# Encounters with a seemingly autonomous sidewalk delivery vehicle: interviews with incidentally copresent pedestrians

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**Abstract**

*Although several studies have explored people's opinions on sidewalk delivery vehicles, these have all been on the basis of hypothetical interactions. This study is the first in exploring people's opinions after having unexpectedly encountered a seemingly autonomous sidewalk delivery vehicle in person. 28 semi-structured interviews with incidentally copresent persons (InCoPs) walking down a footpath (n=46) were conducted. The research goal is twofold: to investigate underlying reasons for the correlation between perceived threat and existence acceptance found in earlier research, and to explore emergent comments made by pedestrians after the encounter. Very little instances of perceived physical and emotional threat surfaced. On the subject of cognitive threat, opinions varied. People disagreed on the subject of expected behavior and who should have priority over whom. The amount of existence acceptance was high. Positive opinions were on the convenience of the technology and reduction of $CO_2$-emissions. Negative opinions were mainly on indirect topics such as technology causing job loss and the direction of technological change as a whole.*

## I. Introduction

In the last decade, the concept of autonomous vehicles has become ubiquitous. Due to the increase of urbanization, e-commerce and consumer expectancy of short delivery times, the annual growth rate for autonomous vehicles is expected to be around 11% (FutureBridge, 2020). Besides driverless cars and trucks, the development of different forms of autonomous vehicles is also gaining traction. Autonomous delivery vehicles that will drive on pedestrian and bicycle lanes are a part of this and the first laws approving the presence of these vehicles on the street are being passed (Rattigan, 2021). Therefore more knowledge should be gained on the positive and negative effects such vehicles have on the people present in their surroundings.

A large body of research exists on the interactions between technology and people that are actively looking to interact with it. In the case of autonomous delivery vehicles, this would be the end-users, who will have to be notified when the order gets delivered, and should know how to obtain their parcels from the vehicle. The largest number of interactions however, will fall in the category of people that Rosenthal-von der Pütten et al. (2020) call *InCoPs*: incidentally copresent persons. These InCoPs have no planned intention of interacting with these vehicles, but will encounter them unexpectedly. Their behavior and experience during such an encounter may differ from people expecting to have these interactions (Rosenthal-von der Pütten et al., 2020).

**Interactions with InCoPs**  Interactions between InCoPs and seemingly autonomous technology have been studied before. Fischer et al. (2015) have qualitatively studied the interactions between InCoPs and a robotic trash can in a Wizard of Oz (WoZ)-setup. WoZ refers to a setup in which a person (usually the

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experimenter or a confederate) remotely operates a robot, while giving off the illusion that the robot is functioning autonomously (Riek, 2012). The operator of the vehicle is within this context referred to as the "wizard". The main findings in the study were that people were curious but shy, often looking at the trash can from a distance, but not directly interacting with it most of the time. When people did not want the trash can's service, they ignored it and waited for it to go away. Rothenbücher et al. (2016) did a qualitative experiment on how pedestrians passing the street in front of a seemingly autonomous car behave, recording their reactions on video. In this study, the experimenter is wearing a seat cover costume, to create the illusion that no driver is present in the car. While it drew attention to observant individuals, most of the passers-by did not react any differently than they would have reacted to a regular car. Passers-by who did fall for the illusion seemed excited to see the car, with some people taking photos or videos of the vehicle.

The aforementioned analyses and pilot studies are based on observations made by a camera or were directly observed by a researcher. Their analyses are based purely on the visible behavior expressed by the InCoPs involved.

**Theoretical research on delivery vehicles** There also exists a small body of research on the topic of sidewalk delivery vehicles.

De Groot (2019) has developed a Robot Delivery Acceptance Model. In his study, it is hypothesised that the existence of autonomous sidewalk delivery vehicles is accepted the most when the behavior of these vehicles resembles the behavior of pedestrians.

Abrams et al. (2021) have studied the acceptance of the presence of autonomous delivery vehicles on the sidewalk, which they call Existence Acceptance (EA). EA is described as *the approval of a delivery robot's presence in an InCoP's surrounding* (Abrams et al., 2021). Their online study was the first one directly measuring EA using the single question "Would you accept autonomous delivery vehicles in your city?". Furthermore, respondents were asked to rate several social-emotional, societal-functional and expected-interactional elements of this technology. Several of these perspectives correlated with EA. One of these correlations was between the perceived (emotional, cognitive, physical) threat experienced by InCoPs and their reported level of existence acceptance.

