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# ***Social Interaction***

## ***Video-Based Studies of Human Sociality***

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### **Stopping Aside: Pedestrians' Practice for Giving Way to a Self-Driving Shuttle**

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#### **Abstract**

Contributing to interactionist studies of walking and to research on human-machine interaction, this article draws on video recordings of a self-driving shuttle being tested as a means of public transportation. The analytical focus is on yielding as achieved through the practice of pedestrians' stepping aside, stopping, and letting the shuttle pass. The paper examines and describes how solitary pedestrians "stop aside" as well as how mobile formations of multiple persons take part in the practice. Finally, it discusses stopping aside as a social action that is often followed by displays of gratitude and reflects on this facet with regard to automated vehicles. In the context of this special issue, the central claim advanced is that agency reflexively emerges from the organized and sequential character of the situation and is grounded in assemblages of human and technological aspects, rather than originating in clearly distinguishable singular actors or agents.

*Keywords:* autonomous mobility, ethnomethodology and conversation analysis, gratitude, pedestrians, traffic, walking

## 1. Introduction

The past decade has seen a growing body of video-based research on naturally occurring mobile interactions (e.g., Haddington, Mondada, & Nevile, 2013; Smith, 2021), including the achieved orderliness of road traffic (e.g., Deppermann, Laurier & Mondada, 2018; Laurier et al., 2020). Concurrently, numerous studies have examined interactions between humans and devices that function with artificial intelligence (AI), such as social robots, conversational user interfaces or autonomous vehicles (see Mlynář et al., 2021). Contributing to these two bodies of research, this article draws on a corpus of video recordings of a self-driving vehicle called Smart Shuttle (see Figure 1) being tested as a means of public transportation in Sion, a town in southwestern Switzerland. Specifically, we focus on the action of *giving way* or *yielding* as it is achieved through the practice of pedestrians' *stopping aside*—halting their walk, stepping aside and letting the shuttle pass.<sup>1</sup> This practice, comprising the phenomenon of study for this paper, is clearly not exclusively specific to pedestrians' interactions with (semi-)autonomous vehicles: stopping aside and giving way can be observed in shared spaces accommodating walkers with cars, motorcycles, wheelbarrows, bicycles, and other kinds of vehicles. The relevance of this article for research in autonomous mobility is thus twofold: first, it demonstrates that in encounters with vehicles, pedestrians routinely produce the embodied work that is glossed here as stopping aside; second, and relatedly, by unpacking the embodied work done to make the practice recognizable to competent members of traffic, the descriptions provided as part of the analysis can be taken as grounds for technologically implementing this aspect in the competences of autonomous shuttles.

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<sup>1</sup> On the relationship between practices and actions, and practices conceived as constitutive of social actions, see Schegloff (1997).

**Figure 1.** *Smart Shuttle in Sion, Switzerland, in 2017.* Source: [https://geschaeftsbericht.post.ch/17/ar/en/08\\_02-smartshuttle-2/](https://geschaeftsbericht.post.ch/17/ar/en/08_02-smartshuttle-2/)



In the “Smart Shuttle” video corpus, the practice of stopping aside was observed mostly in spatially confined locations describable as *narrowings* (see section 3.1). Since stopping aside consists of making space for another member of the traffic system, it is also a transient, locally specific instance of the interactional production of space (as scrutinized by Mondada, 2009, among others). The practice of stopping aside, examined in its setting, develops as a coordinated organization of (human and non-human) participants’ conduct in time and space, a “local action package” (Goodwin, 2018, p. 438): while the autonomous shuttle is moving and a pedestrian stops aside to give way to it, the yielding is routinely appreciated by the human operator, on board for safety reasons, who thanks the pedestrian. Similar to Dant’s (2004) suggestion to study the assemblaged entity of “the *driver-car* as a form of social being that produces a range of social actions that are associated with the car” (p. 61; original emphasis), the shuttle’s situated agency is thus deeply intertwined with and co-constituted by the reciprocal agency of the traveling people. The agencies emerge within, and reflexively contribute to, the structure of the situation, including the spatial positions of the physical bodies (biological and technological), their velocity and projected trajectories, as well as expectations invoked by relevant categorial memberships (Jayyusi, 1984). As noted by Lynch, the “organized assemblages of actions, engineered spaces, equipment, techniques, and ‘rules of the road’ can provide distinctive matrices for the production and recognition of intentions, rights, obligations, courtesies, conventions, violations, and identities” (1993, p. 132).

Interactions between automated vehicles (AVs) and pedestrians have been subject to recent research in computer science, human-computer interaction, human-robot interaction and cognate disciplines, especially with regard to trust and safety issues, focusing on the implications and impact of this technology on pedestrians (Meeder, Bosina & Weidmann 2017; Reig et al., 2018). Attention is

also dedicated to the ways AVs can interact and communicate with pedestrians (Rasouli & Tsotsos, 2020), for instance, to display their intents (Matthews, Chowdhary & Kieson, 2017), and how such communications can be designed (Nguyen et al., 2019) and evaluated (Clamann, Aubert & Cummings, 2017; Hudson et al., 2018). These studies conclude that the emergent organization of traffic is dependent on a complex, dynamic system of interactions, which include gaze, bodily orientations, and gestures. Accordingly, the design of competent AVs must provide adequate technical solutions both on the side of action formation—displaying its immediate movement for projectability—and action ascription—seeing what other members of traffic are doing or are about to do (see Levinson, 2012, for the distinction between action formation and action ascription).

