al., 2013).

The last factor which is stressed by different studies is trust in the system. If the trust is too high it can cause inappropriate use of the system, which causes the driver to relay too much on the system. This means the driver thinks the system can handle every situation (Gold et al., 2015). As a consequence the driver does not monitor the system properly, which may cause accidents as the system fails (Saffarian et al., 2012; Gold et al., 2013). If the trust in the system is too low it can cause a disuse of the system. Consequently the driver would choose not to use the automated driving system (Gold et al., 2015).

Until now a lot of research has been done on the influence of secondary tasks on situation awareness and mental workload and the differences between manual and automated driving when it comes to mental workload and situation awareness (Winter, Happee, Martens, & Stanton, 2014). In the domain of trust, research mainly focused on how to increase trust to make sure that people trust the system enough to use it (Hoff & Bashir, 2014; Choi & Ji, 2015). Little attention was paid to the changing role of the driver and the problem of too much trust in an automated driving system. Adopting the role of an operator takes time and training from driving instructors. A good supervisor has the responsibility over a system or a group of people, which he needs to guide. In other words, a supervisor might also need training to become a good supervisor. The CBR (Centraal Bureau Rijvaardigheidsbewijzen), which is responsible for testing driver proficiency, is especially interested in ways to measure and train the performance of novice drivers who use automated driving systems to assure adoption to this new role. In order to do so they need factors that indicate how someone will perform called performance indicators.

Previous studies on automation in for example automatic airplane systems show, that overreliance, which depends on the amount of trust and a lack of understanding of the systems qualities, can have a negative influence on the performance of a driver, and thereby cause a decrease in situation awareness (Merat, Jamson, Lai, & Carsten, 2012). Hergerth, Lorenz, Vilimek and Krems (2016) tested the influence of trust on monitoring behavior of a person who works with an automated driving system. The monitoring behavior was tested with the means of an eye tracking device. They found that participants who reported higher trust monitored the system less frequently and that participants who gained more trust during the study started to monitor the system less frequently. In their study Hergerth et al. (2016), did not name situation awareness explicitly. However studies that measure situation awareness often use eye tracking as a measurement tool (Winter et al., 2014) and decreases in situation awareness are often associated with a decrease in monitoring the situation.

Thus, trust in the system might be one indicator that the CBR could use to access how somebody would perform while using an automated driving system. The aim of this study is to find out if the amount of trust has an influence on somebodies awareness of the situation while using an automated driving system. The reason for this is to find out whether trust can be used as a performance indicator for a good supervisor. Keeping that in mind the research question is: *′Does trust that someone has in an automated driving system have a significant influence on situation awareness?'*

In this study the trust of two groups was manipulated, to create high and low trust for the main test in which the situation awareness was tested. The 'reliable system' group was manipulated to have high trust in the system, the 'unreliable system' group to have low trust in the system. To do so, the 'reliable system' group watched video footage of a system that was able to handle every situation. The 'unreliable system' group watched video footage of a system that had limitations and boundaries. For the main test participants of both groups were asked to sit in a driving simulator and watch another footage. During the time the footage was shown the participants had two tasks: To play a game on an iPad and to monitor the system which included to click on a red button if they thought it was necessary to intervene with the system.

The participants were asked to play the game as much as they could as long the situation allowed it. To measure situation awareness the participants were asked to point out pictures they recognized out of the footage they just had seen, the time spend on the game was recorded and the times clicked on the button were written down.

