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Safety and justice conflicts in the age of connected and automated vehicles: perceptions of pedestrians and car drivers

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ABSTRACT

Connected and automated vehicles (CAVs) are an emerging technology expected to improve safety, efficiency, and accessibility outcomes for all road users. However, comprehensive and multi-group analyses of the technology still need to be undertaken by the government, car manufacturers, and researchers, particularly around social aspects such as justice and safety value disparities. This study explores car drivers' and pedestrians' perceptions of safety and justice in the current transport system and how the deployment of CAVs might disrupt them. Interviews were conducted with 30 participants in Australia, a car-dependent country. The participants were 18 car drivers and 12 pedestrians aged between 18 and 79. Participants predominantly identified as either pedestrians or car drivers, though some occasionally used the other mode. The interviews were recorded, transcribed, organised, and analysed using a reflexive thematic analysis. Three main themes were identified: (1) independence, (2) the transport system as a safety problem, and (3) the transport system as a justice problem. The analysis indicated that most participants preferred their current mode of transport due to perceived benefits and enjoyment. Car drivers often highlighted flexibility and independence, while pedestrians valued walkability and convenience. However, both groups expressed concerns about safety and justice in the current transport system, particularly regarding limited accessibility for people with disabilities and inadequate public transport. Finally, while both participants broadly supported the introduction of CAVs, many, especially pedestrians, expressed concerns about their potential to exacerbate existing disadvantages for vulnerable road users. This research finds that greater emphasis should be placed on increasing research on and planning for the impact of CAVs to ensure vulnerable groups' concerns are addressed.

1. Introduction

The transport system is undergoing a dramatic transformation, driven by rapid technological innovations that are reshaping mobility across all modes. Among the most significant of these developments is the emergence of Connected and Automated Vehicles

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(CAVs), vehicles that can communicate with their environment and operate with minimal or no human input (Faisal et al., 2019). CAVs are often promoted as a solution to longstanding transport challenges, with the potential to enhance sustainability, efficiency, and safety (Taiebat et al., 2018; Vahidi & Sciarretta, 2018). However, these anticipated benefits remain unevenly realised, particularly among vulnerable road users (VRUs), including pedestrians and people with disabilities, who face systemic barriers to safe and equitable mobility (United Nations, 2015). Ongoing issues such as road trauma, environmental degradation, and limited transport access continue to disproportionately affect these groups. Globally, road crashes are a leading cause of injury-related death, with VRUs bearing the brunt of this impact (Wang & Li, 2019; Jefferson & McDonald, 2019; Rod et al., 2021). Because they lack external protection, VRUs face a significantly elevated risk of severe injury or fatality in collisions with vehicles. They account for more than half of the 1.2 million road fatalities reported annually worldwide (World Health Organization, 2023). In Australia, this pattern persists: in 2023, pedestrian deaths increased by 7.3 % compared to 2022, signalling that safety improvements are not being distributed equally across user groups (BITRE, 2023). These disparities underscore deeper structural inequities that continue to undermine efforts to create a just and inclusive transport system.

The deployment and integration of CAVs into real-world traffic environments is already underway. Companies such as Waymo, for example, operate fully automated ride-hailing services in Phoenix, Arizona. Studies suggest these services can deliver safety benefits under certain conditions (Schwall et al., 2020; Webb et al., 2020). However, the assumption that automation will automatically create safer systems is not yet supported by consistent real-world evidence. Road crashes remain a global public health issue despite technological progress in vehicles and infrastructure (Anjuman et al., 2020). Critically, CAV systems still struggle to detect and appropriately respond to VRUs in complex, real-world environments. A widely reported case occurred in 2018, when a pedestrian was struck and killed by an autonomous Uber vehicle in Tempe, Arizona (Rosenfield, 2018). This and other incidents illustrate that, despite their promise, current CAV technologies have not yet resolved the safety risks faced by vulnerable users.

Although research on CAVs is growing, major technical and policy questions remain, particularly regarding how to ensure their benefits are equitably distributed and do not exacerbate existing inequalities (Fagnant & Kockelman, 2015; Lee & Hess, 2020; 2022). One of the most pressing concerns is how CAVs will interact with non-automated road users in shared environments (Dietrich, 2021). Without thoughtful policy design and inclusive planning, CAV deployment could entrench or even deepen existing injustices, especially for those already facing heightened transport risks (Epting, 2019).

CAVs are expected to appear in increasing numbers on urban roads in the coming years (Blas et al., 2020; Loke & Rakotonirainy, 2021). Yet public scepticism, limited exposure to the technology, and poor understanding of its implications, especially for VRUs, raise concerns about whether these systems will truly deliver on their safety and equity promises (Martínez-Buelvas et al., 2024a; Martínez-Buelvas et al., 2024b). This makes it essential to evaluate CAVs not only through the lens of technical performance but also in terms of their social impact. Specifically, deployment strategies must proactively address long-standing transport disparities and prioritise justice, sustainability, and safety for all users (Strömberg et al., 2021). Open questions related to this issue include how to align CAV deployment with pressing issues of safety and justice in the transport system for all road users and how to manage the value conflicts that emerge when addressing these concepts as one. To answer these questions, we need to give voice to road users as the private sector has largely dominated the conversation (Cardullo & Kitchin, 2019; Cugurullo et al., 2021; Grossi & Pianezzi, 2017).

The present study acknowledges that the impact of CAV deployment on justice in transport would remain uncertain if vulnerable road users are not taken into account. Our research seeks to bridge this gap in vulnerabilities and injustices that VRUs experience today and could experience in the future with the wide-scale deployment of CAVs by exploring car drivers' and pedestrians' perceptions. Using Reflexive Thematic Analysis (RTA), we were able to deeply explore and interpret the complex, subjective experiences of these road users with the purpose of answering the question of how the deployment of CAVs would affect safety and justice in the primary mode of transport for different road users and within the broader transport system.