These theoretical studies asked the participants to imagine passing a delivery vehicle on the sidewalk, based on digitally generated images. Thus, the answers given about the feelings when passing such a vehicle are only hypothetical, and these reactions can not be directly extrapolated to situations where a physical delivery vehicle is encountered on the street.

**Field research** Abrams et al. (2020) have executed a pilot for an exploratory field observation to gather more information about human behaviour in spontaneous encounters with delivery vehicles. In their pilot, they used a mock-up of a sidewalk delivery vehicle. The objective was to test the viability of such a setup for observing human behavior in spontaneous encounters.

The current study builds on this pilot, using a similar setup, this time to collect data by conducting semi-structured interviews instead of making observations. This is the first study to collect first-hand reports of InCoPs after they physically encounter a sidewalk delivery vehicle. The main area of focus is on:

- the observed interactions between the InCoPs and the vehicle;

- the first reactions of InCoPs and their emotions experienced while encountering the vehicle;

- reported experiences of physical, emotional and cognitive threat (explicitly asked);

- the acceptance of the existence of autonomous delivery vehicles in the city (explicitly asked).

The questions on threat and existence acceptance are derived from the research by Abrams et al. (2021).

The reason for conducting semi-structured interviews is to be able to go in depth and respond to reactions of participants to get a deeper understanding about their feelings on the subject, which is very hard to do using quantitative methods.

**Structure** The remainder of this thesis is structured as follows: In section II (Methods), the location of the experiment, sampling and interview techniques, and

the method of analysis will be explained. In section III (Results), the themes resulting from the analysis will be presented, supported by quotes given by In-CoPs. Finally, the shortcomings, main take-aways of this research and proposals for future research will be laid out in section IV (Discussion).

## II. Methods

## Experimental Setup

**Vehicle**  A small vehicle (roughly 70 cm x 90 cm wide; 65 cm high) with a maximum driving speed of 5 km/h was used. See Figure 1. The vehicle has autonomous capabilities, but in this research a WoZ-setup was used for both technical and ethical reasons.

The delivery vehicle used was engineered by Utrecht-based company *More Work, Less Carbon* (MWLC).[1] The crate on top was added to help create the illusion that the vehicle was in the act of delivering parcels.



**Figure 1:** *The vehicle used in this study.*

**Location**  The experiment was carried out on a pedestrian zone in the city of Utrecht. The area consists of two parallel straight footpaths, divided by a planted median strip. This pedestrian area is separated from other traffic, which was a safety requirement. It also has a clear walking direction, which enabled the interviewer to approach the pedestrians and ask if they were interested in participating in the study. The location was suitable for the researcher to keep enough distance from participants, for reasons related to the COVID-19 pandemic. There was also a spot where the wizard could be located to have a good overview of the situation while not being too conspicuously located. The wizard was seated on a chair against a neighboring building and could see both ends of the route from his position (see Figure 2). Live-footage from the two cameras mounted on the vehicle was streamed to the laptop of the wizard. This was also a way for the wizard to pretend to be busy studying instead of being part of the setup.

A colleague of the researcher was present during all research days, sitting on a bench at the location from which the picture of Figure 2 was taken, also indicated in Figure 3. She was observing In-CoPs' reactions as they were walking past the vehicle (Van Mierlo, 2021).

**Wizard of Oz-setup and protocol**  The wizard was instructed to bear safety in mind as the highest priority; when any person or animal came close (within the range of about one meter), the vehicle was to be brought to a complete standstill. When this was not (anymore) the case, the vehicle was steered along a decided path (see Figure 3)[2]. In the straight parts of the path, the vehicle kept to the right-hand side. U-turns were made through the median, on pre-defined places where no vegetation was growing. The vehicle's maximum speed was five kilometers per hour.

Interviews were conducted with InCoPs who had passed the vehicle and walked toward the researcher. The study was executed over the course of three distinct research days. These were preceded by a pilot day, in which no interview data was gathered.

