

Stories from the Front Seat: Supporting Accessible Transportation in the Sharing Economy

ROBIN N. BREWER, University of Michigan, USA

AMY M. AUSTIN, University of Michigan, USA

NICOLE B. ELLISON, University of Michigan, USA

Ridesharing services like Uber and Lyft play an important role in broadening access to affordable, efficient transportation for people with vision impairments by providing an alternative to public transit, friends, or family. While previous work has focused on the challenges that people with disabilities experience using public transportation and how they interact with ridesharing drivers, little research has focused on the people in the "front seat" and how drivers support people with vision impairments during rides. To better understand these interactions, we interviewed 18 ridesharing drivers who had experience driving passengers with a disability, specifically people with vision impairments. Our findings show that ridesharing drivers engage in different forms of labor (i.e. physical, relational) to support passengers with disabilities and are seeking ways to learn more about disability. Contrary to most previous literature on ridesharing and the sharing economy, we find that drivers do not see this labor as a burden. We discuss ethical and design considerations for the complex process of disability disclosure, wherein passengers might benefit from having drivers know in advance about their disability, but also open themselves up to possible exploitation by drivers.

CCS Concepts: • **Human-centered computing** → **Empirical studies in collaborative and social computing**; **Accessibility**; **Empirical studies in accessibility**; *Human computer interaction (HCI)*.

Additional Key Words and Phrases: ridesharing; transportation; labor; disclosure

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1 INTRODUCTION

Use of ridesharing services like Uber and Lyft has increased rapidly in recent years. According to recent research by Pew Research, use has more than doubled in the last three years such that in 2018, 36% of adults in the United States reported ever using a ridesharing service, compared to 15% in 2015 [33]. As one form of transportation within a larger ecosystem of private and public options, ridesharing services help to provide access to resources for economic and personal well-being (e.g., jobs, nutritious food, social events, medical professionals) [17]. Transportation is particularly important for people with vision impairments who disproportionately face challenges accessing these resources [1]. According to the World Health Organization, approximately 253 million people in the world experience moderate to severe vision impairment or blindness [2]. Much prior work has

Authors' addresses: Robin N. Brewer, rnbrew@umich.edu, University of Michigan, USA, Ann Arbor, MI, 48103; Amy M. Austin, austinam@umich.edu, University of Michigan, USA; Nicole B. Ellison, University of Michigan, USA, enicole@umich.edu.

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studied the experiences of people with vision impairments as they engage with public transportation and wayfinding while walking [3, 6, 49–51], yet we lack a clear understanding of how ridesharing drivers support people with vision impairments, and their perceptions of these activities. Better understanding these processes could contribute to literature in HCI, disability studies, and labor studies, informing our approach to designing more inclusive systems in the transportation and navigation contexts and elsewhere.

While there are many benefits to ridesharing, using these systems also present challenges for passengers such as driver bias, technical accessibility, and social accessibility that can affect their use by communities of color, low-income populations, and people with disabilities [18, 24]. In the context of vision-related disability, recent work has studied how passengers with vision impairments in India [35] and the United States [15] interact with ridesharing drivers, and the extent to which they prefer ridesharing to other forms of transportation (e.g. buses, taxis). Findings show how relationship development and trust between the passenger and driver is crucial for continued use [15]. This work also suggests a form of mixed-ability collaboration in which sighted drivers communicate and coordinate with blind and low vision passengers to create an accessible experience. However, we lack an understanding from the driver’s perspective of how the collaboration process with people with vision impairments works, which can provide insights about how to make existing and emerging (e.g., autonomous vehicles) modes of transportation more accessible, useful, and easy-to-use. In this paper, we explore the following research questions:

RQ1: Beyond driving, what roles do ridesharing drivers play when collaborating with people with vision impairments to support accessible transportation?

RQ2: What expectations do drivers have of passengers with vision impairments? How do drivers assess and manage these expectations?

RQ3: How can ridesharing as a socio-technical system better support people in assistive roles for people with vision impairments and other disabilities?

Through interviews with ridesharing drivers (n=18), we extend prior work on labor and highlight the complexities of emotional labor in the ridesharing context, finding that drivers engage in different forms of labor (i.e., physical, relational) to support passengers with vision impairments. Although our focus is vision impairments, we also asked drivers to reflect on their experiences with passengers that have other disabilities and thus we consider both in this paper. Contrary to most previous literature on ridesharing and the sharing economy, we find that drivers do not see this labor as a burden. Additionally, our findings show how they navigate the disability disclosure process as they seek ways to learn more about a passenger’s visual abilities and best support them. We use these data to discuss ethical and design considerations for the complex process of disability disclosure more broadly, wherein passengers might benefit from having drivers know in advance about their disability, but also invite possible exploitation by drivers.

2 RELATED WORK

2.1 Transportation experiences of people with vision impairments

Prior work on transportation in HCI shows how transportation can provide access to a number of other resources such as medical care, jobs, education, and healthy food [17, 35]. These resources may be more important for people with disabilities who may need access to medical care more than people without disabilities. Prior work specifically describes medical care challenges of people with vision impairments showing how individuals who report being blind or low vision were less able to access medical, prescription, or dental care when needed, and were more likely to delay necessary

care [47]. People with vision impairments often receive orientation and mobility (O&M) training to help them navigate independently using public transportation or while walking. However, transportation access can be particularly difficult for people with disabilities who are unable to drive (e.g. mobility or vision impairments) and live in rural areas where public transportation [32] or para-transit services, if available, are inaccessible, unreliable, or difficult to reserve. Together, these factors mean that people with disabilities are increasingly forced rely on friends or family for help [23], potentially transforming social relationships into assistive relationships. Not having access to reliable transportation either through public services or interpersonal relationships may mean, for some people, negative health and economic impacts as well as feelings of social isolation and loneliness.