2. Literature Review

2.1. Conceptual foundation of transport justice

Justice is a complex and contested concept that has been theorised across various academic traditions. Drawing from scholars such as Fraser (1995), Young (1990), and Kymlicka (2002), justice encompasses distributive, procedural, and recognition-based dimensions. While closely related, equity often focuses more on individual needs, impartiality, and proportionality (Rawls, 1999; Sen, 2009; Schweitzer & Valenzuela, 2004). Despite their conceptual overlap, it is essential to distinguish between the two. In the transport domain, this study adopts a dual framing: transport justice is seen as a bottom-up, society-driven approach that seeks to protect marginalised groups, while transport equity is framed as a top-down, authority-led model aimed at fair resource allocation through expert-based decision-making (Pereira et al., 2017; Martens, 2017; Karner et al., 2020).

The concept of justice in transport systems is increasingly recognised as central to equitable urban mobility. It ensures that no person or group is disadvantaged in accessing life opportunities (Karner et al., 2020) and reinforces core principles such as accessibility, fairness, and equality (Martens, 2017). Justice also demands that no community, especially those historically marginalised, bears an unfair share of the negative impacts associated with transport systems (Pereira et al., 2016). Building on these principles, Martens (2017) highlighted in his *Transport Justice framework* the limitations of traditional transport planning, which often prioritises system performance improvements over the needs and experiences of people using the transport system. Martens argues for the integration of justice principles into transport policy, noting that conventional theories of justice are generally aspatial and tend to neglect mobility issues. His framework provides a theoretical, philosophical, and moral foundation for transport policy, critiquing existing paradigms and practices (Vanoutrive & Cooper, 2019). Martens outlines three core principles, equality, fairness, and

accessibility, to evaluate transport systems and propose interventions aimed at achieving a fairer transport ideal.

There have been numerous examples in the media and literature demonstrating that even in the context of advanced transport systems or other technological improvements, certain groups remain vulnerable due to the unintended consequences of these advancements. For example, Lucas & Jones (2012) state in their research that vulnerable populations (e.g., children, people with disabilities, and low-income populations) are the most prone to experiencing exclusion due to their limited ability to access better opportunities within the transport system. Similarly, Schwanen (2020) argues that there are limits to recognising all the needs, experiences, and practices regarding walking and cycling in London, even when they have a progressive approach to encouraging active travel. The study by Basu et al. (2021) investigates how the suburban built environment impacts perceptions of security, focusing on gender disparities. Their research highlights that women have a significantly higher drop in perceived security at night than men.

Regarding accessibility for people with disabilities, van Holstein et al. (2022) demonstrate that focusing on cognitive access barriers in public transport enriches mobility justice for the limited mobility of a marginalised group in Victoria, Australia. Similarly, Rod et al. (2023) identified key risk dimensions affecting pedestrian behaviour and highlighted the need to address both objective and perceived safety, especially for older adults who are scared that they will not walk anymore due to safety and equity concerns. In other words, the transport system must prioritise not only safety but justice, aiming to contribute to the population's social well-being and inclusivity and minimise accidents, injuries, and fatalities through effective road design, vehicle safety standards, and awareness campaigns, while also ensuring equitable access to services without discrimination or undue barriers.

2.2. Transport justice and the relationship with Connected and automated vehicles (CAVs)

CAVs are an emerging technology promoted as a potential solution to several safety and justice issues in the transport system, e.g., road crashes, lack of accessibility and reduction in pollution (Barnett et al., 2021; Shay et al., 2018). Nevertheless, it is undeniable that the transport system has significant inequities that need to be addressed and solved in the future. While some prior work has recognised that CAVs will have substantial benefits, more is needed to know about the nature and scale of the implications regarding VRUs in the transport system. For example, Martínez-Buelvas et al. (2022) present a transport justice framework that offers a structured approach to addressing potential challenges from integrating CAVs and their interactions with VRUs based on Karel Martens' (2017) framework. The authors highlight that while specific problems can be readily mitigated, others will demand substantial policy revisions and investments in infrastructure to reemphasise the importance of VRUs within the transport system.

Other studies have examined government policy discussions surrounding CAV deployment, but most of the current research tends to focus more on automated vehicles (AVs). Tan & Taeihagh (2021) examined the technical risks of AV governance, highlighting that Singapore's approach accelerates the adoption of disruptive technology. This success is driven by public policies that promote pilots and trials, dynamic public–private partnerships, an innovation-friendly business environment, and inter-agency collaboration that supports deliberative, forward-thinking policy decisions. Dianin et al. (2021) discussed the implications of AVs for accessibility and transportation equity. Similarly, Emory et al. (2022) analysed AV policies with equity implications, categorising them as access and inclusion, multimodal transportation, and community wellbeing.

Despite these initiatives, the distribution of CAV benefits and costs remains uneven, particularly for transportation-disadvantaged communities. Nordhoff et al. (2016) and Vlassenroot & Brookhuis (2018) highlighted that equity is central to acceptance of CAVs, yet current approaches often fail to consider how personal characteristics, such as income, gender, or race, shape adoption and interaction patterns. Maintaining a human-centric approach is essential, as interactions between CAVs and VRUs could otherwise deepen existing transport inequalities (Anderson et al., 2014). Australia has made some progress through safety regulations and infrastructure investments (Lee & Hess, 2020; Manivasakan et al., 2021), but many global policies still fail to adequately address the impact of CAVs on vulnerable users. In addition, recent research has begun to explore how gender influences the intention to use fully automated vehicles. For instance, Useche et al. (2021) found that while trip efficiency and safety are important factors for all users, women's intention to use CAVs is particularly shaped by the anticipated reduction in driving demands, whereas men's decisions are influenced by fuel economy and privacy concerns. This highlights the need to design and communicate CAV benefits in gender-sensitive ways to support equitable adoption.