## Data Collection

**Number of participants**  The goal for this study was to explore 61 interactions. This number of interactions is equal to the highest number of interactions used in comparison research:

- Fischer et al. (2015) observed 26 people's reactions to a robotic trash can;

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[1]Apart from providing the vehicle, the company has not been directly involved in this research nor influenced the results in any way.
[2]On the second research day, the direction of the vehicle was reversed to see if this would result in different reactions.

**Figure 2:** *Picture taken from the viewpoint of the observer. 1: The experimenter, 2: The wizard. The blue line indicates one half of the route of the vehicle.*

- Sabelli et al. (2011) studied 55 participants over a longer time in their ethnographic field study of robots in an elderly home;

- Mirnig et al. (2017) studied 45 participants in monitoring people's reaction to an erroneous social robot. They also engaged in recording interactions and taking an interview afterwards;

- Newhart et al. (2016) took semi-structured interviews with 61 participants in their exploratory research on the topic of telepresence robots in the classroom.

For pragmatic reasons, the decided minimum amount of interactions for the current study is 47, the average of the comparison studies mentioned above.

**Sampling method** In recruiting participants, an attempt was made to acquire a balanced sample of different ages and genders. This way, questions on emergent topics could be explored as broadly as possible. There was explicit focus on being open to multiple interpretations (e.g. contradictory views of the same situation from different participants), yielding multiple narratives (Klein and Myers, 1999; Blandford, 2013). This awareness was explicitly pursued to prevent being locked on a single narrative too early on in the research.

**Interview method**

Data was gathered from semi-structured interviews with pedestrians after they had encountered a seemingly autonomous sidewalk delivery vehicle. A voice-recorder was used to save the interview data.

Informed consent was obtained before asking the participants any questions, in which was stated that a participant could quit the interview whenever they wanted, and that in that case their voice recording would be instantly deleted. Participants also received a flyer afterwards containing the contact details of the researcher, in case a participant would change his/her mind afterwards.

When conducting an interview with more than one individual, both persons were addressed at the same time, prompted to add input as it came to mind. This way, the different people involved were able to complement, or contradict, each other's answers or opinions. This prevented taking too much time interviewing both persons separately. On top of this, some occurrences of conversations between
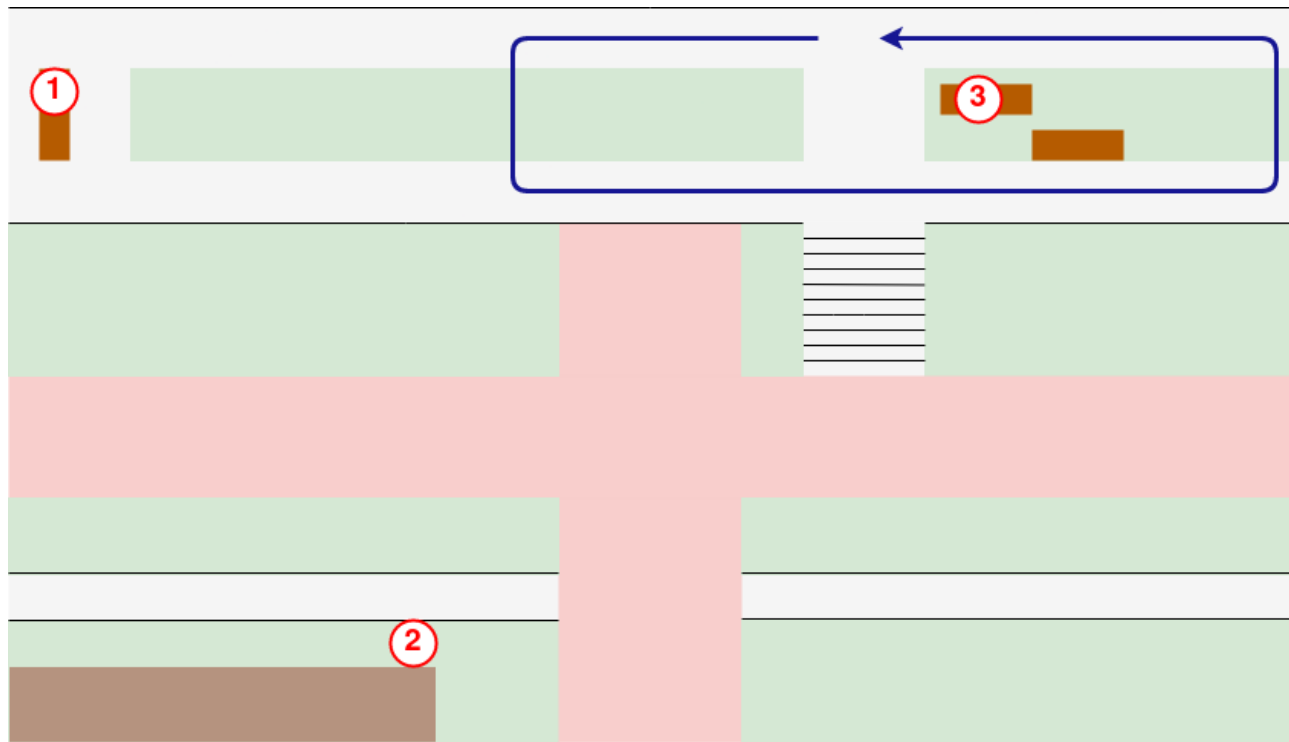
**Figure 3:** *Top-down view of the experimental setup. The grass is indicated in green, cycle paths in red, benches and building in brown, footpaths in gray. The blue continuous arrow indicates the route of the vehicle. 1. interviewer; 2. wizard; 3. observer.*