Even in cities with robust public transit systems, common modes of public transportation can be inaccessible for people with vision impairments, even those with strong orientation and mobility skills. On buses, for instance, it can be difficult to communicate with a driver or find a seat; bus stops may not always be announced leading to relying on a driver who may not remember requests to notify the individual; schedules can change; and it can be difficult to know when and where the bus has stopped [6, 23, 38]. Prior work describes how trains pose many of the same issues as buses but may also lead to people getting stuck in automatic doors, falling from platforms, or being denied the ability to bring service animals [23]. More direct forms of transportation like taxis can be expensive if people are forced to rely on them daily [19]. HCI researchers have designed solutions to such transportation challenges [6, 22, 28], but using these forms of transportation can still be stressful, unsafe, or disempowering for people with vision impairments if they have to travel alone or rely on assistance from others [6, 11].

The above literature shows how drivers can, at times, be responsible for providing an accessible transportation experience for people with vision impairments. Little work has described this process from the perspective of drivers, which we see as a gap in the literature because drivers are a vital component of the transportation puzzle, often performing the critical service of helping passengers within a vehicle (e.g. getting off at the right stop) or outside a vehicle (e.g. navigating between the transit service door and their destination). Azenkot et al.'s work [6], which surveyed bus drivers of blind and deaf-blind passengers, showed how they felt the weight of this responsibility and recognized that technologies could help to improve the transportation experience for people with disabilities. Our prior work, in which we interviewed people with vision impairments who use ridesharing services, shows how ridesharing drivers play an important role in helping people with vision impairments enter and exit the vehicle, provide information about the environment, and are seen as trustworthy transportation sources [15]. As such, we seek to better understand accessible ridesharing transportation experiences from the perspective of those who provide this service - the drivers.

Ridesharing (e.g. Uber and Lyft) is relatively underexplored in the context of transportation options that support people with disabilities. Yet, it can provide better customer experiences compared to buses and lower fares than taxi services, thus empowering people with vision impairments to travel independently. Echoing the above benefits of ridesharing, Kameswaran et al. interviewed blind people in India and found the convenience of ridesharing services was noted by participants, especially in comparison to other forms of transportation [35]. Mobility challenges were mentioned by a few participants, who worried about whether or not the driver would give them the necessary assistance and/or be able to accommodate them, and participants expressed a desire for better support by drivers during the ride. Additionally, our more recent work [15] shows how passengers rely on drivers for entry and exit work and to provide information about their environment to strengthen spatial awareness. Some participants also described trusting and preferring ridesharing drivers over family members and friends for transportation because they could travel to sensitive

locations privately and there was a lack of expected reciprocal behavior. These findings further highlight the need to study the roles of ridesharing drivers.

2.2 Ridesharing drivers

2.2.1 Roles. Prior work that has been done on ridesharing drivers, while limited, has shown that drivers play multiple roles during the experience. For some passengers, drivers play the role of a "friend," providing conversation and companionship. Gloss et al. found that passengers have high expectations of their ridesharing drivers compared to taxi drivers, expecting small talk to be part of the experience. They found Uber drivers to be friendlier than taxi drivers and were critical if their driver was perceived as not being sociable [25]. Kameswaran et al. interviewed Uber passengers and drivers and found that drivers provide words of encouragement and advice to passengers, with some drivers feeling as if they acted like a "psychologist" during rides [34]. Prior work where passengers with vision impairments were interviewed showed how conversations between passengers and drivers helped passengers build trust during that particular ride and in ridesharing services in general [15]. Ridesharing drivers also have discussed tolerating rude behavior or racial slurs and avoiding conversation topics that could lead to a disagreement with passengers [42]. Additionally, drivers perform the role of a "helper", giving riders instrumental assistance with different aspects of the ride. Passengers with vision impairments in India spoke about not needing to rely on as much assistance from other individuals when using ridesharing services compared to other forms of public transportation, though they did not necessarily classify help from the driver in this category. They saw extra assistance as being an extension of the driver's job. This help provided by the driver included locating the vehicle and assistance in reaching their final destination [35]. This is consistent with other work, where individuals with a disability have appreciated receiving physical help from drivers with things like folding up wheelchairs and walkers, and were disappointed when a driver didn't provide this [34]. Other instrumental assistance includes entering and exiting the vehicle, walking the passenger to their final destination and providing verbal cues about the ride and where the passenger is being dropped off [15]. Lastly, drivers also play the role of a "guide," giving passengers local knowledge about things like popular restaurants and other attractions [34]. In this paper, we study how these roles align or diverge from those of ridesharing drivers engaging with people with vision impairments in the United States.

2.3 Collaboration and Labor

2.3.1 Mixed-Ability Collaboration. Prior work suggests ridesharing drivers and passengers with vision impairments engage in a collaborative process for a successful transportation experience [35]. Considerable work in the CSCW community incorporates these themes of collaboration, but we extend prior work on mixed-ability collaboration by studying the experiences of sighted people collaborating with people with vision impairments. Blind and sighted collaboration has often been studied in educational and work contexts (e.g. [13, 44]) where sighted and blind children engage in communicative practices and coordinate to solve an audio or haptic puzzle, or when blind employees discuss challenges working in a predominantly sighted workplace. Limited work describes collaboration outside of these contexts, and such work mostly focuses on collaboration with known parties (e.g. case workers while grocery shopping or spouses in the home) [12, 52]. In this paper, we investigate the role of sighted people in a collaborative experience with people with vision impairments beyond a work or learning context, and with unknown parties.