While Martens' framework offers a foundational perspective on transport justice and CAVs deployment (Beyazit, Soh, & Martens, 2024), other frameworks provide complementary or alternative viewpoints. For example, Milakis, van Arem & van Wee (2017) outline three sequential impact stages of AVs' implications for accessibility and location choices: first-order (traffic, travel costs, choices), second-order (vehicle ownership, location, land use, infrastructure), and third-order (energy, pollution, safety, equity, economy, public health). Similarly, Milakis, Kroesen, & van Wee (2018) present a socio-technical approach, focusing on how technological advancements can reshape transport equity. The authors examined the potential accessibility impacts of fully automated vehicles, developing a conceptual framework to assess these impacts, drawing on the model of four accessibility components: land use, transport, temporal, and individual, based on Geurs & van Wee (2004).

Despite advances in the field, de Sio (2021) underscores the need for a broader ethical debate on the implications of CAVs regarding road safety, privacy, fairness, and responsibility. Echoing these concerns, Hancock (2020) emphasised that the transition to full automation may not be linear or seamless and warned against assuming that automated systems can readily outperform human drivers, particularly in complex interactions. His work also cautions against the erosion of driver autonomy and privacy and argues for a careful, evidence-based approach to CAV deployment that preserves social values and individual expression.

To conclude, the adoption of CAVs may have uneven and potentially unjust consequences, especially concerning interactions with VRUs; for instance, Verlinghieri & Schwanen (2020) argue that it is crucial to explore whether these innovations will be exploited by vested interests or disrupt existing socio-spatial inequalities, thereby altering discussions about rights, responsibilities, and mobility

opportunities. Hence, a comprehensive ethical, legal, and societal framework should guide the development of CAV technology.

3. Method

3.1. Eligibility Criteria Overview

Participants were eligible to participate in this study if they were 18 years or older, from the greater Brisbane area (Queensland, Australia), were current pedestrians or car drivers, and were willing to complete a face-to-face or MS Teams interview. Pedestrians' vulnerability and their frequent vehicle interactions, as well as car drivers' influence on transport systems and policy, justified their inclusion in the study for a comprehensive analysis of CAV deployment. Since all car drivers are pedestrians at some point, and some pedestrians may also drive, participants were allowed to self-identify as either pedestrians or car drivers based on their usual mode of transport. This distinction was important because walking forms a part of all driving trips, often limited to controlled areas such as parking lots or within shopping precincts. In contrast, self-identified pedestrians are likely to experience a broader range of walking environments and have greater exposure to motorised transport than car drivers.

This study centred on Queensland, Australia, due to its significant role in early CAV adoption and testing, evidenced by proactive initiatives (Kaye et al., 2019). The state's diverse transport infrastructure, spanning urban and rural areas, allows for a comprehensive analysis of CAVs' impact across different settings. Queensland's efforts to adapt its legal and regulatory frameworks to accommodate CAVs highlight the importance of understanding the evolving regulatory context (Queensland Government, 2017). These findings provide valuable insights for discussions on CAV adoption in car-dependent urban contexts and can help guide policy and planning in regions worldwide exploring automated vehicle integration.

3.2. Procedure

More research should be conducted regarding safety, justice, and the deployment of CAVs in the transport system because these concepts are multifaceted and context-dependent, involving a range of perspectives, experiences, and cultural influences (Saunders, Lewis, & Thornhill, 2016; Walle, 2015). A qualitative research design was applied to explore pedestrians' and car drivers' perceptions about safety and justice related to deploying CAVs into level 5 of automation (See Society of Automotive Engineers – Levels of driving automation) (Society of Automotive Engineers, 2021). We captured car drivers' and pedestrians' lived experiences, beliefs, and emotions using in-depth semi-structured interviews (Longhurst, 2010; Osborne & Grant-Smith, 2021). This method balances structure and flexibility, facilitating an in-depth exploration of the topic and providing a holistic understanding of human experiences and perspectives. During these interviews, participants often spoke not only of their own experiences but about the experiences of others, providing what Morse (2001) calls "shadowed data." We also adopted a justice and equity lens that requires participants to consider the needs and experiences of others, stepping away from self-interest to reflect on different perspectives (Cameron & Grant-Smith, 2005). By capturing these nuanced perspectives, we better understand how people perceive the current transport system and CAVs deployment, enriching our study with broader insights. Through these methodologies, we investigated the benefits and difficulties car drivers and pedestrians identified about their principal mode of transport, their perception of safety and justice in the current transport system, and their knowledge about any safety or justice problems that the deployment of CAVs may create or exacerbate. After exploring participants' perspectives on safety and justice, we provided a clear explanation of these concepts to ensure better understanding and uniformity in the responses. Besides, prior to delving into CAV-related topics, we asked participants about their familiarity with CAVs and any perceived future problems associated with this new technology.

For those who were unfamiliar, we provided a detailed explanation, including defining CAVs and clarifying Level 5 automation. We also emphasised that our research focused explicitly on private CAVs with Level 5 automation. Participants were interviewed face-to-face or via MS Teams for between 45 and 60 min. An interview guide was developed by the first author and reviewed by the other members of the research team. The interview guide is included in Appendix A.