The present paper contributes to this broader literature by identifying and explicating pedestrians' practice in real-life interactions with an AV: specifically, the Smart Shuttle street trials (Marres, 2020) in Sion. The analysis specifies in lived circumstantial detail the sequential organization of situated "negotiations" between pedestrians and AVs (Keferbock & Reiner, 2015) as they use "communication methods that include gestures, facial expressions, and built-in vehicular devices" (Stanciu et al., 2018, p. 58), which might be typically glossed as "implicit communication cues" used to "transmit intentions" (Rasouli, Kotseruba & Tsotsos, 2018, p. 729). As an analytical counterpart to the cited studies, and many more, the approach taken in this article—grounded in ethnomethodology and conversation analysis (see Garfinkel, 1967, 2002, 2022; Sacks, 1992a, 1992b; Schegloff, 2007)—strives to eschew the cognitivist vocabulary and notions prevalent in the reviewed literature on AVs and pedestrians. Instead, informed by the literature that combines ethnomethodological insights with Wittgensteinian philosophy (e.g., Coulter, 1979; Watson & Coulter, 2008), we do not consider the human brain, the neuropsychological domain, or the mind as entities of causal-explanatory or theoretical primacy for the study of sociality and action. Organized human conduct in the vicinity of an AV—in our case the Smart Shuttle in Sion—is analyzed here without resorting to invisible cognitive phenomena (such as pedestrians' intents), but by addressing the transparently visible structures and systematic occurrences that are witnessable by attending to the video recordings. Our aim is to adequately describe and explicate, for further recognition and elaboration "in other empirical settings" (Ziewitz, 2017, p. 12), how a course of action takes place, rather than theorizing and explaining it. A central analytical principle was suggested by Harvey Sacks: "I don't take it that my job is to clarify. My job is to show how it is that it's clear." (Garfinkel et al., 1962, hour 5 of 14, 58:30) Accordingly, the central questions of this article are: How is it *clear* to traffic members that a stopped aside pedestrian is giving way to the passing vehicle? Just how is this practice constituted as ordinarily visible and recognizable in the spatial, social, and temporal context of the urban ecology?

After discussing the central methodological principles in the following section, we present an analysis of video materials that involve interactions between pedestrians and the Smart Shuttle. Focusing on “the in-situ intelligibility of the world as it is unfolding, moment by moment” (Goodwin & Salomon, 2019, p. 6), we show how pedestrians coordinate their movements and bodily orientations in mobile formations to do a concerted stopping aside as a pair or a group (a “mobile with”; Jensen, 2010). We further propose that stopping aside is also a practice that allows for “doing watching” (of an exotic technological object), and “doing being safe” (in a narrow street with a vehicle passing by) in a non-marked way, while also allowing for marked transgressions that sketch out the boundaries of stopping aside as a recognizable social practice. In the concluding discussion, we argue that the interactional phenomenon of stopping aside is often accompanied by gestures of gratitude, which problematizes the “autonomous” competence of the vehicle itself and establishes the shuttle with its on-board operator as an assemblaged mobile unit that collaborates as a unitary “agent” to achieve its membership in the ordinary and orderly traffic flow.

## 2. Materials, Methods, and Setting

The materials analyzed in this paper come from a video corpus collected as part of the testing of several autonomous vans called Smart Shuttle<sup>2</sup> in the historical center of Sion, a Swiss town with approximately 35,000 inhabitants that is also the capital of the canton Valais (Wallis). The video recordings took place from 2016 to 2018 as part of a research project conducted at HES-SO Valais-Wallis (Eden et al., 2017; Verma et al., 2019a, 2019b) in collaboration with the public transport operator CarPostal. The autonomous shuttle would cruise through the municipality at a maximum of 20 km/h (around 12.5 mph), following a pre-programmed route, and would stop whenever it encountered an unexpected obstacle. For safety reasons, as legally required, a trained human operator was always on board, overseeing the situation and able to switch from automatic to manual mode in the event of an emergency or to get the vehicle back on track after it encountered an obstacle.<sup>3</sup> The shuttle was able to drive autonomously along the route, but the operator’s participation (supervision and intervention) was required at all times for a smooth and safe incorporation into the traffic system.<sup>4</sup> The fact that the vehicle was “driverless” was otherwise not visibly

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<sup>2</sup> Learn more at <https://www.post.ch/-/media/post/ueber-uns/medienmitteilungen/2016/dokumente/smartshuttle-factsheet.pdf> (accessed on March 20, 2023).

<sup>3</sup> As Eden et al. (2017) document on the basis of the video recordings, in addition to official tasks, the operator would also coordinate the traffic participants “on behalf of the AV” to “negotiate next moves with one another through their windscreens using embodied signals such as gestures, lip-reading, and head nods to coordinate and manage a traffic situation” (pp. 1569, 1573).

<sup>4</sup> We do not provide a characterization according to the “levels of automation,” aligning with Hopkins and Schwanen’s (2021) call for “more nuanced ways of thinking and talking about

indicated, and neither did the shuttle display its upcoming movements or other warnings to fellow traffic members.

The video recordings analyzed below were obtained by two or three fixed cameras located inside the vehicle. One camera was mounted behind the front windshield and oriented to the exterior of the shuttle, recording the road ahead; one camera was mounted behind the rear windshield and oriented to the shuttle's interior. In some recordings, an additional third camera was mounted in the front right corner of the shuttle to record the frontal part of the shuttle interior. The audio track of the recordings therefore consists solely of the sounds hearable inside the vehicle. No handheld cameras or other recording devices were used.

Several years after the recordings were made, the first author of this paper performed a secondary analysis on all the recordings from 2016 and 2017 (eight hours of video materials in total). He did not analyze the recordings from 2018 because the route of the shuttle changed that year: while in 2016 and 2017 the bus followed the same route around the historical center (see Figure 3), the route was extended in 2018 to the bus and train station outside of the historical center. Working with the recordings from 2016 and 2017 secured a circumstantial comparability of the observed instances of the identified phenomenon.

**Figure 2.** *The shuttle's route around the historical center of Sion (2016/2017). In 2018, the route was extended to the bus and train station in the south. Source: Eden et al., 2017*

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automated vehicles that move beyond the notion of transfer of responsibilities from human to machine and thus assume a strict ontological separation between them" (p. 7).



Hannah Pelikan stressed “the importance of studying interaction with autonomous vehicles in real world traffic, throughout entire rides, particularly also aspects of driving that appear utterly mundane” (2021, p. 84), and this article aligns with her suggestion. The first author noticed a mundane phenomenon, glossed as pedestrians’ *stopping aside in order to give way to the vehicle*, during his first watching of the recordings in their chronological order, while looking for “unmotivated observables” (Garfinkel, 2022, pp. 42-43; Sacks, 1984). Stopping aside consists of the pedestrians suspending their walk and stopping with their torso turned to the vehicle, perpendicular to the projectable trajectory of the vehicle, and letting it pass with their head turned in its direction (see Figure 3). Although the bodily features of this practice are akin to waiting to traverse the vehicle’s projectable trajectory (e.g., to cross the street; analyzed by Merlino & Mondada, 2019), in the case of stopping aside, the pedestrian’s trajectory is parallel to the vehicle’s, not perpendicular to it. Most of the instances analyzed below, however, consist of pedestrians encountering the shuttle moving in the opposite direction. This paper therefore contributes to the study of “incidental encounters” between autonomous vehicles and other road users that have already been conducted on the basis of videorecorded materials (Pelikan, Broth & Keevallik, 2022).