participants have resulted in new and interesting observations.

If applicable, the interviews picked up on the observed interactions between the InCoPs and the vehicle, addressing remarks overheard by the interviewer. Further questions were asked to obtain more understanding of these topics, as well as on other topics that arose spontaneously. The introductory questions most of the time were naturally answered, or otherwise explicitly asked. The interviews ended with structured verbatim questions on perceived threat and existence acceptance (see Appendix A).

To be able to focus the available time on interviewing as many InCoPs as possible, not all lines of questioning in the Topic Guide were pursued in all interviews. The focus was laid on the types of questions and emergent topics that would result in new insights, which could not be obtained in an online study like that of Abrams et al. (2021). These were questions on the thoughts and feelings of InCoPs while seeing and interacting with the vehicle.

As is typical for exploratory research like this, it is impossible to plan all the details of the study ahead of time and get them all right: the details have to evolve as understanding of the context and subject matter matures (Blandford, 2013). Following each half hour long session of interviews, a consideration was made as to whether new information had been obtained containing an interesting lead for a new line of questioning to be added, or whether any other adjustment should be made to the topic guide. One such adjustment could be due to having reached theoretical saturation on a topic. At this point, asking the same question to different people brings up no new information, and the researcher might cease asking questions on the topic (Rowlands et al., 2016). After each research day, the audio data was transcribed and the same consideration was made, this time regarding the entirety of interviews taken that day. Because of both reaching theoretical saturation on a topic, as well as adding new lines of questions, the topic guide has been adjusted appropriately during the research.

**Perceived Threat and Existence Acceptance**

An explicit line of questioning that was decided on beforehand was on perceived threat, and what influence it has on the acceptance of the existence of autonomous delivery vehicles on the sidewalk. The inspiration comes from Abrams et al. (2021), who found a correlation between the level of threat a participant perceived, and their level of existence acceptance. By questioning participants, reasons and motivations behind their answers on these topics can be explored. This is what the current study aims to do. The verbatim questions on threat and existence acceptance can be found in appendix A.

## Data Analysis

Verbatim transcriptions of the interviews were used for the analysis. All participants were given a number, anonymising their identity. After transcription, the audio files were deleted.

**Grouping and theme identification**

The data was analysed and divided into themes using grounded theory (Charmaz, 2006). This is a bottom-up method for letting theories emerge from the data, instead of from literature.

Some feel for the data had arisen during the transcription-process. In the first read-through after that, the most striking themes were written down. If a theme was detected in one transcription, the others were carefully re-read while focusing on that theme to ensure that no utterances on that theme were missed.

The most striking themes and quotes were written down separately from each other so that no fixed pattern was decided on too early in the analysis. Many different themes and groupings were considered before the final decision for the best grouping was made.

## III. RESULTS

28 interviews were taken, consisting of 46 people in total. 10 of the interviews were conducted with single passers-by, of which three were walking a dog. The other 18 interviews were conducted with pairs of two people. The age range was estimated to vary from 22 to 80 years old. 22 participants were male, 24 were female.