Trust in a partial automated driving system was hypothesized to influence the awareness the driver has of the situation, which would impact the drivers' performance of the supervisor role. If the amount of trust increases the situation awareness will decrease and vice versa. The following hypothesis can be set up: Hypothesis 1 is: *There is a significant difference in the average time spent playing between the reliable system and the unreliable system group.* Hypothesis 2 is: *There is a significant difference in the average number of pictures recognized between the reliable system and unreliable system group.* Hypothesis 3 is: *There is a significant difference in the average number of times clicked on the button between the reliable system and unreliable system group.*

Methods

Participants

In total a convenient sample of 20 university students (6 female, 14 male; age M = 22.4 years, SD = 1.9) who had their driving license for at least one year, had never used a partial automated driving system before and drove at least one time per week participated voluntarily in this study. In the 'reliable system' group there were a total of 10 participants (3 female, 7 male; age M = 22.5 years, SD = 2.1). The 'unreliable system' group had consisted of 10 participants (3 female, 7 male; age M = 22.3 years, SD = 1.8). In each group men and women were distributed equally. In terms of age the participants were distributed randomly over the two groups. The age of the participants ranged from 19 to 25 years. The study was approved by the University of Twente Faculty of Behavioural Management and Social Sciences Ethics Committee. All participants signed an informed consent prior to participation.

Materials

In total 6 different footages were used to create high and low trust in the automated driving system: Footage 1-3 was used to manipulate the 'reliable system' group to have high trust in the automated driving system (see appendix 3.a) and Footage 4-6 was used for the 'unreliable system' group to create low trust in the automated driving system (see appendix 3.b). All footage showed a driving car, from the drivers' perspective. On the top right of each footage, the speed of the car was displayed at all times. Every footage had a different scenario in it. The footage for the ‘reliable system’ group included three scenarios of a reliable automated driving system that guided the driver safely through various situations (see appendix 3.a):

Footage 1 shows a street on the campus. On the street is a bollard (see appendix 4 screenshot 1). The automated driving system drives around the bollard. In the second footage a pedestrian is walking on the right side of the street (see appendix 4 screenshot 2). The automated driving system drives around the pedestrian with much room left between them. Footage 3 shows a car driving on an 80 km/h road (see appendix 4 screenshot 3). The road changes into a 50 km/h road. The automated driving system reduces the speed of the car itself. The footage for the ‘unreliable system’ group included three scenarios of an automated driving system that made a number of mistakes while driving (see appendix 3.b). Footage 4 shows a street on the campus (see appendix 4 screenshot 4). On the street is a little box. The automated driving system drives over the little box. Footage 5 shows a car that is driving over a pedestrian crossing (see appendix 4 screenshot 5). A pedestrians wants to cross but the automated driving system keeps driving. Footage 6 shows the car drives on a 50 km/h road out of the residential zone into an 80 km/h road (see appendix 4 screenshot 6). The automated driving system does not speed up. Footage 1 lasts 25 seconds, footage 2 lasts 25 seconds, footage 3 lasts 45 seconds, footage 4 lasts 20 seconds, footage 5 lasts 13 seconds and footage 30 seconds.

Additionally another footage (Footage 7) was shown to participants of both groups (see appendix 5). Footage 7 lasts two minutes and 30 seconds. In the footage the car is riding on an 80 km/h street. At the end of the street is a 50 km/h sign and an intersection. The automated driving system stops the car to give a bicyclist the way and turns right on another street. The automated driving system reduces speed of the car to 50 km/h as the sign indicates. The car drives onto another intersection with a traffic light. The automated driving system stops the car for the red lights and drives further after the traffic light turns green. On the street the car is driving on it has the right of way. The automated driving system guides the car through a roundabout. The car follows the new road. After that the footage stops. The footage symbolizes an automated driving system which drives the car through various situation that the participants needed to monitor.

Moreover a driving simulator was used, in which the participant was placed while watching the footage. The footage was shown on the screen of the driving simulator. The driving simulator had a seat and a steering wheel. The purpose of the driving simulator was to give the participants a more realistic feeling of driving in a car with an automated driving system.

Furthermore a red button was used. The red button was on the right side of the seat. The red button symbolizes a take-over button in a car and was used by the participants to show whether they would interfere with the system. So if the red button was pressed a dangerous situation was detected by the participant no matter if the situation was actually critical or not.