It may be relevant that, according to the first author’s notes, he first noticed the practice of stopping aside in one of the few videos made on a late winter afternoon when it was already dark, as one can see in Figure 3. It is possible that the headlights of the shuttle made the phenomenon stand out from the scene in a

novel way compared to recordings made in broad daylight. After this initial noticing, he inspected the whole video corpus again for more renderings of the phenomenon – “just to see whether, having noticed one, others can be noticed” (Sacks, 1992b, p. 292)—building a collection (Schegloff, 1996) containing 35 items, based upon his own analytical recognition as a competent Sion pedestrian in 2016 and 2017. These instances “comprise elaborate reminders of mundane phenomena, not samplings of them nor exhaustive sets of them” (Coulter, 1983, p. 374). He then selected a sub-collection of 18 cases meeting the criterion of an ensuing members’ ratification (see also the next-turn proof procedure in Sacks, Schegloff & Jefferson, 1974) available in: (1) the shuttle operator acknowledging the pedestrian’s action, and/or (2) the pedestrian either visibly suspending their walk before the stopping aside or visibly resuming the walking just after the shuttle passes by them.<sup>5</sup>

**Figure 3.** *The first-noticed instance of the examined practice—a couple stopping aside to give way to the approaching self-driving shuttle. The camera is mounted at the vehicle’s front, facing the direction of travel*



### 3. Analysis

The self-driving shuttle is a newly introduced member in the traffic system. As Haddington and Rauniomaa point out, “road users draw on fairly general means, such as their overall positioning and velocity relative to one another, to offer

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<sup>5</sup> Sometimes, the camera angle in conjunction with the vehicle’s movements obscures the pedestrians’ course of action before or after their stopping aside. Although most of these “uncertain” cases are probably also instances of the practice under investigation, they were not included in the sub-collection.



space in traffic” (2014, p. 180). In the video corpus examined in this article, such “general means” are turned into constitutive features of a locally emerging recognizable structure of the setting’s temporal development. The pedestrians’ embodied practice of stopping aside makes visible the Smart Shuttle’s consequentiality as both a technological artifact and a member of mundane street traffic: “[o]utside of test environments autonomous cars are not things of wonder, but are just another car progressing through the social order of traffic” (Brown & Laurier, 2017, p. 425). During the passing by, the projectable temporality of the shuttle’s movement becomes relevant as the waiting pedestrian closely monitors it, and the operator inside the shuttle may deliver a wave or a smile as an appreciative response to the pedestrian’s yield.

This section presents the outcomes of an analysis of the video materials ordered in two subsections. First, we specify the recurrent production-recognition features of stopping aside in relation to its embodiment in a particular location, that is, we describe how stopping aside is recognizably produced as a practice that achieves the social action of yielding in the given spatial environment. Second, we focus on how units consisting of more than one individual—such as couples and families walking together—take part in coordinated stopping aside and provide detailed analysis of the embodied features of their concerted work. Throughout the analysis, we attend primarily to the timely coordination and intertwining of multiple resources, such as gaze, gestures, bodily posture, and speech. Nevertheless, although the recorded talk of the shuttle travelers is certainly of interest, we do not take it into account in the analyses presented here, unless it observably orients to the visible pedestrians’ actions.

### 3.1 Narrowings: The spatial circumstances of stopping aside

Stopping aside tends to be conducted as giving way in restrained spaces such as those we call narrowings. In the setting under scrutiny here, a narrowing is a place where the architectural or circumstantial spatial configuration produces an area too narrow for the vehicular traffic and pedestrian traffic to run alongside each other. There are two kinds of narrowings, varying in width, that educe slightly different methods for the local organization of the traffic flow. One kind of narrowing is *exclusive*: it is a narrowing so narrow that when the autonomous shuttle is inside, the pedestrian(s) coming in the opposite direction must wait at the narrowing’s entrance until the shuttle passes through, and vice versa.<sup>6</sup>

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<sup>6</sup> A turn-taking system is therefore in operation—one that distributes the access to the literal floor rather than a figurative conversational floor (see also Ivarsson & Greiffenhagen, 2015). As Sacks, Schegloff and Jefferson (1974, p. 696) remark, turn-taking is also used to regulate traffic. Similarly, studying an architectural element that resembles narrowings, Weilenmann, Normark and Laurier (2014) point out that revolving doors function as turn-taking technologies in that they “challenge mobile formations because the formations need to disassemble in order to pass through the doors, and then re-assemble again on the other side” (p. 122). However,

One example of an exclusive narrowing is depicted in Figure 4: often announced by the operators to the passengers as a notable moment in their journey, this street is 2 m 40 cm wide while the vehicle's width is 2 m 11 cm. This leaves approximately 15 cm on each side of the shuttle, a distance that does not allow a person to pass through or even stop aside with their back to the wall. In the moment captured in Figure 4, a pedestrian is approaching the narrowing in the opposite direction of the shuttle. Once she notices that the narrowing is currently occupied, she waits behind the corner on the left. The displayed screenshot shows the pedestrian just at the moment when she abruptly changes the direction of her walk, commencing stopping aside to yield to the shuttle.

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this aspect can merely be noted here; the local systematics of the turn-taking system of urban narrowings cannot be sufficiently elaborated in the present article.

**Figure 4.** *A pedestrian approaches an exclusive narrowing already occupied by the shuttle. In the schematic map, the position of the shuttle is shown as the red rectangle and the position of the pedestrian is shown as the green dot, with arrows indicating the directions of movement. The camera is mounted at the front of the moving vehicle, facing the direction of travel*



Figure 4 shows an exclusive narrowing that is architecturally fixed in and as the constitution of this street. In addition, urban life regularly gives rise to contingent narrowings, such as those produced by parked cars, outdoor restaurant seating, street construction, festival stages and their crowds, market stands and their service lines, or audiences watching street performers (see Carlin, 2014, for an elaboration of the last example). These are more temporary than narrow streets, but as contingencies of the local traffic flows, they seem to be dealt with through the same practices. An instance of such narrowing—produced by outdoor restaurant seating on one side and a Smart Shuttle parked on the other—is presented in Figure 5.