During the interviews, theoretical saturation on the subject of physical threat was reached at the end of the second research day, after 18 interviews. At this point in the research, the topic was not further examined, for all participants up to that point had been consistent in their answers. A new topic that arose spontaneously on the third research day, was that of the size and salience of the vehicle. During subsequent interviews, this topic of conversation has been attended and questioned explicitly.

## Themes

### 1 Appearance

**Resemblance**  One person noticed a similarity between the vehicle used and a Mars Rover, that is used for doing research on the planet Mars.

In six independent interviews, the subject of bombings and/or terrorism was mentioned in the context of the vehicle. In all cases, these participants said to be joking or to not really fear a bombing, but at the same time acknowledging that this technology could be used for bad as well as for good.

**Conspicuity**  Another subject that came up was that of conspicuity. In six interviews, participants remarked on the size of the vehicle, and/or the amount of noise it produced. Comments were made about the vehicle being so small that some people would not be able to see it, and might trip over it. Especially in situations where a vehicle will have to cross a street in the future, these people felt that the vehicle might easily be overlooked by car drivers or cyclists who are moving at higher speeds and don't expect a small delivery vehicle to cross.

### 2 Vandalism

**Theft**  Because of the lidless crate that was part of the vehicle, a lot of comments were made on the ease at which one would be able to steal it's contents. After explaining that the current form factor was a prototype, a lot of these worries disappeared. However, two participants noticed that because of the vehicle's small size, it would be quite easy for

people to pick up the entire vehicle, and to bring it inside their home.

**Destructiveness**   Three participants expressed the concern that people could try to destruct the vehicle for their own entertainment, or to see if there's anything of value in terms of electrical parts.

## 3   Societal remarks

A lot of societal remarks have arisen. In two separate interviews, an overall powerlessness towards technological change was mentioned. These participants stated that their opinion on delivery vehicles or technology as a whole would not make a difference, for technological progress has its own agenda, sometimes it being progress for progress's sake.

One related remark was that technological progress only makes people lazy, and that in the long run it won't be of any good to anybody.

**Privacy**   Because of the cameras that were clearly visible on the vehicle (see Figure 1), some privacy-concerns were expressed.

**Emissions**   Some remarks were made on $CO_2$-emissions. Most of them were positive, comparing the electrically powered delivery vehicle to the elimination of delivery vans that have higher emissions. There was one person however, who thought sidewalk delivery vehicles would have negative effects on the environment by slowing down the business of bicycle delivery.

**Employment**   In four interviews, the fear of the disappearance of parcel deliverers was mentioned, which was thought to have a bad impact on society.

Two participants, on the contrary, believed the technology would be welcomed by parcel deliverers, for they currently have to work too long days.

**Recreation and relaxation**   In four different interviews, concerns were voiced about the experience of walking down a footpath. People probably don't walk there because it is the most efficient route, but because they want to take a relaxing stroll. The participants were concerned that their level of relaxation

would deteriorate when they had to pay attention to delivery vehicles. In the busy city center, they said, it had already gone too far. Too much obstacles exist on the sidewalk already, and adding delivery vehicles would only make that situation worse.

## 4   Miscellaneous

**The state of technology**   In 13 of the 28 interviews, participants stated to have been actively looking for a person that was controlling the vehicle. In some cases, when explicitly asked, these InCoPs stated that to their knowledge, technology is not yet advanced enough for autonomous vehicles to be working properly.

**Walking the dog**   Three of the participants were walking their dog. When asking them about their reaction and the reaction of their dog to the vehicle, they all responded the same: When a dog sees something new, s/he will be very curious, but over time, that will fade away and it will be nothing special to either the dog nor the owner. Quote: "My dog gave the same reaction when he saw a person in a wheelchair for the first time. A few times later, he barely noticed anymore."

**Too many vehicles**   In multiple separate interviews, participants said they would accept the vehicle, as long as there would not be too many of them. When prompting these participants how many vehicles would be "too many", they weren't able to state a number.

**Driving direction**   On the second research day, the driving direction of the vehicle was reversed so that instead of driving on the right one of the two tracks, the vehicle drove on the left track. Two participants reacted to this fact, noting that it would be better for the vehicle to use the right-hand lane, just like the other pedestrians. In the "normal" situation, no comments were made on the driving direction.