The study received approval from the Research Ethics Committee (reference number 6593), and data collection was conducted between February and April 2023. Each participant received a $50 e-gift card for their participation. All interviews were audio-recorded and transcribed verbatim by the first author, who also conducted the interviews. Participants were encouraged to contact the research team to share additional information post-interview or to receive a brief report of the results. To ensure a diverse and broad outreach in recruiting participants, we employed various strategies, including online advertising, social media campaigns, snowball sampling, distributing recruitment flyers in Brisbane City, and collaborating with government organisations and government departments such as the Queensland Department of Transport and Main Roads.

3.3. Participants

A total of 30 participants took part in the study, comprising 18 car drivers and 12 pedestrians with varied demographic and mobility profiles. Car drivers ranged in age from 20 to 79 years ($M = 48.3$, $SD = 18.77$), while pedestrians were generally younger, aged 18 to 61 years ($M = 36.0$, $SD = 12.94$). Two-thirds of the sample identified as female (twelve car drivers and eight pedestrians), while 30 % identified as male (five car drivers and four pedestrians) and one participant (a car driver) identified as non-binary. Although four pedestrians reported occasionally driving, their primary mode of transport remained walking.

Participants' travel routines reflected a wide spectrum of engagement with the transport system. Car drivers reported driving on average 4.67 days per week, most often for short durations and distances, though a few drove significantly more. Pedestrians, by

contrast, walked an average of 6.5 days per week, with many walking over an hour and more than 10 km daily. This diversity in age, gender identity, and mobility patterns provides a valuable foundation for examining perspectives on safety and justice in relation to emerging CAV technologies. Detailed participant characteristics are presented in Appendix B.

3.4. Data analysis

We employed Reflexive Thematic Analysis (RTA) as outlined by Braun & Clarke (2006, 2021a) due to its flexibility and theoretical adaptability for qualitative data analysis. RTA facilitates the identification and examination of patterns or themes within a dataset and incorporates a reflexive approach, which emphasises researchers' critical self-awareness and acknowledges how their biases and preconceptions shape the research process (Finlay & Gough, 2008). This method allowed us to explore the nuanced perceptions of safety and justice related to CAVs deployment among different road users rather than focusing solely on one aspect of the data. The research team wanted to answer the following research question: *How would the deployment of CAVs affect safety and justice in the principal mode of transport for different road users, as well as within the broader transport system?*

We began by immersing ourselves in the data, following the six phases of RTA as described by Braun & Clarke (2022). This process involved repeated readings of interview transcripts and noting key insights to familiarise ourselves with the data. We then generated initial codes by identifying meaningful data segments, addressing both semantic (explicit statements) and latent (underlying assumptions) elements (Byrne, 2022; Braun & Clarke, 2021b). These codes were clustered into preliminary themes, which were reviewed, refined, and clarified to ensure distinctiveness. The final step included defining, naming, and documenting the themes. All data coding and analysis were conducted manually to maintain close engagement with the dataset and ensure a deep, interpretive understanding of participants' perspectives.

Throughout this process, extensive discussions among co-authors ensured consensus in coding, theme development, and interpretation of participant quotes. To maintain confidentiality, quotes are presented with pseudonyms, where "D" is stated for driver and "P" for pedestrian. The choice of RTA is justified by its adaptability, its capacity to capture subjective experiences, and its alignment with the research objectives, enabling a thorough exploration of safety and justice concerns in the context of CAV deployment. Additionally, rather than relying on data saturation to determine the sample size, we based our decision on the quality and relevance of the data in addressing the study objectives, which is in line with Braun & Clarke's (2021c) recommendations.

4. Results

The data were developed into three main themes, which explained the perception of safety and justice in the current transport system and participants' perspectives about any safety or justice problem that the deployment of CAVs will have in society. The first theme, *Independence*, was informed and influenced by three subthemes: (1) Convenience, (2) Freedom, and (3) Well-being. The second theme, *The transport system as a safety problem*, was influenced by three subthemes: (1) Road safety, (2) Road behaviour, and (3) Regulation and enforcement. The third theme, *The transport system as a justice problem*, was influenced by two subthemes: (1) Equal right to use the road and (2) Accessibility. The themes were evident across all road users in our dataset (car drivers and pedestrians) and did not appear to differ based on age or gender. The few differences found were explained.

4.1. Independence

This theme represents the shared experiences of independence in the transport system, referring to the ability to have reliable and accessible transport options that allow participants to move around as they wish, regardless of their age, physical abilities, or other factors. Both car drivers and pedestrians valued independence, although their views on how it is currently achieved differed. When discussing the potential of CAVs, many participants highlighted that the technology could enhance independence for groups often underserved by the existing transport system, such as older adults, people with disabilities, or those who do not drive. They saw CAVs as a safer, more accessible, and potentially on-demand alternative to private cars or unreliable public transport. Some envisioned CAVs offering greater autonomy to those who currently rely on others to get around or face limitations due to physical conditions. At the same time, several participants expressed concerns about trusting CAV technology and questioned whether it might disrupt or reduce access to existing transport options. This theme was informed and influenced by three subthemes: (1) Convenience, (2) Freedom, and (3) Well-being.

4.1.1. Convenience

Participants consistently highlighted the convenience of their preferred method. Both car drivers and pedestrians appreciated the ease of their chosen transport; for example, car drivers noted, *"The advantage of being a car driver is you're able to cover a long distance in quite a short time"* [D13]. In contrast, pedestrians valued the simplicity of their mode, stating, *"I feel like it's easy to get to places and don't get stuck in traffic"* [P2]. Cost-effectiveness was also a significant factor for both groups, with car drivers highlighting the financial freedom from avoiding public transport costs: *"It's cost effective and time efficient"* [D13] and pedestrians noting the economic benefit of walking, especially for students: *"economically viable for me to walk just because I don't have to spend anything"* [P8].