Furthermore a tablet and a game were used as a distraction from monitoring the system. The tablet was an apple iPad model A1460. The software version installed on the device was IOS 10.3.3. The game which was used was 'geometry lite'. It is a game were the player needs to jump and fly over different obstacles. The game has different levels. Every level can be divided in three parts. In the first part the player is a square block and needs to touch the screen to jump over spiky obstacles (see appendix 6 screenshot 1). In the second part the player is playing a square block that is placed on a rocket (see appendix 6 screenshot 2). The player needs to guide the block over different obstacles. To do so, the player needs to touch the screen so the rocket will fly up. If the player does not touch the screen the racket flies down. The game uses colour changes in the game. In the last part the player is a block again and needs to jump over obstacles (see appendix 6 screenshot 3). Consequently, the player really needs to focus on the game to successfully play the game, which makes the game a high visual-manual attention task. The purpose of the game was to distract the participants from monitoring the system and to test how much attention they would pay to the game. To measure the time the participants spent playing the game a mobile phone was used.

Lastly, a paper with eight pictures on it was used (see appendix 7). The pictures show screenshots of four situations that match with Footage 7 and four situation which do not match with Footage 7. The purpose of the pictures was to test whether participants were aware of their surroundings while performing the task and could therefore recognized all four pictures of Footage 7.

Task

First every participant had the task to watch Footage 1-3 or Footage 4-6 depending on the group they were assigned to and look for situations that attract their attention. Secondly for the main test participants watched Footage 7 (see appendix 5) for which they got two tasks to measure situation awareness. One was to monitor the system and click on a red button when they thought the system was not able to handle the situation. The last one was to play a game on the iPad as much as they could as long as the driving situation would allow it. After watching the Footage 7 the participants got the task to point out pictures of situations they recognized while watching Footage 7.

Procedure

Firstly, the participant was asked to read and sign the informed consent (appendix 1). Then the participant was asked to give some personal data (see appendix 8.a). Thereafter the instruction sheet was handed over (appendix 2). After answering potential questions, the participant was instructed to take a seat in the driving simulator. Once the participant was seated and ready, the researcher explained that three different footages of an automated driving system would be shown to them. After every footage, the researcher asked the participant to describe what the automated driving system was doing, so they could get a feeling of the performance of the automated driving system. Afterwards the participant was asked if he had any further questions regarding the functions of the automated driving system. If all questions were answered the researcher explained, that they were going to see another footage of a car driving in automated mode. The researcher explained that the participant had two tasks: Monitoring the system which included clicking on a button if the participant thought the system could not handle the situation and playing a game on the iPad. The iPad was given to the participant with a short explanation of the game. The researcher emphasized that it was the aim to play the game as much as possible as long as the situation allowed it and asked if their task was clear and started the footage. During the time the participant was watching the footage and executed the tasks, the researcher recorded the time the participants played the game with a mobile phone and wrote down the number of times the participant clicked on the red button. Thereafter the researcher asked the participants to point out pictures with situations they recognized while watching Footage 7 (see appendix 7) and wrote down all data in a table (see appendix 8.b). After that the researcher thanked the person for participating and asked if there were any questions left.

Data Analysis

A between group design was employed. The attained data was analyzed and reviewed with the help of the computer program SPSS. There was one independent variable 'trust in the system' with two levels: high and low. The concept that was measured was the drivers' awareness of the surroundings and of the status of the system (situation awareness). The situation awareness was measured with the means of three dependent variables: 'the time spent playing the game in seconds', 'the number of recognized pictures' and 'the number of times clicked on red button'. First the data was analyzed for outliers. No extreme outliers were found. The residuals of the dependent variable 'the time spent playing the game in seconds' were observed for normal distribution with the means of a Shapiro Wilk test and a histogram. The dependent was normally distributed ($p<0.41$). The differences of the two groups for the dependent variable 'the time spent playing' were compared by means of an ANOVA with an alpha level of 0.05. The dependent variables 'the number of recognized pictures' and 'the number of times clicked on the button' were analyzed with a Fisher exact test of independence to find out if there is a relation between the independence variable 'trust in the system' and the two dependent variables.