2.3.2 Labor. Prior work has discussed how ridesharing drivers participate in a form of labor called emotional labor. Inspired by the work that flight attendants are called upon to do as they engage socially with customers in addition to their other expected tasks, Hochschild's initial framing of

emotion work describes the ways in which laborers engage in "invisible" work to alter their behavior to satisfy the social and emotional needs of an audience [30]. References to Hochschild's work often center on the emotional burden placed on the laborers [8]. In ridesharing, the feedback system encourages drivers and passengers to perform emotional labor during trips [42]. This work describes how workers within the sharing economy such as ridesharing drivers can experience burnout, cynicism, increased turnover rate, and overall dissatisfaction with their role [37]. Additionally, passengers are expected to engage in emotional labor through "small talk" with drivers. In both cases, rating systems encourage a service mindset which can be perceived as negative, but could motivate good behavior on the part of actors in the system. Humphrey et al.'s work has described the nuances of emotional labor and how it is composed of three types of acting - surface acting, deep acting, and genuine labor [31]. They argue emotion regulation with surface labor produces negative effects, whereas the latter two forms of emotional labor may have positive effects for highly stressful jobs (e.g., 911 dispatchers) if workers perceive their jobs to benefit others. One extension of emotional labor is relational labor, which refers to how some professionals, such as musicians, feel the need to engage in repeated interaction with their audiences to build profitable relationships [7]. Yet, relational labor can also feel burdensome. Baym's work discusses how musicians may feel the need to "perform" off stage and engage in a similar form of surface acting in order to satisfy their fans [7]. In this paper, we seek to better understand the types of labor ridesharing drivers engage in with passengers with disabilities, with a focus on passengers with vision impairments, and compare this to what we know about how drivers support sighted passengers.

3 METHODS

We conducted remote semi-structured interviews with ridesharing drivers about their experiences as a driver. The interviews focused on their interactions with people with vision impairments, but we also asked questions about their experiences with people that have other impairments (e.g. mobility) that may be similar to challenges blind and low vision people face. Some interview questions were informed by online forums where drivers discussed accessibility-related issues. These questions included what types of assistance they provided to riders with a vision impairment or other disability, how they felt about providing additional assistance, and what they did to ensure passengers felt comfortable during rides. Verbal consent was obtained from participants as interviews were conducted by phone. Interviews lasted 45-60 minutes, were audio recorded, and all participants were compensated for their time with a \$20 gift card. We continued interviews until we reached saturation on our key themes and research questions.

Participants were recruited online in Facebook groups and forums (e.g., RideGuru, UberPeople.net) for ridesharing drivers to discuss their experiences, ask questions and share tips about working for ridesharing companies. The groups that we recruited from ranged in size from approximately 1,000 to over 8,000 members. Recruitment was done in both general and location-specific groups in the United States. Of the 67 individuals who indicated interest in the study by completing the online screening survey, 39 were eligible (inclusion criteria of at least one month of driving experience and indicated at least one interaction with a person with a vision impairment).

After contacting those who were eligible, we conducted interviews with 18 participants who worked as drivers for at least one ridesharing service. Participants' ages ranged from 35 to 81 years old (median = 50), 6 participants identified as female, and 12 identified as male. A majority (17/18) had been working as a ridesharing driver for more than one year. More details about drivers' experiences driving passengers with disabilities can be found in Table 1.

Table 1. Participant Information - average age = 51.67 years old, 6 = female

List of Participants					
ID	Gender	Age	Driver For	Location	Experience w/Passenger Impairments
P1	Male	47	Uber & Lyft	Richmond, VA	Mobility, vision
P2	Male	57	Uber & Lyft	Columbus, OH	Mobility, vision, hearing
P3	Female	50	Uber & Lyft	Cleveland, OH	Mobility, vision, hearing
P4	Male	45	Lyft	Detroit, MI	Mobility, vision, hearing
P5	Female	57	Uber & Lyft	Charlotte, NC	Vision
P6	Female	50	Uber & Lyft	Seattle, WA	Vision
P7	Male	81	Uber & Lyft	Charlotte, NC	Mobility, vision
P8	Male	34	Uber & Lyft	Wilmington, NC	Mobility, vision, hearing
P9	Male	63	Uber & Lyft	San Diego, CA	Mobility, vision, hearing
P10	Male	52	Uber & Lyft	Charlotte, NC	Vision, hearing
P11	Male	35	Uber	Chicago, IL	Vision, hearing
P12	Female	60	Uber & Lyft	Los Angeles, CA	Mobility, vision
P13	Female	60	Uber	East Lansing, MI	Vision
P14	Male	66	Uber & Lyft	East Lansing, MI	Mobility, vision, hearing
P15	Male	50	Uber & Lyft	Lansing, MI	Vision
P16	Female	40	Uber	Mount Pleasant, MI	Vision
P17	Male	35	Uber & Lyft	Lansing, MI	Vision
P18	Male	48	Uber & Lyft	Lansing, MI	Mobility, vision, hearing

3.1 Analysis

Interviews were audio recorded, transcribed, and de-identified for data analysis. Both deductive and inductive coding processes were utilized. An initial set of codes was developed based on previous literature and included categories such as image management and social experiences. Codes were iteratively refined and created as the content of the transcripts were reviewed and discussed among the research team. Any discrepancies were discussed by the research team until agreement was reached. The final set of codes included labels like "perceptions of people with vision impairments," "policies and training," "mistrust," and "negative experiences during trips."