**Figure 5.** A young boy and a man wait behind one parked Smart Shuttle to give way to another shuttle, dealing with a contingent narrowing. On the schematic map, the position of the moving shuttle is shown as the red rectangle, the position of the stationary shuttle is shown in light red, and the position of the pedestrians is shown as the two green dots, with arrows indicating the directions of movement. The camera is mounted at the front of the moving vehicle, facing the direction of travel



Excerpt 1 below shows, in motion, how stopping aside is integrated into the organization of traffic in exclusive narrowings.<sup>7</sup> A Smart Shuttle approaches the narrowest street on its route (see Figure 4 above) with a pedestrian walking in front of the shuttle, down the middle of the street. The velocity of the autonomous shuttle is such that the pedestrian does not even seem to notice that the shuttle is following her, or at least she does not display an orientation to it.

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<sup>7</sup> For all excerpts in this section, the incorporated video clips themselves are the empirical material to which the analytical commentary refers. This takes advantage of the journal's invitation to "embed video extracts as integral part of the papers" (<https://tidsskrift.dk/socialinteraction/about>). Without watching the video clips, readers may find that certain aspects of the analysis are not sufficiently clear.

**Excerpt 1. Stopping aside in an exclusive narrowing**



((video clip only available in the online version of the paper))

We will now consider Excerpt 1 in more detail to lay out some identifying features of the examined phenomenon. Two moments in Excerpt 1 make it possible to outline stopping aside as a practice and account for giving way as a social action. The first moment occurs between 00.08 and 00.13 seconds into the clip. The pedestrian walking ahead of and in the same direction as the shuttle leaves the street at its opposite end, while another pedestrian approaches the entrance to the street at the same time. In Figure 6, we can see how the pedestrian about to enter the narrow street (pedestrian “L”) notices the shuttle and proceeds to stop aside behind the corner (Figure 6-A; see also Figure 4 above). At the same time, the pedestrian leaving the narrow street (pedestrian “R”) notices pedestrian L’s stopping and turning in the direction of the shuttle’s projectable trajectory, which incidentally also means that pedestrian L is turning towards her, as they pass each other by. We can see pedestrian R’s head turned towards pedestrian L, looking at him with scrutiny, her left arm bent (Figure 6-B). She manifests that “[i]n the hustle and bustle of urban life, stillness is peculiar” (Lan Hing Ting et al., 2013, p. 371). In Stanley et al.’s (2020) terms, pedestrian L’s stopping and standing still might be seen by pedestrian R as “something”; 0.6 seconds later, as she looks back over her shoulder, she can—possibly for the first time—see that a Smart Shuttle is just entering the street behind her, and thus recognize pedestrian L’s stopping as an instance of stopping aside for the shuttle to pass through (Figure 6-C). Here, as Sudnow has aptly pointed out, “the essentially unfolding, developmental character of scenes” (1972, p. 261) is skillfully made sense of “at a glance” (Sudnow, 1972, p. 259). Shortly after pedestrian R looks back (see also Stanley et al., 2020, p. 1260) at the shuttle, she turns her head forward and continues walking ahead, her left arm now released from its former position and hanging freely at her side (Figure 6-D). This sequence brings to light

that the practice of stopping aside, once recognized as such, is transparently accessible to members as a reasonable thing to do under the present circumstances.

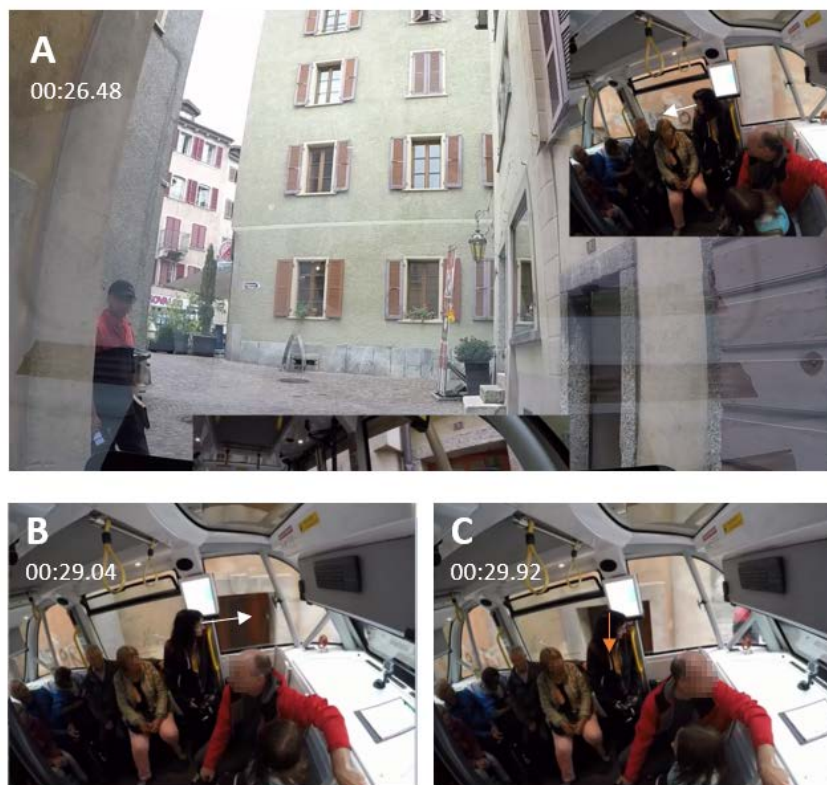
**Figure 6.** Seeing another pedestrian stopping aside, then noticing the Smart Shuttle behind. The camera is mounted at the front of the moving vehicle, facing the direction of travel



The second moment of analytical interest in Excerpt 1 is the shuttle operator's silent acknowledgement of the pedestrian's giving way (25.00–33.00 seconds), which is delivered within the sequentially and spatially established “gratitude opportunity space” (deSouza et al., 2021) during the passing by. While talking to and gazing at passengers on board (Figure 7-A), the shuttle operator seems to also monitor the shuttle's position in the street. Nearing the end of the street, she turns her gaze in the direction of travel and looks through the windshield, simultaneously putting both hands on the control device used to manually control the vehicle (see Figure 7-B), which is currently driving autonomously. This might be an orientation to the entrance to the narrow street as a place that could potentially educe a dangerous situation and require a manual override of the driving—as noted by Brown and Laurier, “autopilot drivers acquire a sensitivity to what features of the road are ‘dangerous’ in relation to the autopilot, even though they would cause minimal challenges to a typical human driver” (2017, p. 419–

420).<sup>8</sup> Meanwhile, pedestrian L has stopped aside behind the corner, as we saw above in Figure 6. He turns his head towards the shuttle when it reaches the corner marking the end of the street, and shortly thereafter the shuttle operator produces a head nod as a token of appreciation (Figure 7-C). Next, once the autonomous shuttle has left the street, the pedestrian walks into the narrowing and the shuttle starts turning left on its route. This sequence reveals that stopping aside constitutes a “thankable”: the head nod in Figure 7-C belongs to the ways gratitude is ordinarily expressed in traffic (see Laurier, 2019).