Participants showed general awareness and enthusiasm for CAVs, expressing positive attitudes toward their potential. Many saw the technology as promising, with one participant saying, *"I actually like the whole idea of them. I think I'd be more relaxed and at ease if I could just hand the controls over"* [D13], and another sharing excitement as a technology enthusiast, *I'd love it. I absolutely cannot wait for i"* [P3]. However, concerns were also voiced, with some participants expressing apprehension about the limitations and safety of fully

automated vehicles. One respondent noted, *"I'm threatened for several reasons… they are limited by the people programming them and the data sets that are training the"* [D9], while another felt uneasy about the absence of a human driver: *"I feel really unsafe… where there is not a driver per s"* [P5].

Looking forward, participants saw potential benefits in CAVs, particularly for improving mobility for those with limitations or who cannot drive. One participant envisioned using CAVs to maintain independence: *"When I'm older and can't drive, I'll still be independent because I can call a self-driving car for an appointment"* [D7]. At the same time, another appreciated the ease of use, noting, *It's comfortable. You won't need any effort to drive. Just sit there and turn it on"* [P4]. Despite these positive views, both groups agreed that further research is crucial. As one participant suggested, *"Trust between me and the car would be established following a series of research and experiments"* [P4]. At the same time, another emphasised the need for broader public and political engagement, stating, *"We need to get people thinking about this, right? The public and the politicians and users"* [D2].

4.1.2. Freedom

Participants who identified driving or walking as a better way to feel free often evoked the idea of going wherever they wanted or enjoying hobbies. Both car drivers and pedestrians emphasised freedom as a key attraction, with drivers highlighting the control they have over their schedule: *"You decide to leave or to arrive at your destination"* [D1]. Pedestrians, in contrast, appreciated the directness and simplicity of walking*: "You don't need to find car parking. You don't need to sit in traffic"* [P5]. Many participants also valued the flexibility to adjust travel plans for work, leisure, or errands. For example, one driver mentioned, *"I can go and come back whenever I want, and I can carry things in the car"* [D5]. At the same time, a pedestrian enjoyed the spontaneity of window shopping: *"When I'm just walking by, I can look at whatever shop I want"* [P3]. However, pedestrians sometimes view freedom negatively, as their travel could be hindered by traffic, weather, or long distances: *"If the distance is too long, and if it's a sunny day, it becomes a bit exhausting"* [P7].

Looking to the future, opinions on how CAVs could influence their freedom varied. Pedestrians were generally sceptical, feeling that CAVs might complicate their freedom due to design and regulatory issues*: "It would be more difficult to interact with CAVs because so far, they don't consider much about the pedestrian"* [P7]. Conversely, car drivers saw CAVs as a potential enhancement to their mobility and quality of life. They envisioned benefits such as restful travel and simplified navigation: *"I could perhaps just sleep in the car and be at my destination when I wake up"* [D13], and appreciated the *"..simplicity of travel"* that CAVs could offer [D17].

4.1.3. Well-being

Well-being encompasses being happy, healthy, and prosperous in various aspects. Pedestrians argue that walking, an everyday activity for everyone, benefits fitness and mental health. One pedestrian noted, *"There's no stress about driving, and you get exercise also while walking"* [P4]. Another highlighted the mental health benefits: *"You have less stress compared to driving or riding, so I think, for mental health, it's better to be a pedestrian"* [P10]. The attractiveness of walking and driving is often enhanced by the scenic beauty of the surroundings and the enjoyable nature of the activity. A car driver shared their appreciation of Brisbane's scenery, saying, *"Brisbane is beautiful. The scenery is amazing, especially going to the city at night, and a car is a must-have experience"* [D13]. Similarly, a pedestrian expressed, *"I think the thing I like the most is having a green environment, having all these species that you can find in many places in Brisbane"* [P10]. Both modes of transport also provide opportunities for social interaction. One pedestrian said, *"The good part is communicating with people when you're walking. You get to know the neighbourhood; you get to know people, we can stop and chat with them"* [P6]. A car driver echoed this sentiment: *"It gives you a lot of flexibility in terms of timing, choices, and meeting people, so I think it's great, it's a lot easier, from a social point of view, to do that"* [D2]. However, participants had differing views on the impact of weather conditions while driving or walking. Car drivers appreciated their vehicles' protection against adverse weather: *"The car protects you from heat stroke"* [D11]. On the other hand, pedestrians saw the weather as a significant drawback to walking: *"What do I dislike? On the other side of the weather thing, in the summertime, it's like you have to dodge; you must find shade. It's too hot, humid, and sometimes, like, if I do commute on foot, I have to bring a change of clothes"* [P9].

Regarding the potential of CAVs to positively impact well-being, both groups acknowledged the possibilities but were cautious about the inherent uncertainties and costs. A pedestrian expressed scepticism, *"I know that there is always a system failure. I just don't understand how a vehicle that relies on humans to have programmed it can be safer"* [P5]. Meanwhile, a car driver remarked, *"It should be useful and make us safer, but probably not cheap"* [D7].

4.2. The transport system as a safety problem

This theme represented participants' perspectives of how CAV deployment would have the potential to address many of the safety problems in the traditional transport system by reducing human error or enhancing road safety measures; however, the transition to CAVs has its own set of challenges. Both participants discussed safety as a central concern in developing and deploying CAVs. While CAVs offer the potential to reduce accidents and enhance road safety significantly, they also pose unique safety challenges that require careful consideration and regulatory oversight. The following sub-themes were identified around this topic: (1) Road safety, (2) Road behaviour, and (3) Regulation and enforcement.