4 FINDINGS

From iterative coding, we highlight key themes around the types of labor involved in supporting people with vision impairments (RQ1), extending what we know about ridesharing driver labor in the context of emotional labor for people without disabilities to forms of physical and relational labor in the context of collaborative ridesharing experiences between drivers and people with vision impairments. We also discuss drivers' interactions with passengers outside of traditional driver roles and their perceptions about these forms of labor. Next, we focus on participants' perceptions of people with vision impairments (RQ2) and how these perceptions impact social and technical aspects of drivers' work experiences (RQ3). Although we focus on drivers' experiences with passengers with vision impairments, we note that they also compared these experiences to passengers with other disabilities such as mobility impairments. We include these cases below and indicate where drivers discussed disability more broadly as opposed to solely vision-related disabilities.

4.1 Types of labor involved in supporting people with disabilities

4.1.1 Physical. Drivers frequently discussed being asked or offering to physically assist passengers with vision and mobility impairments, such as helping them get in and out of the car, walking them to their destination, or loading a wheelchair or walker into their vehicle. For example, P10 described an interaction with a passenger with a vision impairment, saying, "*...I got out and helped him with the door, he stepped out the car and he grabbed onto my arm and I lifted him up.*" Similarly, P17 walked a passenger with a vision impairment into a medical clinic saying, "*...when we got there, I stopped, got out of the car, and I walked him in, and then walked him up to the desk, where he had to check in.*" Drivers indicated doing this physical work because they saw it as part of their jobs or noticed an environment was not accessible. This view has been echoed in prior work with passengers with a vision impairment, as they believed that receiving assistance from a driver was less burdensome than asking another individual who may not feel obligated to help [35]. For example, P1 said, "*The only one I had to assist was a gentleman [with a vision impairment] that I took to the airport early one morning. I did help him get to the doors of the airport, just because there's not a whole lot of clues for him to tap and there really wasn't a whole lot of clues close to him to get him where he needed to go.*" Implicit in this statement is the invisible work performed by a driver who has to assess the destination environment and recognize that someone with a disability might need additional help.

Other examples of participants reporting doing physical labor include P13, who described a trip with a sighted passenger with a mobility impairment, saying, "*I usually have to fold up the wheelchair and put it in the trunk or the walker, but they're able to swing their bodies into the car. And then, when I end the ride, I get their wheelchair [or] walker out before I end the ride and get them started on their way to the door. So, that takes a little bit of time, but I'm paid for my time, so it doesn't bother me.*" Although many drivers echoed P13's sentiment and reported that they did not mind helping, sometimes it was described as a burden, depending on the nature of help needed. For example, P1 said, "*[the passenger] could not stand on her own so I needed to help her get stood up from the chair and then turned into the seat. Then again reverse the process once we got her to her home. I actually had to assist her up the stairs to her front porch before I could get the chair and bring it to her. For somebody that's not trained to do that kind of stuff, that was very cumbersome.*" This quote describes the experience of a driver and a sighted person with a mobility impairment. While previous work describes how ridesharing drivers engage in emotional labor [42], we find drivers supporting people with disabilities often engage in different forms of physical labor. Besides drivers stating how they are given specific instructions to not discriminate against riders with service animals, most described not being given explicit training on how to support various kinds of disabilities.

4.1.2 Emotional. Drivers also implicitly discussed engaging in forms of emotional labor for passengers with and without vision impairments. Here we use the term "emotional labor" to refer to the concept that some kinds of work implicitly requires processing and managing customers' social and emotional needs, either by manufacturing emotions or concealing genuine feelings [30]. Across our dataset, we see that the most common form of emotional labor was through conversation with passengers whereby drivers chatted with passengers and attempted to respond to their implicitly or explicitly articulated needs. For example, drivers provided information about their personal lives to help customers feel at ease or provided information about the surrounding environment. Prior work has described how establishing common ground through conversation can be used to decrease uncertainty in new or risky environments [16]. One driver described how they participated in attempts to find common ground: "*They might ask me something like, 'Are you married?' So I give 'em a little quick run down. It's like, yeah, 'In my 60s, I've been married for 32 years. I've got kids, grandkids, even have a great-granddaughter.' And, 'Oh, oh,' and then the conversations usually take off that way.*"

But when they ask me, any passenger asks me something like that, I figure they're asking just because they [want to know], 'Okay, are you serial killer or a nice guy,' you know? (P17)" Although in this case, disclosing one's family status did not seem particularly troubling, one can imagine this might not be the case for all drivers. For instance, a driver might not feel comfortable disclosing political views, sexual orientation, or nationality to passengers but may feel implicit pressure to do so. In this example, the driver talks about their experiences with people with and without disabilities, recognizing there may be some discomfort in getting in a car driven by someone else, and trying to minimize this discomfort by sharing personal information. While one could argue that passengers with vision impairments may rely on these verbal cues to determine whether to trust the driver, we also interpret the use of conversational grounding as an attempt to humanize the ridesharing experience while acknowledging that expectations of personal disclosures can function as a form of emotional labor for some drivers. Prior work with passengers has not explicitly mentioned personal disclosures from the driver as being important, but has found that conversation during the ride is both pleasant for the passenger and expected [25].