**Figure 7.** *The shuttle operator monitors the shuttle’s exit from the narrowing and nods at the pedestrian who has stopped aside and been waiting on the corner. In section A, the larger picture comes from the camera mounted at the front of the moving vehicle, facing the direction of travel. The smaller picture in the top right corner of section A, as well as the pictures in sections B and C, come from a camera located inside the shuttle, in its front top corner below the vehicle’s roof*



<sup>8</sup> We thank one of the anonymous reviewers for pointing out this aspect of the operator’s conduct.

The analysis so far has focused on exclusive narrowings and on stopping aside at the entrance to a narrowing. Compared to exclusive narrowings, slightly wider narrowings can be said to be *inclusive*: they can spatially accommodate both the vehicle and the pedestrian at the same time, but the practice of stopping aside seems to be preferred for a safer and more fluid passing by. The constitutive elements of the practice, such as turning the body sidewise and suspending the walk, stabilize the body in space and minimize the pedestrian's width relative to the size of the narrowing. Excerpt 2 below shows a video clip of a pedestrian doing stopping aside in an inclusive narrowing. The pedestrian's presence is acknowledged by the operator with a nod, but given that the shuttle has also stopped, the stopping aside is abandoned, and the pedestrian continues to walk past the shuttle.

**Excerpt 2.** *Stopping aside in an inclusive narrowing*



((video clip only available in the online version of the paper))

It can be noted that the stopping of the shuttle, which is the preprogrammed response of the AV in its automatic mode to unexpected obstacles on the route, seems to be routinely treated by the pedestrians as if the shuttle was giving way to them. This is in line with previous observations of conventional vehicles giving way to pedestrians, followed by gestures of gratitude (McIlvenny, 2019). Here, Excerpt 2 is included as an exemplary instance of a solitary pedestrian conducting the practice of stopping aside. The pedestrian, who is approaching the shuttle in the opposite direction, suspends his walk, turns his back to the wall to face the projected trajectory of the shuttle while gazing in the direction of the shuttle, and starts “doing waiting” (Ayass, 2020). However, the pedestrian remains in the characteristically identifying position of stopping aside for only one



second. As soon as he assumes the bodily posture and position recognizably displaying that he is giving way to the shuttle, the shuttle stops. Although not visible in the recording, it is possible that mutual gaze was then established between the operator and the pedestrian through the windshield. What we can see in Excerpt 2 is that the operator nods, and the pedestrian then immediately resumes his walk to pass by the side of the shuttle. Potentially, it is a token of gratitude, like in Excerpt 1, but it might also be an embodied go-ahead response. The agency of the shuttle and its inhabitant cannot be distinguished from each other, and the conduct of the machine and the operator only makes sense when mutually intertwined. As a situated whole, they produce slots for alternate expectable next actions of the walking person—either stopping aside or being given right of way.

To sum up, this section has outlined the characteristic features of stopping aside by focusing on cases when the practice is conducted by a solitary pedestrian. In addition to describing the embodied features of this practice, we have also provided initial insights on its observability and recognizability by other members of traffic (a passing-by pedestrian and the shuttle operator). Nevertheless, so far we have been focusing on stopping aside as a practice employed by a single person. Next, we provide an analysis of how walking units of multiple pedestrians—pairs and larger groups—coordinate their movement to stop aside together.

### 3.2 Coordinating movement: Stopping aside together

Instances of stopping aside may involve pedestrians “identifiable as a proper togetherness” (Ryave & Schenkein, 1974, p. 270). First, we turn the analytical focus to a couple stopping aside with their backs to the wall in an inclusive narrowing; thereafter, we consider a similar case where a man and a boy stop aside behind a parked vehicle to give way to the passing Smart Shuttle in an exclusive narrowing. As a third excerpt in this subsection, we examine a moment when a family gives way to the shuttle by stopping aside in an inclusive narrowing. Altogether, the section aims to document how stopping aside is a practice conducted not only by solitary pedestrians, but is also systematically and routinely done in collectivities through precise coordination of bodily movements and visibly achieved postures.

Excerpt 3 shows the Smart Shuttle driving down a street (an inclusive narrowing), where it encounters two pedestrians seeable on the video recording as “members of a pair, as constituents of a unitary group” (Gurwitsch, 2010, p. 103). They are seeable as a mobile unit through their continuous walking achievement, as is also the case when their course of action changes from walking down the street as a couple to stopping aside as a couple, as captured in the excerpt.

**Excerpt 3. Stopping aside as a couple in an inclusive narrowing**



((video clip only available in the online version of the paper))

Excerpt 3 starts with the Smart Shuttle turning left and entering the street, making the narrowing gradually visible from the inside of the vehicle. Conversely, the shuttle is only visible to potential street occupants relatively late, as it enters the street from behind a corner. Between 5.00 and 10.00 seconds, the pedestrians can be seen walking in the opposite direction to the shuttle, displaying no response to the approaching shuttle. Then, at the 10-second mark, pedestrian R slows down and turns slightly to his right-hand side, towards the other member of the couple. Due to his position, pedestrian R can see the shuttle appearing behind the corner earlier than pedestrian L, and he is able to commence the early onset of stopping aside first. His slowing down might also alert pedestrian L to the shuttle ahead. It is likely that talk between the pedestrians may play a role in the coordination, but their visible actions alone are routinely recognizable, even without the talk.