4.2.1. Road safety

Participants discussed the difficulties associated with driving and walking, reflecting diverse perspectives on their experiences with road safety. Some participants felt secure and capable without feeling disadvantaged compared to other road users. For instance, one driver shared, *"I have a nice, safe car. I've been driving since I could and feel like a capable driver"* [D3]. Similarly, a pedestrian noted, *"I am a pedestrian because I want to be a pedestrian, not because it is my last option"* [P10]. Conversely, others expressed frustration with the

current transport system, feeling it favoured car drivers. One driver commented, *"Car drivers have the biggest advantage on the road because that's what the road systems are designed for"* [D9], while a pedestrian observed, *"Brisbane's not designed for walking necessarily. It's definitely made more for drivers than it is for walking"* [P12].

Participants also proposed measures to improve road safety outcomes for all users. One driver suggested separating pedestrians from car traffic, advocating for better public transport: *"Get the cars off the road with disincentives and get people onto public transport with incentives by making the public transport system more reliable and more accessible"* [D4]. A pedestrian emphasised the need for urban planners to consider the pedestrian perspective: *"Transport planners, urban planners, and city designers should put themselves in the sneakers of the pedestrian and see what being a pedestrian is like in different situations"* [P10]. These suggestions highlight the importance of designing inclusive transport systems that cater to all road users.

The deployment of CAVs sparked a mix of optimism and concern among participants. While they acknowledged the potential for CAVs to reduce accidents and enhance road safety, they also expressed worries about the technology's reliability and the lack of safety knowledge. One driver noted, *"The biggest problem is safety. So, I guess the current legislation needs to consider it"* [D6]. Another participant added, *"They expect accidents to occur less or prevent accidents. But since there is no data to prove that, I think it could increase the rate of accidents"* [D13]. Concerns about real-life operations and trust in the technology were prevalent. A pedestrian questioned emergency mechanisms: *"What to do if you saw a car not operating the way it should, like is there an emergency mechanism to stop it?"* [P6]. Overall, participants expressed the need for more research and understanding of CAVs before fully trusting their safety benefits. One driver remarked, *"I probably won't use it at the moment. I'm not sure; it will depend on how good the technology becomes"* [D6]. Another added, *"I think it would depend if I was able to actually get my hands on one"* [D11].

4.2.2. Road behaviour

This subtheme navigates the interaction between different road users, highlighting concerns about safety and aggressive behaviour on the road. Participants consistently expressed disgust about these issues, regardless of age, gender, or type of road user. Many were particularly worried about how aggressive driving contributes to stress and anxiety, creating a hostile driving environment. One driver observed, *"I found the speed that people drive and probably the risks that they take as well. There's been a real decline in road safety; I don't feel as safe driving now as I used to feel. People generally go faster, are less patient, and courteous"* [D1]. Another driver noted, *"People don't drive with enough foresight to anticipate what other people are doing. Also, people probably spend most of their time on their phones rather than looking straight ahead, which I would consider a threat to my safety"* [D4]. Pedestrians shared similar concerns, with one commenting, *"The bus drivers can be quite erratic. I understand that they're on a schedule, but often you'll see people are still just getting on when they'll take off, and they don't wait for people to sit down"* [P1].

Participants expressed cautious optimism regarding the potential for CAVs to reduce aggressive behaviour and distractions on the road. One driver remarked, *"If they are running at 100 % and they've done all the alphas and the betas, and they're tested for years, everything was running fine. Taking off the human factors then will increase safety"* [D15]. However, many participants were concerned about removing the human element from driving. A pedestrian voiced unease: *"I feel unsafe about the concept of a fully automated car where no driver controls what happens around it. I know road accidents and fatalities are a huge problem, especially in Australia, but I don't see how a vehicle could be faster or more intuitive than a person"* [P5]. These perspectives underscore the need for extensive testing and reassurance before CAVs can be widely accepted.

4.2.3. Regulation and enforcement

Participants frequently identified the lack of regulation and enforcement as a central issue contributing to transport safety problems. One driver highlighted the need for better law enforcement, asserting, *"People should have a right to be able to drive in a safe manner, and if people are not obeying the rules, then they should be called to account for that "*[D1]. Similarly, a pedestrian suggested more targeted measures to enhance safety: *"More reduction of speed for cars in local areas.. mechanisms to slow them down using the resources and increase awareness for pedestrians and car drivers"* [P4]. These insights reflect a consensus that current safety issues stem from insufficient regulatory frameworks and enforcement practices, which exacerbate risks for all road users.

When discussing CAVs, participants strongly believed in the necessity of robust regulations to manage their integration and address potential challenges. A driver emphasised the importance of developing and enforcing regulations specifically for CAVs: *"There should be inbuilt laws against CAVs. They should be [tested] only by not-for-profit research organisations in conjunction with the government*" [D9]. Another driver cautioned against over-reliance on CAVs as a panacea for road safety issues, recommending that *"Governments need to take the advice of experts and not be sucked into that kind of mess of this is gonna solve all our problems… more research on actual impairing equal evidence and also, take lessons from what's happening in other countries"* [D12]. A pedestrian proposed a practical approach for initial CAV deployment, stating, *"They should be tested in small areas where the impact on pedestrians is minimal"* [P1]. In addition, participants advocated for broader transport improvements, such as reducing speed limits, decreasing reliance on cars, and enhancing public transport accessibility: *"Reduce speed limits. Reduce the reliance on cars as a main form of transport. Make public transport more accessible and affordable, and make walking easier"* [P12].