We identified another example of this attempt to humanize the ridesharing experience when some drivers described sharing information about the environment with passengers, more broadly. For example, P10 said, *"And then I just try to be friendly and polite and answer questions about the city if I could. If the people from out of town would ask, 'Hey, what's the best barbecue place in town?' Since, you know, that's kind of our thing here, I would say, 'Well, here's where I would go if it were me. Tell your driver to take you to this particular place.' I mean, just nothing out of the ordinary than just trying to be a human being."* This driver describes their role as a guide, regardless of passenger's abilities, providing recommendations and local knowledge to improve the passenger's visit to that location.

Emotional labor also included sometimes needing to serve as an impromptu social support provider. Similar to the 'stranger on a train' phenomenon [43] wherein people engage in more honest self-disclosure with strangers whom they don't know and don't expect to meet again, passengers sometimes confided to drivers, such as: *"...you just stop and sit and listen and talk them up for a while so they're not so depressed. Or, people who are abused by other people and in a bad situation and nobody's coming to bat for them, and so you sit and try to feed them other points of view and to boost them up so that they can [...] figure out options for themselves. It's like you bond with people, and you just get to be there for them sometimes"* (P12). In these cases, when drivers noticed that a passenger (sighted or blind/low vision) might be upset about something, they tried to provide an emotional outlet for the person, allowing them to talk openly about what is bothering them, and sometimes offering advice. While prior work refers to how drivers perceive establishing this emotional bond as a burden [42], drivers in our study did not seem to view it as such.

Drivers also engaged in less explicit, emotionally-tinged labor that fell outside the scope of their responsibility of getting passengers to their destination. Drivers often worked to assess the comfort of passengers using a variety of cues, regardless of ability. This was commonly done through interpreting body language and then adjusting behavior based on passengers' responses. For example, P18 said, *"...you're talking to them, so I guess it's a matter of just reading people and understanding their non-verbal cues as well as the tone of their voice, and how they're speaking and how they're, I guess, sitting and answering any questions they have."* Similarly P1 said, *"I guess it's just kind of instinctual. I've learned how to read people's body language and conversational stuff. If they're not comfortable, you can kind of hear it. Or you see them tense up, or whatever. Typically, if I see something or hear something like that, 'Is there something I can do? Do you want me to take a different route? Do you need more heat, are you cold?' You start asking some questions to see if there's an issue, or if it's just how they are."* These two drivers, and others, described a continuous process of assessing expectations during a trip, evaluating patterns of their "backseat audience" over time,

and modifying their own behavior to try to make their passengers more comfortable and to feel safer.

4.1.3 Relational. Beyond the forms of physical and emotional labor documented above, we also observed instances of relational labor. As explicated by Baym (2018) "relational labor" refers to how workers can engage in repeated interactions and continuing communication with an audience to build relationships, ultimately leading to or otherwise supporting paid work activities [7]. There were instances where a driver discussed completing multiple rides with the same passenger, slowly developing an interpersonal connection with the individual over time. For example, P3 described an experience with a passenger with a vision impairment saying, "*...we just talked on the way and got her to where she was going, [she] was very happy. And then the second time I had her she remembered me and our conversation, whatever we talked about that particular day, being what I used to do for a living and et cetera, just little fun facts that she remembered, and was glad that it was me.*" Emotionally, most drivers seemed to enjoy the relational components of their ridesharing experiences, and passengers with a vision impairment have previously discussed that they feel more comfortable on rides with a driver that they have been on a ride with before [15]. At times, these relationships led to the passenger inquiring about scheduling future rides with the driver outside of the ridesharing apps. Although not with a person with a vision impairment, P5 described a trip with a person with narcolepsy saying, "*she actually asked me if I would like to drive her to and from work... We had a lot of discussion ... because she was going pretty far. She was going from one part of Charlotte to the other end of Charlotte and we talked a lot.*" Prior work suggests that paid work with activities that are typically associated with more interpersonal relationships such as providing emotional support can be draining for individuals [7], especially those who have to engage with the same customers over time. Yet, we did not observe this with most participants as those who discussed relational aspects of ridesharing often did so happily, taking pride in continued conversations across rides.

In some instances, drivers and riders benefited from these repeated interactions with customers. This was the case with P6 and a passenger with a vision impairment who learned to overcome the limitations of the online mapping system used by ridesharing apps. The driver told us, "*I pulled out, parked along the side of the road. One of the things that I know about him is when, as far as the Uber and Lyft apps, they route you down the back alley where he lives, but a lot of the drivers don't understand that. He's not actually down the back alley which is horrible especially for people who are vision-impaired because they're waiting down on the alley and he's actually on the street. He comes out and he knows exactly ... I park in the exact same spot right by the little sidewalk area. He'll work his way over to the car...I've learned over time that the system that Uber and Lyft use is actually horrible with their location with where it places a lot of these pickups...*" Here, the passenger with a vision impairment benefits from being able to easily find the vehicle, a major complaint about ridesharing for blind people [35]. Also, the driver benefits from easily finding the passenger, saving time and avoiding a low rating. As we describe above, relational labor has traditionally been defined as the burden of interacting in a public sphere and needing to build relationships to be successful in one's role [7]. These examples show the ways in which drivers use information about repeat passengers over time to improve the ridesharing experience for both parties, in some cases forming interpersonal relationships that both parties appear to enjoy and benefit from.