Between 11.00 and 14.00 seconds, the two pedestrians effect a smooth transformation in their mobile formation, changing from walking side by side to stopping aside, side by side. As noted above, this transition is initiated by pedestrian R, who slows down and turns to his right (see Figure 8-A for the precise moment of his stopping). Pedestrian L does not seem to slow down but diverts the trajectory of her walk to the left side of the street. Simultaneously, pedestrian R has lined up behind her, producing a small temporary “flow-file” (Watson, 2005, p. 206; see Figure 8-B). In Schmitt’s (2012) terms, they shift from “walking together” to “walking behind someone,” albeit only for a second. Shortly thereafter, though, pedestrian L stops aside with her back to the wall and looks at pedestrian R behind her, who also stops. Furthermore, her backward glance

can also be seen as her checking for possible traffic behind them. As the shuttle approaches them and the moment of passing by draws near (15.00–19.00 seconds), the relative dimensions of the shuttle in the narrowing perhaps become more synoptic, and the couple’s interactive achievement of the spatial configuration of stopping aside is topped by backward adjusting steps towards the wall, first by pedestrian L (see Figure 8-C) and then by pedestrian R. In Figure 8-D, we can see the two pedestrians already standing still, giving way by stopping aside next to each other as the shuttle passes by. The position of the pedestrians’ bodies and their visible monitoring of the shuttle’s movement displays the temporariness of the stop and a readiness to continue the walking as soon as the vehicle passes. Stopping aside is also conducted in a way that seems to treat the shuttle as a “spectacle”: this may display orientation to the unusual appearance or perhaps even its publicly available “autonomousness.” In other cases, for instance, in Excerpt 1, stopping aside is accompanied by a display of inattention to the passing vehicle, such as looking down at a mobile phone (Excerpt 1).<sup>9</sup>

**Figure 8.** *Pedestrians coordinate stopping aside as a couple. The camera is mounted at the front of the moving vehicle, facing the direction of travel*



<sup>9</sup> We are grateful to one of the anonymous reviewers for highlighting this performative variety.

So far, the analysis of Excerpt 3 has only considered the pedestrians' conduct. What is the shuttle operator doing while the two pedestrians carry out this intricate yet inconspicuous maneuver of transforming the walking-together configuration to the stopping-aside configuration? She is standing to the left side of the shuttle, and though she is looking in the direction of travel, she can probably first see the pedestrians at around 14.50 seconds, when the stopping-aside position is already almost fully achieved. It seems that once the operator notices the pedestrians, she repositions her right hand and rests it on her left elbow (see Figure 9-A). This movement can be seen as an incipient but abandoned grasping of the control device; nevertheless, the shuttle continues driving autonomously. The right hand resting on the left elbow is also better prepared for the operator's next action occurring a few seconds later. At 21.00 seconds, as the vehicle is passing by the yielding pedestrians, the shuttle operator holds up her right hand with the palm open in a thanking gesture for about one second (see Figure 9-B) and possibly also establishes mutual gaze with them.

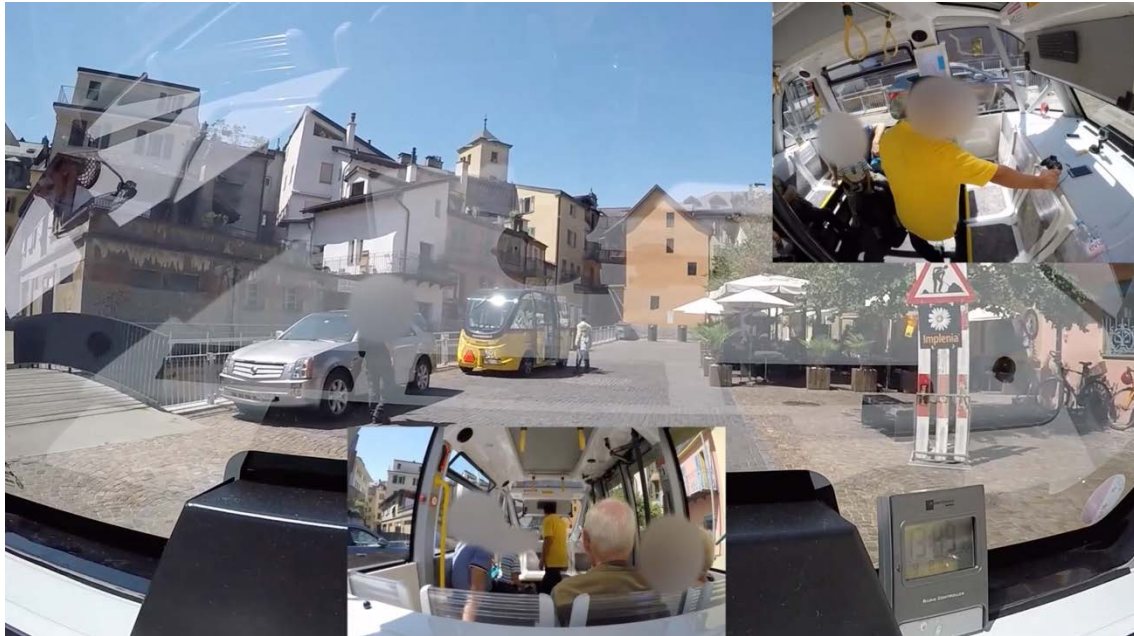
**Figure 9.** *The operator repositions her right hand and uses it six seconds later to thank the yielding pedestrians. The camera is located inside the shuttle, in its front top corner below the vehicle's roof*



Whereas Excerpt 3 considered stopping aside in an inclusive narrowing, the spatial condition of Excerpt 4 is an exclusive narrowing (and a contingent one). As in the previous excerpt, in Excerpt 4 we encounter a pair of pedestrians who accomplish stopping aside and giving way to the autonomous shuttle together as a mobile formation. However, in this case, the pair of pedestrians consists of an adult and a child: a man and a boy. At the beginning of Excerpt 4, in the first five seconds of the video, they approach and scrutinize a parked Smart Shuttle that

is visible from the other traveling vehicle (fitted with the video recording equipment), which is also stopped at this time.

**Excerpt 4.** *A man and a boy stopping aside in a contingent narrowing*



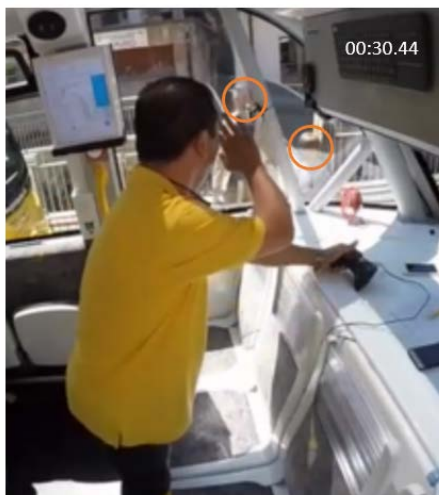
((video clip only available in the online version of the paper))

Around five seconds into the clip, the Smart Shuttle with the cameras starts moving ahead. This seems to be first noticed at 7.40 seconds by the boy, who turns his head to the left, facing the moving shuttle. A moment later, the man standing next to the boy also looks at the shuttle and they start walking away. After a few steps backward, the man turns to his right-hand side and walks behind the parked shuttle, while the boy's gaze remains fixed on the approaching shuttle for a bit longer. Their embodied togetherness as a unit is displayed by their holding hands for the entire duration of the excerpt. As noted by Goffman, “an adult holding the hand of a child” is “certainly a *tie-sign*, a signal that the persons holding hands are in a *with*, are together” (1971, p. 232; emphasis added). Furthermore, holding hands can also be seen as a “normative cultural patterning of . . . intercorporeal engagement” (Meyer, Streeck & Jordan, 2016, p. xxvii) and a haptic apparatus for social control (Cekaite, 2016). In Excerpt 4, the appropriate social action is initiated by the adult—moving to stop aside, the adult leading the way, as they walk around the parked shuttle and find a suitable spot behind it.