4.3. The transport system as a justice problem

This theme reflects participants' perceptions of how the transport system as a justice problem underscores the need for fairness, equity, and accessibility in transport policies and practices. Both participants emphasised the need for an inclusive, equitable, and sustainable transport system that serves the needs of all members of society, especially for all who are vulnerable or marginalised, instead of CAV deployment. The following sub-themes were identified around this theme: (1) Equal right to use the road and (2)

Accessibility.

4.3.1. Equal right to use the road

Participants generally understood the concept of justice in the current transport system as related to equal rights for all road users, regardless of their mode of transport. Many expressed that justice entails ensuring all roadways' safe and equitable use. As one participant put it, *"Justice would mean that whatever your capacity is—whether walking, using a scooter, bicycle, car, or public transport—you can use it confidently and safely"* [P4]. Another participant emphasised the need for equal rights across different transport modes, stating, *"All modes of transport have equal rights to use the way, whether it's a road or a footpath or a cycling lane"* [P5]. A driver echoed similar sentiments about fairness and accountability: *"We should all have an equal right to use the roadway and feel safe… when people are clearly not doing the right thing, I believe there should be consequences for them"* [D1].

Despite this understanding, participants highlighted significant disparities within the current transport system. Many felt the system was skewed in favour of cars, creating an unequal experience for non-drivers. One participant observed, *"Cities have long been engineered to favour cars, so if you're not a car, you're disadvantaged"* [D5]. Another noted the financial inequality associated with car ownership: *"It's not an equal playing field in terms of people having sufficient funds to, you know, either have their own car or to properly maintain a car"* [D3]. Additionally, discrepancies in public transport access were cited as a fairness issue: *"We have different suburbs, and each suburb has different access to the different levels of transport. Some suburbs have very good public transport because of the access to pathways and frequent busses, but for most of them, like mine, the bus service is very average. So that's not very fair"* [D6]. Participants also called for improved infrastructure and more investment in public transport to address these inequities: *"More investment in infrastructure and public transportation is needed"* [D6], and *"It's better to have bikes entirely separate from cars"* [D9].

Regarding CAVs deployment, participants expressed scepticism about their ability to address existing injustices in the transport system. They called for more comprehensive discussions involving all stakeholders to ensure that the deployment of CAVs does not exacerbate current inequalities. One participant noted, *"Inequities are all definitely things that I would be concerned about. This illustrates the need to be objective about it, consider the facts, and look at both sides, the pros and cons should also not be taken in by what manufacturers say."* [D12]. Another highlighted the need for prioritising societal needs from multiple perspectives*: "Companies will advocate for this type of car, and they will always be saying good things because it is their business to sell you a car. Also, I think that Governments, on the one hand, want a society that thrives and that is modern. So, I think it is about prioritising what really should come first and from different perspectives"* [P10]. This indicates a recognition that while CAVs could offer benefits, they must be carefully regulated to ensure they contribute to a fair and equitable transport system.

4.3.2. Accessibility

Participants consistently highlighted the urgent need to address accessibility issues within the current transport system, particularly concerning vulnerable groups and people with disabilities. Many expressed concerns about the limitations faced by those with mobility challenges. One participant noted*, "In Brisbane, it's a lot harder for disabled people in wheelchairs to access a lot of different locations"* [P8]. At the same time, another mentioned, *"Footpaths can be narrow and too close to fast traffic"* [P5]. This reflects a broader concern about the exclusion of certain groups from fully participating in mainstream society due to inadequate infrastructure.

When discussing the deployment of CAVs and looking forward to the future, participants were equally concerned about ensuring equitable access and addressing existing justice issues. They noted that while CAVs could potentially improve transport options, there is a risk that these benefits may not be evenly distributed. One participant emphasised, *"We need to be very aware of making our transport options accessible and equitable for everyone"* [D7]. Another raised concerns about socioeconomic disparities, suggesting that CAVs might exacerbate existing inequalities: *"Rich people will be able to access exclusive lanes, get to work faster, and so on"* [P6]. There was also scepticism about the impact of CAVs on congestion, with one participant questioning, *"I don't understand why they think that the congestion will be reduced by using these cars because these cars will take up the same space as regular vehicles"* [P7]. This highlights a need for careful consideration of how new technologies will be integrated into the transport system to avoid perpetuating or widening existing inequities.

4.4. A thematic roadmap conceptualising the safety and justice perspective of CAVs deployment

The findings from our interviews with car drivers and pedestrians have identified three key themes that characterise car drivers' and pedestrians' perceptions of safety and justice related to the deployment of CAVs. These themes include (1) independence, (2) the transport system as a safety problem, and (3) the transport system as a justice problem. The results highlight the various benefits CAVs can bring. Still, they also shed light on the significant perceived enjoyment, justice, and safety challenges their adoption may pose among car drivers and pedestrians.

CAVs will influence user behaviour and preferences within an existing transport system. Therefore, these themes help frame participants' perceptions of justice within the larger landscape of their perspectives with CAVs about safety and perceived enjoyment. By presenting these themes alongside our justice findings, we offer a more comprehensive view that can better inform discussions and decisions about CAV implementation. Understanding these themes provides valuable insights into how CAVs might be integrated into the current transport ecosystem and their potential impact on road users. We have created Fig. 1, a thematic framework to visually represent these themes, their sub-themes, and their interrelationships. Fig. 1 outlines the opportunities and challenges in deploying CAVs to enhance safety and justice in the transport system within car drivers' and pedestrians' perceptions. Overall, independence highlighted how participants thought about their current experience with the transport system and how CAV would impact their perceived enjoyment. The transport system as a safety problem refers to the infrastructure, regulations, and organisations collectively

responsible for operating, maintaining, and improving the transport system and how CAVs would ensure safe integration with traditional transport modes. Finally, the transport system as a justice problem emphasises various social problems, which may be interconnected with individualism and system issues in the transport system.