4.1.4 Beyond expected labor. Lastly, some drivers discussed other forms of assistance that they provided, either labor outside of the ridesharing context or activities that could be categorized into multiple categories of labor. For example, P2 describes an experience with a passenger with a vision impairment who said, "*I've just got a few things to move'. He goes, 'would you mind helping me?'* I grab boxes. He's carrying boxes. We load them up, take him to his new apartment, and he goes, 'I've

got a favor to ask you'. He goes, 'would you help me carry these up the steps?' No problem, I would've done it if he wouldn't have asked, I would've offered. But he asked, and you know, because I generally don't go inside anybody's apartment ever, you know? And he goes, but I've got one more favor. He goes, 'would you let me hold onto your arm, and you walk me around the room so that I can memorize where everything is at?'...We walked around and we got to the thermostat for the heating and cooling. And he goes, 'tell me what each button is for on this'. And then after we went over everything, he repeated it, and he goes, 'do I have it right?' I said, 'yeah, you do.' And he goes, 'okay, I'm all set.'" Helping someone carrying objects from the ridesharing vehicle to the target destination may not be considered too far outside of the range of requests a driver might get from a passenger. However, being asked to help the passenger carry boxes, rather than grocery bags, could be considered to be beyond a typical work request. Additionally, being asked to assist with object identification in a passenger's home represents a meaningful role transition, from a paid driver to a role more akin to that of an orientation and mobility specialist, for whose job it is to train people with disabilities to navigate their environments safely and independently.

Although these types of requests by people with vision impairments may result in additional emotional labor for drivers, participants like P2 did not express discomfort when describing these experiences. Similarly, P10 said, "I get a lot of satisfaction in kinda giving back. I think for me, I kinda felt like, I'm helping this individual [with a vision impairment] do something that he wouldn't be able to do otherwise." In this sense, assisting passengers with a vision impairment seems to move from being a form of labor, with its extrinsic incentives like ratings and payment, to more like an altruistic effort incorporating intrinsic incentives ("I get a lot of satisfaction"). Interestingly, most drivers reported not expecting passengers with a vision impairment to rate them or leave a tip due to accessibility issues in the app, saying that they did not consider either of these as a factor when assisting passengers. A majority of drivers did not see an issue with being asked to perform these additional tasks, and even described it as providing a service to their community.

More broadly, we find that one of the most salient aspects of driving those with vision impairments was the potential to engage in physical labor, which was much less often the case with sighted passengers. We also find that drivers are being asked to participate in forms of labor that may be outside the boundaries of what is expected for their jobs, but see intrinsic incentives to engaging in such behavior.

4.2 Working through Disability

Next, we focus on drivers' perceptions of people with vision impairments and how they initially approach the topic of disability by discussing disclosure processes.

4.2.1 'Just like everyone else'? To better understand the transportation experience of people with vision impairments, drivers were asked to compare and contrast rides with blind or low vision passengers to rides with sighted passengers. While they listed examples of physical, emotional, and relational labor that they provided, they insisted that most rides were no different from rides with people without disabilities. For example, P13 said, "I don't see it any different from a regular passenger, other than they either have the guide stick [white cane] or the service animal." However, three drivers described either not wanting to accept rides with passengers with guide dogs, or knowing others who cancelled for this reason. For example, "If it's like a pit bull or a crazy looking dog, I probably will skip on that ride and not have that issue" (P11). Because drivers can be rated by subsequent passengers about the cleanliness of their car, some felt like service animals could negatively impact their driver rating score if visible (e.g., dog hair) or invisible traces (e.g., scents) of the animal remained. Additionally, a few drivers mentioned feeling anxious or unsure about how to support passengers who may need help during the ride, but these feelings quickly dissipated after

the ride began. For example, P10 said, *"I was a little anxious because I really didn't know what to do, cause normally you just pull up, somebody pops in your car. It was really more out of lack of experience more than anything else. It wasn't because I had any kind of angst about having someone who's visually impaired in my car. I just didn't want them to feel uncomfortable riding in my car."* This quote describes one driver's uncertainty about how to support a person with a vision impairment. While many participants described reading policies about supporting passengers with vision impairments and other disabilities, they noted that most of these policies focused on what was illegal (e.g., refusing passengers with guide dogs), and had less information about how to provide assistance to the person prior to or once they are in the vehicle if/when they disclose a disability.

4.2.2 Disclosing Disabilities. Although disclosure can be a complex process, particularly for people with "invisible" disabilities [21, 46], most participants said passengers would disclose if they were blind or had low vision before a trip and indicate that they needed additional assistance, if necessary. P16 recalled one such experience, saying, *"The first time I picked her up, I remember, she actually text me [sic] as I was on my way, saying that she was blind, and she told me exactly where she was at."* Drivers appreciated this disclosure as it allowed them to better prepare for the ride. For example, P2 said, *"as a driver it would be nice to know ahead of time. However, I get the fact that they wouldn't want to tell us that ahead of time, also. ... There are predators out here and if somebody knew that that was a visually impaired person, they could plan it ... try to figure out some way to take advantage of them."* Similarly, prior work shows how some people with vision impairments state that a form of identification would be useful in disclosing disability, with others believing that this may make them more vulnerable [23]. When a passenger did not provide this information beforehand, drivers used *"the tools [passengers] had with them"* (P18) or cues, such as dark sunglasses or a guide dog, to identify passengers who may have a vision impairment. Disclosure was most useful at the beginning and end of a trip as prior work has shown that people with vision impairments may need additional help locating the vehicle or getting from the vehicle to their target destination, a concept known as the "last mile problem". However, disclosure before a trip can also be risky for passengers of any protected class (e.g. disability, race) as drivers can discriminate by intentionally cancelling trips at their discretion. For example, P4 said, *"Well, like I mean with Lyft and Uber the driver is being paid by time and distance. I have a feeling, I personally wouldn't do it, but I have a feeling that there's people out there that would take a very circuitous route or drive wherever in order just to make more money..."* This can be particularly problematic for people with vision impairments who have reported accessibility challenges with navigating ridesharing applications and could find it more difficult to report negative experiences.