Results

In line with the first hypothesis a significant difference in the time spent playing the game between the 'reliable system' and the 'unreliable system' group was found, $F(1, 18) = 28.204$, $p < .0005$. As can be seen in Figure 1, the 'reliable system' group spent an average time of 116 seconds and the 'unreliable system' group spent an average time of 88 seconds playing the game. This means, that on average the 'reliable system' group spent more time playing the game than the 'unreliable system' group. Unexpectedly, no support was found for the second hypothesis. There was no significance difference in the number of pictures that was recognized, $\chi^2 (2) = 5.707 = p= 0.077$. As can be seen in Figure 2, on average the 'reliable system' group recognized less pictures than the 'unreliable system' group. The aim of the third hypothesis was to test whether there was a significant difference between the average times clicked on the button between the two groups. The analysis indicates that there was no significant difference $\chi^2 (2) = 4.267 = p= 0.140$. Figure 2 shows that the 'reliable system' group clicks on the button an average of 0.3 times, which is less than the low group which clicks on the button an average of 1.1 times.

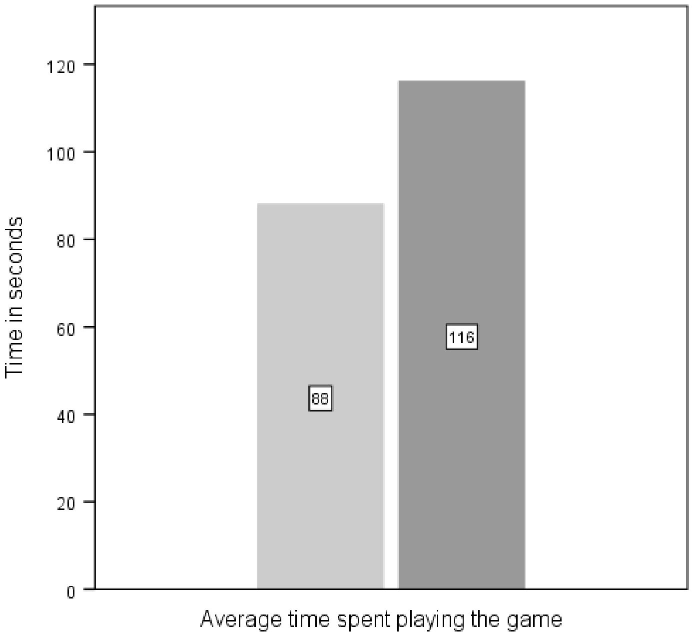

Figure 1. Average time spent playing in seconds per group

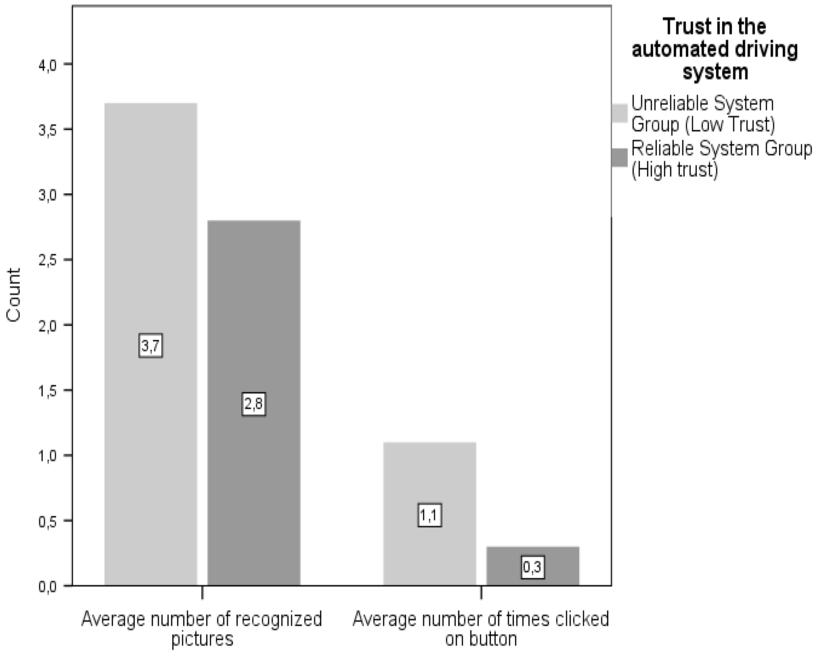

Figure 2. Average number of recognized pictures and average number of times clicked on button per group

To summarize, it can be stated that support has been found for hypothesis one: There was a significant difference in the time spent playing the game between the ‘reliable system’ group and the ‘unreliable system’ group. As expected the ‘reliable system’ group spent more time playing on the game than the ‘unreliable system’ group. The second and third hypothesis however, could not be confirmed: No significant different was found in the number of pictures that had been recognized between the two groups. Furthermore, there was no significant difference in the number of times clicked on the button between the two groups. Despite this it can be said that as expected, the ‘unreliable system’ group clicked more often on the red button and recognized more pictures than the ‘reliable system’ group.

Discussion

The purpose of this study was to test if trust has a significant influence on situation awareness. Situation awareness was measured by the time spent playing the game, the number of pictures that been recognized and the number of times clicked on a red button. The results show that there is a significant difference between the two groups when it comes to the time the participants played the game, but not in the number of recognized pictures and the number of times they clicked on the red button.