At this point, the shuttle with the cameras halts at the entrance to the narrowing, possibly sensing the parked shuttle as an unexpected obstacle, and the operator takes control of the vehicle (around 18.50) to pass through. Meanwhile, the man and the boy are still waiting behind the parked shuttle (note that an additional solitary pedestrian also stops aside on the left). At 21.50, the shuttle starts moving

again, progressively revealing on the camera the pair of pedestrians yielding to the shuttle, standing next to each other, hand in hand. In addition to giving way to the Smart Shuttle, they appear to also be watching it with heightened interest—the boy points to the shuttle at 25.00 (see Figure 5 above). As in Excerpt 3, the shuttle operator produces an appreciative hand gesture when passing by the pedestrians in this excerpt too. He looks in their direction through the windshield and waves his right hand while smiling (29.50–30.30; see Figure 10), orienting simultaneously to the activity of temporarily driving the “self-driving” shuttle and thanking the pedestrians for their cooperation. Once again, neither the driver alone nor the shuttle alone are singular members of the traffic flow; rather, their assemblaged “hybrid agency” (Pelikan, Broth & Keevallik, 2022, p. 11) emerges in real time, moment by moment, in and as the sequential organization of the situation.

**Figure 10.** *The shuttle operator thanks a man and a boy who together give way to the vehicle. The heads of the pedestrians, visible through the windshield, are circled. The camera is located inside the shuttle, in its front top corner below the vehicle’s roof*



Excerpts 3 and 4 served to illustrate the basic features of the practice of stopping aside done by recognizable pairs of pedestrians in both exclusive and inclusive narrowings. To conclude this subsection, and to present some further analytical findings, Excerpt 5 features a larger group of pedestrians ( $n > 2$ ), likely a family, stopping aside in an inclusive narrowing.

**Excerpt 5.** *A larger group of pedestrians in an inclusive narrowing*



((video clip only available in the online version of the paper))

As the Smart Shuttle turns around a corner, the camera mounted at its front captures a group walking in the opposite direction at the other end of the street (5.50 seconds; see Figure 11-A). In the first moment that the mobile formation is visible, one can already see that the group begins to transition from walking together to stopping aside. In particular, the man walking at the front of the group is stepping to his left-hand side, towards the wall. Shortly after, the woman walking on the left also turns to her left-hand side (see Figure 11-B). Meanwhile, the man stops with his back to the house entrance, which appears to be the first suitable place available for the stopping aside. The four children (a girl and three boys) are the last to start changing the trajectories of their walking, as the woman turns towards the wall: the coordination is “also organized around the omnipresent device of the family and its members” (Laurier et al., 2021, p. 564). The girl, in a white T-shirt, positions herself next to the man and stops with her back to the wall, clasping her hands together (see Figure 11-C). The boy in the dark gray T-shirt makes a few steps towards the approaching shuttle, walking around the man and the girl, who are already stopped aside. As he stands next to the girl, we can see the woman and two other boys behind them also stopping aside with their backs to the wall. All four then achieve the final position with a backward step and a turning of their bodies in a remarkably orchestrated, synchronized manner (11.50–12.50 seconds). At the 13-second mark—7.5 seconds after they were first visible on the video—all six individuals are already lined up along the wall, yielding to the shuttle and looking in its direction (see Figure 11-D and Figure 12), displaying not only their willingness to yield, but also to doing it safely and well ahead of time. The sequence and the way the practice

is accomplished is quite similar to Excerpt 3, except that the higher number of participants requires additional steps in the more complex coordination.

**Figure 11.** *A group of six pedestrians (two adults and four children) coordinates a stopping aside. The camera is mounted at the front of the moving vehicle, facing the direction of travel*



In analyzing this excerpt, we can see that unlike in the previous excerpts, the passengers' conduct is also relevant, as they seem to respond to the scene in front of them. At 13.50 seconds, the boy in the dark gray T-shirt stopped aside at the very right, closest to the autonomous vehicle, produces a piece of conduct that seems to exaggerate the practice: he “flattens” himself against the wall, stretching his arms out along it and tilting his head back to touch it, emphasizing his stopping aside by producing a bodily posture that may be seen as displaying a higher level of discomfort and anxiety about the proximity of the vehicle. Such a position would be necessary for smaller, nearly exclusive narrowings and for situations more perilous than this one. The boy holds his posture only for 1.5 seconds, but shortly after he abandons it, at 16.50 seconds, one of the passengers laughs, and another one produces subsequent laughter after a pause. As underscored by Jefferson, laughter “can be managed as an interactional resource, as a systematic activity” (1985, p. 34)—here, the first passenger's laughter treats the scene ahead of the bus as in some sense funny,



and the laughter of the second passenger affirms this analysis. Due to this response by the passengers, the boy's exaggerated posture could also be seen as poking fun at the practice of stopping aside. The entire passing by is then conducted in this light-hearted manner: as the shuttle gets closer to the group, the boy recycles his previous "glued-to-the-wall" posture (at 18.00 seconds) and holds it for the remainder of the clip (see Figure 12). Around 23.00 seconds, one of the passengers says "bonjour" ("hello" in French), as if addressed to the waiting pedestrians; but given that the pedestrians cannot hear it, and the passengers probably know this, the talk is actually intended for the other people on the bus and is hearable as adding a further humorous tinge to the moment. The operator does not seem to participate in this exchange among passengers, but around 25.00 seconds, we can see him thanking the yielding pedestrians with a raised hand (similarly to Figures 9 and 10).