We find that although most drivers insisted that there was no difference between their trips with passengers with vision impairments and sighted passengers, some expressed anxiety around supporting their' needs. These needs are, at times, communicated by passengers directly when disclosing their vision impairment, but the disclosure process, especially by people in stigmatized communities, is complex. On one hand, this information could be used to make transportation experiences more accessible. On the other, it might be used for discrimination. We discuss the implications of disclosure in physical-digital environments below.

5 DISCUSSION

Our findings highlight the many collaborative roles that ridesharing drivers and their passengers (primarily with vision impairments) play when getting these passengers safely from pickup to final destination, focusing on the role of drivers in this process. Below, we elaborate upon this theme by describing the different forms of labor enacted by drivers and propose revisiting some of the negative connotations around labor, incentives, and reciprocity in the sharing economy.

Additionally, we address ethical considerations of designing for drivers which contributes to prior work on disclosure, stigma, and discrimination for people with disabilities. For each of these sections, we discuss design implications that may help researchers, designers, and developers of socio-technical systems create accessible transportation and navigation experiences and may better support recipients of these services. While our study focused primarily on passengers with vision impairments, drivers also discussed experiences with passengers with mobility impairments. As such, we recognize our findings could extend beyond blind and low vision communities, and also situate the discussion and design implications to research related to people with disabilities more broadly.

5.1 Labor without burden

We extend existing work on ridesharing drivers, which focuses on the emotional labor asked of them, to discuss the different forms of physical labor that may be requested of or offered for people with disabilities. Work like that of Raval and Dourish describes the immense emotional labor that is required of ridesharing drivers such as the performative challenges of 1) assessing the appropriate amount of conversational openings directed towards an audience (i.e., the passenger) or 2) displaying "enough" empathy towards audience concerns, which can determine a driver's rating by passengers, and subsequently contributes towards their success as a driver [42]. Similarly, we observed how drivers are sharing information with passengers to make them more comfortable. For example, we saw evidence of how drivers use conversation to humanize the ridesharing experience by enacting different types of roles such as friend or guide. It is important to note that these niceties may also affect passengers' ratings of their drivers, although our participants did not indicate that the rating process impacted their willingness to provide help. Additionally, our findings show that a few drivers described how navigating through the post-trip rating (and tipping) system is so inaccessible that many vision-impaired passengers do not complete it. Although companies can do things like provide different formats for entering ratings for people with disabilities (e.g., voice input), the inaccessibility of the rating system seems to free drivers from "laboring for ratings" [42] and the burdensome performative aspects of being a ridesharing driver.

We saw several examples in our data about instances where physical labor was requested of or offered by drivers towards people with disabilities, above and beyond what is typically done for sighted people or people without vision or mobility impairments. Rather than positioning this as a form of labor per se, drivers described their roles as filling an important societal gap for people who may not have access to this type of help, thus emphasizing the interdependent relationship between driver and passenger. Bennett et al.'s interdependence framing discusses a "mutually reliant" relationship where different types of assistance show how people with disabilities can contribute to the relationship [9]. In our work, this "mutually reliant" relationship is between the driver and passenger where the passenger may rely on the driver for physical, emotional, or relational labor and the driver perceives their role to be beneficent, and contributing to society. We use this framing to reflect on how we define labor within and outside of the sharing economy.

Perceptions of the term "labor" are ambiguous as this term can generate positive connotations from the presence of professional identity and the act of being employed, but also have negative connotations especially in regard to forms of unpaid labor. In the context of ridesharing, much research has highlighted the poor labor conditions experienced by drivers, such as unfair or low wages, inconsistent work, and poor communication with employers. These challenges have been discussed in other sharing economy contexts [25]. However, we argue for a more nuanced understanding of labor as something that can exist without implying burden upon the person engaging in the work. As such, we propose extending a call to "design for labor" [25] to **designing for meaningful labor**. In Gloss et al.'s prior work, researchers interviewed taxi and Uber drivers

and passengers comparing and contrasting different forms of labor and transportation experiences. The notion of "design for labor" was motivated by the conflict in a profitable service and the needs of users, proposing that HCI researchers design for a more "equitable exchange." In our findings, we show how drivers articulate their roles as meaningful and being needed in the community, but not always feeling supported by their companies for appropriate training.

In ridesharing mobile apps, designing for meaningful labor could mean including visualizations or dashboards for drivers to see the ways in which they have helped people over time. Their employers (e.g. Uber or Lyft) could also view this information in aggregate to see how drivers engage with passengers, using this data to help update their training materials and preparing drivers for unfamiliar contexts. Information about who and how drivers have helped could also be used to empower people with disabilities to choose preferred drivers. Designing to show the meaning in labor might also be useful in other "gig work" or sharing economy contexts like crowd work, where researchers have considered altruism and highlighting the meaning of work as an alternative incentive mechanism [14]. However, we also encourage critical reflection of "designing for meaningful labor," in that making such labor more visible and quantifiable can have unintended consequences. For example, it could lead to false expectations that helping someone with a disability should always be associated with an incentive. In this context, it could also perpetuate stereotypes suggesting people with disabilities always need help. As such, we do not intend for this design approach to incentivize help, rather we position it as a way for sighted drivers to obtain resources they need to improve their jobs and for people with vision impairments to have increased control over daily inaccessible experiences.