Based on earlier research from Merat et al. (2012) and Hergeth et al. (2016), it was expected that trust has a significant influence on situation awareness and that high trust indicates a decrease in situation awareness and vice versa. This study emphasizes this partially as the ‘reliable system’ group spent more time playing the game and less time monitoring the system compared to the ‘unreliable system’ group. Furthermore the ‘reliable system’ group recognized fewer pictures and recognized fewer dangerous situation as more attention was payed to the game. However, only one of the variables ‘time spent playing’ indicates a significant difference between the groups. This is in line with the findings of Hergeth et al. (2016), who found that higher trust can be associated with a decrease in monitoring the system. In this study participants with high trust spent more time playing the game than monitoring the system, which indicates a decrease in monitoring the system. Despite this no support for the other two hypothesis could be found. One reason for this can be that all of the participants already knew the surroundings in which the footage was filmed. This can be a problem because the pictures that were shown to the participant were spots where a potential dangerous situation might occur. In other words, it was easy for the participants to detect these spots while playing the game because they already knew all spots in which a dangerous situation might occur.

Research indicates that trust may play an important role when it comes to automation (Parasuraman et al., 2008; Ma & Kaber, 2005). Despite this only little research is done on the influence of trust as a performance indicator for partial automated driving. This study gives a first impression on the influence of trust on the performance of a car driver concerning the awareness of the situation. Furthermore it shows that a right amount of trust might be essential for a sufficient amount of situation awareness as the monitoring of the system increases and decreases with the amount of trust. In other words, training on partial automated driving that gives the driver the right expectations for monitoring the situation of a partial automated driving system might be essential for a safe and right use of the automated driving system.

One point that can be improved is the number of participants. To test the research question and the hypotheses it is important to have enough participants. To get valid results more participants need to participate in the study, so that a high number of people can be divided over the two groups. Another point that can be improved is the video used for the main task (Footage 7). The footage that was shown contains different situations. Most participants pointed out that there were only two situation that they perceived as dangerous and that they already knew the area which made it easier to know when it was necessary to carefully monitor the system and to intervene with the system.