**Figure 12.** *A boy exaggerates the stopping aside position. The camera is mounted at the front of the moving vehicle, facing the direction of travel*



In sum, this section examined how pedestrians in mobile formations coordinate their movement and bodily orientations to undertake the practice of stopping aside together as a pair or a group. Notably, in all excerpts, the transition from walking together to stopping aside together is accomplished in a relatively calm and orderly way—there is no apparent haste or fuss, despite the limited time that is available. In all excerpts, though, the transition is commenced at the earliest possible moment, and it is directly seeable precisely as what it is. The walk slows down, its trajectory diverts towards a side of the narrowing, and the pedestrians eventually turn their bodies sideways with their backs to the wall. Once the shuttle enters the narrowing, the pedestrians not only display their awareness of the shuttle's approach, but they also make it immediately publicly visible that they know they should yield, and that they are about to do it as early as possible, in

the first appropriate spot. In addition to accomplishing “traffic safety” and taking the necessary precautions for the encounter, they may also thereby explicitly display their readiness to yield to the approaching shuttle.<sup>10</sup> Such temporal organization of stopping aside in multi-person mobile units is different from that of solitary pedestrians (see section 3.1), who tend to stop aside slightly later, as the achievement of the proper yielding position has different temporal properties for a single person. We have also shown in this section that stopping aside is a practice that—due to its normal constituent features (such as stopping and facing the trajectory of the vehicle)—makes it possible to do watching in a non-marked way, as noted in Excerpt 4 when the boy points to the passing-by Smart Shuttle. Furthermore, Excerpt 5 provided an example of exaggerating the practice, possibly to mark it as explicit (or even somewhat poke fun at it). This observation thus sketches out the boundaries of mundane stopping aside and illustrates how they can be transgressed.

#### **4. Concluding Discussion**

This article has delivered a rather literal demonstration of Garfinkel’s proposal that order topics are “to be discovered as topics of produced order of the streets” (2022, p. 118). We have focused on the previously understudied practice of pedestrians stopping aside as a way of achieving giving way or yielding within the traffic flow. As bodily conduct, stopping aside consists of pedestrians pausing their walk and standing with their torso turned to the vehicle, facing the projected trajectory of the vehicle, and gazing at the vehicle with their head turned in its direction, while the shuttle moves down the street at low velocity. Similar to the “body torque” described by Schegloff, stopping aside has a “capacity to display engagement with multiple courses of action and interactional involvements” (1998, p. 536)—that is, visibly paying attention to the approaching vehicle, and at the same time visibly waiting for the vehicle to pass. The interactional problem that stopping aside—as an ethno-method—might be designed to solve stems from the speed difference (when the vehicle and the pedestrian unit are moving in the same direction) and the local spatial constraints (when the vehicle and the pedestrian unit are moving in opposite directions) in cases in which pedestrians share their trajectory with a vehicle. Essentially achieving “staying out of the way” (Rasmussen & Dalby Kristiansen, 2022, p. 22), the practice in effect prevents miniature traffic jams and other possible problems in traffic and also shows that members orient to the smoothness and progressivity of the flow of traffic as a desirable outcome of their road activities.

Our analysis began with the conceptualization of narrowings as spatial environments that make certain cultural practices conditionally relevant for

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<sup>10</sup> Once again, we thank an anonymous reviewer for suggesting a detailing of this very important aspect and for providing a formulation we were able to borrow for this sentence with only slight modifications.

dealing with the flow of traffic. The location of the observable practice of stopping aside plays a crucial role, as the practice achieves its reflexive meaningfulness from its material circumstances, that is, the constrained character of the streets. In turn, the features of the streets are brought about by the traffic members' practices and actions designed to deal with the unique spatiality. Furthermore, we have suggested that the exotic character of the Smart Shuttle (in 2016 and 2017, if not today) might be a relevant property oriented to by the pedestrians, since the practice of stopping aside also provides an opportunity for "doing watching" in a non-marked and inconspicuous way. Finally, one could also consider the issues of risk, danger, safety and trust (see González-Martínez & Mlynář, 2019; Watson, 2022), which become possibly relevant in situations in which a pedestrian allows a vehicle to pass by in a confined spatial environment, hence the "marked" stopping aside displayed in Figure 12 above.

Making space for others in traffic is neither a purely technical operation, nor one that is reducible to psychological processes (such as "intents" or "decisions"). As our study shows, and as already emphasized in earlier work (e.g., Haddington & Rauniomaa, 2014), it is—first and foremost—a social action with situated agency. Stopping aside bears resemblance to other kinds of passing-by interaction, that is, the "variety of 'in-passing' interactional configurations while on the move" (González-Martínez, Bangerter & Lê Van, 2017, p. 5; see also González-Martínez et al., 2016). As a social action, stopping aside is publicly available to and recognizable by competent members of the street traffic order. Producing space for another member of traffic is also a *giving*, and thus—as seen in many excerpts in this article—constitutes a "thankable." Showing gratitude in response to a stopping aside is an omnipresent ingredient in the closings of the sequences analyzed above. Yet, in this setting, thanking seems not to be present in response to the other party doing "more than expected" (Zinken, Rossi & Reddy, 2020, p. 253) but rather after the other party has done what *is* expected to achieve smooth traffic flow in urban narrowings.<sup>11</sup>

Although this text is empirically grounded in video recordings of testing a (semi-) autonomous shuttle, the pedestrians' practice of stopping aside is likely much more ancient than this technology, and not specific to AI-based vehicles (or even to motorized vehicles in general). So, it cannot be claimed with certainty that it is relevant or consequential for the pedestrians that what they are encountering, and giving way to, is an automated vehicle. Indeed, the fact that the shuttle is a self-driving one does not truly feature as consequential in the analysis or main argument of the paper. However, we argue that the findings presented in this text are highly relevant for research in autonomous mobility, given that elucidating and describing the practice of stopping aside in its constitutive details is crucial for its machinic recognition, and it also informs us about what might be required from a fully autonomous self-driving vehicle. In addition to the problem of

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<sup>11</sup> And, conversely, *not* giving way to another in a situation when it would be appropriate can incite very heated exchanges spanning several minutes (see Lloyd & Mlynář, 2021).

recognizing stopping aside as a practice that is doing yielding (see also Brown, 2022), our findings on thanking, outlined in the previous paragraph, invite further reflection. The gratitude dimension of stopping aside also raises questions regarding the current state of AI: If there is no human driver on board, who is going to do the thanking for giving way (and who is to be thanked when the vehicle yields)? How can a self-driving vehicle recognize pedestrians' stopping aside and properly acknowledge it as a "thankable"? Are the practices of thanking pedestrians for stopping aside culturally and geographically specific, and if so, how do they differ in various societies and locations? Such questions are already far beyond the scope of this article, but finding the sociological and technological answers will be crucial if fully autonomous shuttles are ever to become adequately competent members of urban road traffic.

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