5.2 Ethics of Disclosure

Our results suggest drivers would prefer to have information about passenger's disability(ies) in advance, yet this raises questions about the ethical implications of such a complex disclosure process. In the United States, the Americans with Disabilities Act of 1990 [27] ruled disability as a protected class, meaning it is illegal for anyone to discriminate on the basis of one's disability. Discrimination and disclosure by people in stigmatized communities has been discussed in online contexts like online dating for people with disabilities [41] and men who have sex with men [10], Facebook for women who experience pregnancy loss [4], and Instagram for people who experience depression [5]. Prior work has also discussed disability and disclosure in the context of assistive technology use [21]. This work describes how disclosure can be performative as disclosing or choosing not to disclose disability can be beneficial. Similarly, in Porter et al.'s work on disability and dating, we see how people with disabilities prefer early disclosure if it helps with planning logistics of a date [41]. Our data show how drivers seek information about passenger disabilities to help with planning logistics, for instance how to better communicate the location of a vehicle. While this work discusses how proactive disclosure can also be used to help people with disabilities "filter out" dating prospects, drivers described instances where other drivers who do not want service animals in their vehicles might be tempted to cancel rides with people with vision impairments, thus illegally discriminating on the basis of disability. Disclosure of disability has been suggested by some individuals with a vision impairment who felt that a form of identification, such as a lapel pin, would be useful when using public transportation, though this did bring up issues regarding vulnerability [23]. Ridesharing is a complex socio-technical experience where disclosure through technology (within the app or via phone call to the driver) may have implications for passengers' safety and feelings of self-efficacy. Should passengers be able to disclose their disability and should drivers have access to this information if it can be both helpful and hurtful to the transportation experience? Who should decide what kinds of information are disclosed and when?

Our findings have implications for the design of accessible transportation experiences. While each disability is different, perhaps ridesharing companies can provide in-app tips for supporting people with disabilities once (and if) a disability is disclosed. We extend work on **designing for selective disclosure**, sharing information differently based on the audience [48], linking back to Goffman's conceptualization of selective self-presentation [26]. In HCI literature, selective disclosure has been a topic of transition literature such as with career and gender transitions [20, 29, 45] where people are carefully constructing how they are perceived by digital audiences using media like text and images, or privacy settings [36], particularly stigmatized populations [39]. However, ridesharing and disability disclosure is more complex, in that disability can be concealed within the app, but often not in-person when interacting with a driver, as drivers mentioned using visible cues to identify if passengers had a vision impairment (if their disability was not communicated prior to the trip).

Faucett et al.'s work suggests the ability to control one's disclosure can be empowering for people with disabilities [21]. Therefore, we propose providing different ways for passengers to be able to disclose their disability *and* different ways for this information to be presented to the drivers in a way that cannot be used for discriminatory behaviors. For example, a passenger can directly indicate disability in their rider profile and have this information be presented to the driver. Second, the passenger can indicate disability within the app, yet they can choose to not disclose their specific disability to the driver. Instead, this disclosure act can prompt the ridesharing company to share tips about how to support people with disabilities, but only after the driver accepts the ride. Lastly, passengers can choose not to disclose their disability within the app, doing so by phone call, in-person, or not at all. Most importantly, and one component that is currently missing from research on algorithms that make decisions based on profile information [40], is including a feedback loop that provides consequences for discriminatory behavior patterns. Since drivers would receive any form of disability disclosure information after accepting the trip, ridesharing companies could track the proportion of cancelled rides of people with disabilities, thus identifying drivers who may be engaging in discriminatory behaviors, educating them about the legality of these behaviors, and providing consequences for those who continue to do so.

5.3 Limitations

As is the case with all research, there are some limitations to our work that readers should keep in mind. First, we recognize that this paper is driver-focused and explores the experiences that drivers have with people with vision impairments from the drivers' perspective. As such, they may have a limited understanding of appropriate terms for referring to this community (e.g. "guide stick" vs. "white cane") and cannot accurately convey the subjective perceptions or experiences of their passengers, nor was this the intended focus of the study. Second, drivers self-selected to participate in our interviews, and as such we may have over-sampled drivers with more positive attitudes towards people with disabilities. Similarly, we acknowledge that there may be a potential response bias in our dataset, in that drivers may be reluctant to disclose negative attitudes towards passengers with vision impairments, although we did emphasize the confidential nature of the interview and that we wanted their honest opinions.

6 CONCLUSION

Our work extends knowledge in the HCI and CSCW communities on the sharing economy, labor, and accessibility by presenting findings from ridesharing drivers reflecting on how they support people with vision impairments during trips. We complement existing work that focuses on ridesharing from the perspective of passengers with vision impairments by describing the various forms of labor in which drivers engage, beyond emotional labor. Our discussion of labor shows that there

are nuances in how workers think about labor with regard to perceived meaning and societal benefit. Additionally, our findings show how, in many cases, drivers would like disability disclosed before they pick up a passenger. Yet, as we discuss, there are legal and ethical implications of this disclosure that become clear when situated within the disclosure and algorithmic bias literature. Our design recommendations for how to appropriately provide control over disclosure could be extended to support other stigmatized populations engaging within the sharing economy. More broadly, our contributions could inform HCI researchers, designers, engineers, and policy makers on how to provide accessible transportation experiences for people with disabilities.

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