In future research it is therefore important to choose a bigger sample. Furthermore footage should be used of an area that is unknown to the participants. Besides that, it would be interesting to use an eye tracker to measure how much drivers monitored the system as other studies also used this as a measurement tool (Hergeth et al., 2016; Winter et al.,2014). In addition a questionnaire that measures the amount of trust could be given to the participants after manipulating their trust in the automated driving system, to check whether the footage really manipulate the trust of the participants.

This report provides evidence of the importance of trust in the performance of a driver who supervises a partial automated driving system and emphasizes further research, to provide further support for trust as a performance indicator.

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Appendix

Appendix 1

Informed consent

1. I volunteer to participate in a research project conducted by Jule Landwehr. I understand that the project is designed to gather information about the interaction between a driver and an automated driving system. I will be one of circa 50 people participating in this research.

2. My participation in this project is voluntary. I understand that I will not be paid for my participation. I understand that I get 0.5 Sona system points. I may withdraw and discontinue participation at any time without penalty.

3. Participation involves watching videos and playing a game while sitting in a driving simulator being observed by an instructor. The participation will take approximately 30 minutes. Notes will be written down during the participation and you will be filmed. After watching all videos the instructor will ask a few questions and will take notes of the answers.

4. I understand that the researcher will not identify me by name in any reports using data obtained from my participation, and that my confidentiality as a participant in this study will remain secure. Subsequent uses of data will be subject to standard data use policies which protect the anonymity of individuals and institutions.

5. Faculty and administrators from the University of Twente will neither be present at the interview nor have access to raw notes. This precaution will prevent my individual data from having any negative repercussions.

6. I have read and understand the explanation and instruction provided to me. I have had all my questions answered to my satisfaction, and I voluntarily agree to participate in this study.

______________________________ My Signature

______________________________ My Name

For further information, please contact:

Jule Landwehr

_________________________ Date

_________________________ Signature of the Investigator

Appendix 2

Instruction sheet:

In a few minutes you get a short training on automated driving. For the training three videos will be shown to you with a short oral explanation of the researcher afterwards. Thereafter you can ask any remaining questions. After that one longer video will be shown to you. All videos show a car driving on the road from a driver's perspective. Every video shows a different scenario. On the upper right you can see how fast the car is driving. The car is driving with a partial automated driving system switched on. This means that the car is itself a controlling motion. You have two tasks: One is to monitor the system. This includes clicking on the red button when you think the system cannot handle the situation anymore. The second one is to play a game on a tablet. As long as the situation allows it you should play the game as much as possible. After watching the videos the researcher will ask some questions.

If you have any questions concerning the procedure don't be afraid to ask one of the present person. Do you want to know more about the research or do you have any questions afterwards do not be afraid to send an E-mail to: j.landwehr@student.utwente.nl.

Appendix 3

Footage

3.a Reliable system footage

Footage	Footage 1	Footage 2	Footage 3
Length	25 seconds	20 seconds	45 seconds
Events	Pion on the street which the automated driving system can detect	Pedestrian walking on the right side of the street, the car drives around	Car drives into residential zone, speed is 80 should go to 50, car reduces speed
Automated driving system able to handle the situation	yes	yes	yes

3.b Unreliable system footage

Footage	Footage 4	Footage 5	Footage 6
Length	20 seconds	13 seconds	30 seconds
Events	Little box on the street which the automated driving system cannot detect	Pedestrian want to cross the street at a crosswalk automated driving system cannot detect it	Car leaves residential zone, speed is 50 should go to 80, car does not speed up
Automated driving system able to handle the situation	no	no	No

Appendix 4

Screenshot Footage 1-6:

Screenshot 1 (Footage 1)

Screenshot 2 (Footage 2)

Screenshot 3 (Footage 3)

Screenshot 4 (Footage 4)

Screenshot 5 (Footage 5)

Screenshot 6 (Footage 6)