## 5   Threat

The subject of threat was measured using three axes: emotional threat, cognitive threat, and physical threat (for the verbatim questions, see Appendix A).

**Physical threat**   The question whether participants were afraid of getting run into by the delivery vehicle saturated very quickly. Nobody was. Whether participants thought that the chance of getting hit by the delivery vehicle was present or not, the universal response was always something along the lines of "If it would hit me, it would not be a big deal because the vehicle is quite small and drives slowly. If the vehicle would come to hit me, it would not hurt me."

**Emotional threat**   To the question whether people were getting nervous while standing in front or walking past the delivery vehicle, not a single confirmatory answer was given.

To the question if something bad could happen if road traffic became too dependent on autonomous delivery vehicles, varying answers were given directly, as well as picked up indirectly. These answers, much of the time, were answers with societal content and did not have to do with feelings of direct threat (see Subsection 3).

**Cognitive threat**   On the question whether people found it hard to decide how to behave when encountering the vehicle, the answers varied. In two interviews, approaching and walking past the vehicle was described as feeling similar to walking past another person. This is in line with the findings of De Groot (2019).

In four other cases, participants reported being cautious, due to the lack of information on how the vehicle would be behaving. These participants all felt that when they would know how the vehicle behaves and would understand its goal, this cautiousness would disappear over time. However, if the vehicle would behave unexpectedly, people would feel threatened: "[...] if [the vehicle] would be driving more to the left side, or would come straight toward me, I would be inclined to give it a kick."

To the question "Were you afraid to make mistakes in handling the autonomous delivery vehicle?", people primarily gave reactions such as "No, you just walk past it" or "I think it is more likely that [the vehicle] makes a mistake than me."

A subject that arose from the questions on cognitive threat, is whether the vehicle has priority over pedestrians, or vice versa. Both the statements "[...] [the vehicle] has to behave well. It has to wait. [The vehicle] is the last one that is permitted to cross the road I think." and "It will be dangerous for children, who do not always pay attention" have been made, the last one suggesting that people should be the ones paying attention to the vehicle while it is driving along its path, instead of the other way around.

## 6  Existence Acceptance

To the question on Existence Acceptance (Appendix A), only two participants stated they would not accept delivery vehicles in the city. Among the people with an accepting position however, not everyone was equally enthusiastic. One person stated: "The moment an independent party has researched it and has given it's approval, I will accept [autonomous delivery vehicles]. No sooner, no later."

## IV.   Discussion

It is interesting to note that what people say is not always the same as what they do (Bertrand and Mullainathan, 2001). For example, though comments were made on the vehicle being too inconspicuous, this was not at all apparent from the behavior of the InCoPs, with the vehicle attracting a lot of attention.

## Shortcomings

**Number of participants**   The desired goal for this research was to explore 61 participants' interactions with the vehicle. Due to time and other pragmatic issues, only 46 interactions were explored from 28 interviews. This is equal to the minimum amount of interactions that was aimed for. Despite this, the information-density proved to be high, and a lot of different topics have emerged.

**Hiding the wizard**   Despite the attempt to make the wizard blend in with the environment as much as possible, in seven interviews, participants indicated to have seen the wizard. This might have skewed the results, for people's reactions and opinions could differ when the illusion of autonomy is broken.

**Realism of the vehicle** In this study, a real autonomous vehicle was used (although not driving autonomously). However, for lack of the time to build a proper realistically looking exterior, a lidless plastic container was used to convey the message of the vehicle delivering parcels. This decreased the realism of the situation, and cost a lot of time explaining that the exterior was just a prototype. It is probable that opinions could have differed had the vehicle looked more finished, especially for the reactions on appearance and theft (Theme 1 and 2).

**Location** The location of the experiment was chosen with safety as the first priority. Though part of it, this location is not representative of the places where the vehicle would be driving in practice. People could have different opinions on the vehicle driving on a busy sidewalk during rush hour instead of a quiet footpath during lunchtime. Besides this, the action of a delivery vehicle crossing the street is also relevant to this area of research. Because of ethical and safety reasons, this was not considered in this study, though it should be explored in future research.