Appendix 5

Footage 7 (Length: 2 minutes 30 seconds):

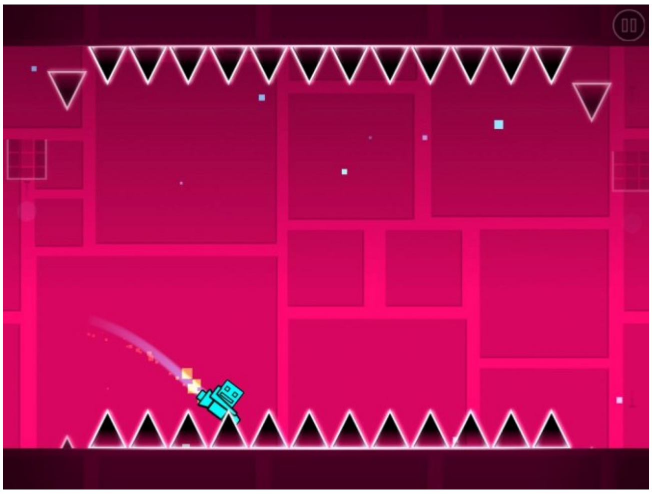
	Short explanation of the event	Level 1 Perception (did the participant press the button?)	Level 2 Understanding (why did he press the button)
Event 1	Give way for the bicycle	Recognize that there is a bicycle on the street	Intervene or not
Event 2	Slow car down to 50 km/h	Recognize the 50 sign	Interfere or not
Event 3	Stop at intersection because of red traffic light	Recognize the traffic light is red	Interfere or not
Event 4	The car has the right of way	Recognize the right of way sign	Interfere or not
Event 5	Car drives into a roundabout	Recognize the blue van driving in the roundabout	Interfere or not

Appendix 6

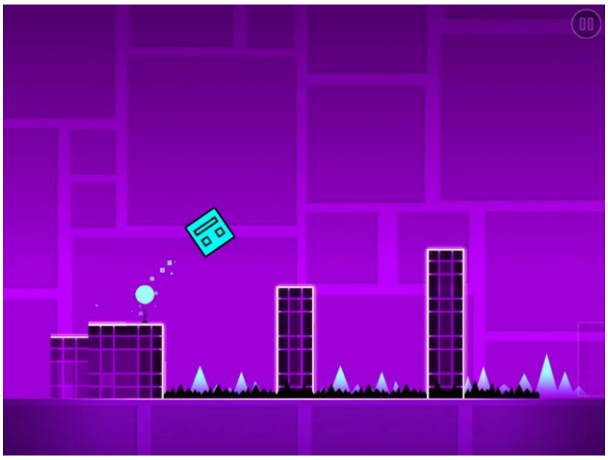
Screenshot Game

Screenshot 1

Screenshot 2

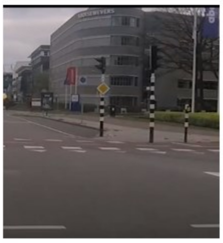


Screenshot 3



Appendix 7

Pictures for participants



Appendix 8

8.a Questionnaire

Level 1:

1. Which of the following pictures match with the footage you just saw?

Level 2:

1. You choose to ... times intervene with the system. Why did you choose to do so? (Ask separate for every situation)
2. Did the performance of the automated driving system met the expectation you had of the system?

8.b Table

Reliable system group:

Persons, Sex, age, driver license since, already conducted study like this, drove in AS before	Time spent with playing	Times clicked on button	Situations clicked on button	Photos they pointed right 4/4	Reason why they intervene/ not intervene, did the automated driving system performed as expected

Unreliable system group:

Persons, Sex, age, driver license since, already conducted study like this, drove in AS before	Time spent with playing	Times clicked on button	Situations clicked on button	Photos they pointed right 4/4	Reason why they intervene/ not intervene, did the automated driving system performed as expected