## Future Research

This qualitative research provides some deeper understanding of the numbers obtained in preceding quantitative research on this topic. This is a crucial step to deepen understanding of the results from quantitative research. As an example, the correlation between perceived threat and existence acceptance found by Abrams et al. (2021) has underlying causes that are not directly evident. Although because of it's qualitative nature this study can confirm nor reject the existence of this correlation, it does give some insight into the reasons people give for feeling threat, or accepting the technology. More qualitative studies are needed to find the explanations behind other correlations found in quantitative research, especially in applied areas like interactions with sidewalk delivery vehicles.

It would be interesting to know the effect of habituation on existence acceptance, and whether the acceptance would increase when people have a better understanding of the general benefits of the new technology, as was also mentioned in Abrams et al.

(2021).

**Practical tips** Practical tips to ensure a smooth set-up of such research are similar to the one given by Abrams et al. (2020): Make sure to have the vehicle looking as realistic as possible, and find a good spot for hiding the wizard. Although a good attempt was made in the current study, a lot of people still spotted the wizard. This could be due to the fact that people didn't expect the vehicle to be driving autonomously, as was stated in the results (Subsection 4). Replicating the setup but having a vehicle drive autonomously would remove the need for a wizard, and would solve this problem, maybe even bringing forward more naturalistic results.

**Priority and intention** In this study, varying opinions emerged on whether the vehicle should be the one to give priority to pedestrians or vice versa. This difference in opinions has also been reported by De Groot (2019), who had participants report that the vehicle should be subordinate, while also stating that pedestrians should step aside if a vehicle approaches. In the current study, these findings were collected by way of spontaneous remarks. Because of the low amount of data in both these studies, more research is needed to paint a clear picture on this topic. This information could be helpful in designing a natural way for sidewalk delivery vehicles to be interacting with pedestrians on sidewalks.

Future research could try making the vehicle's intentions more explicit, for instance by slowing down and waiting at the outer edge of the footpath for InCoPs to pass by, maybe signaling their priority by turning the wheels so that it could not move forward. InCoPs' reactions to this behavior could be compared to the behavior that was used in this research, to see if people perceive the interaction as more pleasant.

**Validity of Existence Acceptance** Answers to the single question on existence acceptance in this research have been varied, with participants addressing different angles supporting their opinions. Answers like the one shown in the results (Subsection 6), show that not all participants were able to answer in a binary way. This raises concerns to the validity of this question for directly measuring existence accep-

tance. The concept of existence acceptance might, as Abrams et al. (2020) state, indeed be more complex.

## Conclusion

Overall, reactions from InCoPs on encountering the vehicle are neutral to positive. The amount of perceived threat was low, and existence acceptance was high. Novel topics have been raised, such as the question of who has priority, and the lack of signaling of intentions.

Research validating the direct assessment of existence acceptance is neccessary. More qualitative research is needed for exploring people's opinions on other topics related to sidewalk delivery vehicles that has up to now only been researched quantitatively.

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## A.    Topic Guide

## Non-verbatim

**Introductory**

- [Questions regarding observed interaction with the vehicle]

- Have you just noticed anything special? (when no clear interaction has taken place)

- Have you passed this vehicle before?

- What did you think when passing the vehicle?

- What do you think is the goal of the vehicle that just passed?

**Appearance (on 3rd research day)**

- What do you think of the size of the vehicle?

- What do you think of the salience of the vehicle?

## Verbatim

**Perceived Threat**

- Physical Threat (Heerink et al., 2010)

  – Were you afraid of being hit by the autonomous delivery vehicle? Why (not)?

- Emotional Threat (Syrdal et al., 2009)

  – Do you get nervous standing in front of this autonomous delivery vehicle? Why (not)?

  – Do you have a feeling that something bad could happen if road traffic became too dependent on autonomous delivery vehicles? Why (not)?

- Cognitive Threat

  – Did you find it hard to decide how to behave when encountering the delivery vehicle? Why (not)? (Heerink et al., 2010)

  – Were you afraid to make mistakes in handling the autonomous delivery vehicle? If yes, what kind of mistakes? If no, why not? (Venkatesh and Davis, 2000)

**Existence Acceptance**

- Would you accept autonomous delivery vehicles in your city?
  (Abrams et al., 2021)