5. Discussion

The present study used a qualitative research design and reflexive thematic analysis to explore car drivers' and pedestrians' perceptions of safety and justice concerning CAV deployment. This approach allowed for a detailed capture of diverse road user opinions. Discussions covered the benefits and difficulties of current transport modes, perceptions of safety and justice in the existing transport system, and potential safety or justice issues with future CAV deployment. Regardless of road user type, participants saw similar advantages and disadvantages in CAVs entering urban traffic. They were excited about potential safety improvements by eliminating human error but had concerns about increased disadvantages for vulnerable road users, safety issues, and accessibility for those without resources. This study applied an interdisciplinary, innovative approach by integrating values like justice and safety, which are often studied in isolation despite communities considering a wide range of values when interacting with transport systems. This section will contextualise the three themes identified and their key sub-themes against relevant literature, helping the reader appreciate the broad view of justice and safety in the transport system and the implications of future CAV deployment.

5.1. Mobility, infrastructure, and urban safety

Regardless of their current experiences with the transport system or the perceived benefits and enjoyment associated with driving or walking, participants consistently described their chosen mode of transport as a way to support their daily lifestyle and hobbies. Both drivers and pedestrians emphasised convenience and timing as important factors in their transport choices. For car drivers, using a personal vehicle was often linked to a sense of autonomy and control, findings that align with previous research (Marsh & Collett, 1986; Glasgow & Blakely, 2000). Walking, on the other hand, was valued for its affordability, health benefits, and sustainability (Arellana et al., 2020). However, pedestrians also noted its limitations for longer distances or in poor weather conditions. Despite this, walking was recognised as a way to reduce traffic congestion and improve both physical and mental health. Indeed, it has been shown to lower rates of chronic disease and reduce healthcare costs (Lee & Buchner, 2008).

Most participants stated that the cities have long been engineered to favour road-use cars. Both car drivers and pedestrians proposed separate pedestrians for car drivers, which is consistent with Flatt & Odinsman's (2015) and Saeidizand et al. (2022) studies. Both studies found inadequate active transport infrastructure in Australia and the U.S., and motorists dominate available public road space. Another central point of concern among car drivers and pedestrians was frequently related to two main topics: the safety of everyone using the road and instances of hostile or aggressive behaviour exhibited by road users. They agreed that in Brisbane, there needs to be more regulation and enforcement for all road users. Research indicates that aggressive behaviour from car drivers poses a significant safety risk for pedestrians, as drivers often seem unaware of them (Pires, 2020). Additionally, cyclists and e-scooters are seen as unpredictable, adding to safety concerns for both car drivers and pedestrians (O'Hern et al., 2020; Haworth et al., 2021; Useche et al., 2022). We also found that car drivers and pedestrians had some knowledge about the concept of safety, and only a few learned about it when we explained it to them.

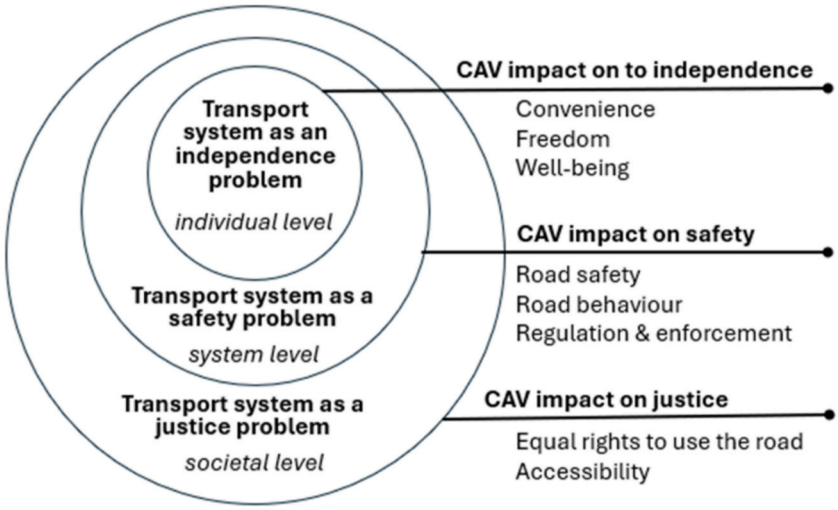

Fig. 1. A thematic roadmap conceptualising the safety and justice perspective of CAVs deployment.

5.2. Perceptions of justice in the transport system

Although the concept of justice is commonly referenced in mobility and transport planning, it often remains vague or poorly defined in practical implementation (Adli et al., 2019). In this study, participants identified several justice-related concerns in Brisbane's current transport system, particularly in relation to unequal access for people with disabilities, disparities in how the road is used, and the unfair distribution of transport benefits across different user groups. These findings are in line with previous studies that have highlighted persistent inequities in urban transport systems (Lucas & Jones, 2012; Schwanen, 2020; Basu et al., 2021; van Holstein et al., 2022).

Despite the strong momentum behind CAV development, driven by government and industry enthusiasm, participants expressed mixed feelings about their deployment. While many were curious and optimistic about the potential benefits of CAVs, they also raised several concerns. A common issue was a general lack of trust in the technology's capabilities, especially in complex or unpredictable road environments. In addition, participants consistently pointed to affordability as a major barrier: even those who saw value in the technology believed that CAVs would be financially out of reach for many. This aligns with Xu and Fan's (2019) findings, which emphasise the importance of public willingness to adopt CAVs as a key driver of successful deployment. Building and maintaining that trust will require clear and transparent communication (Rebalski et al., 2022).

Our findings also suggest that income level plays a role in attitudes toward adoption. Participants with higher incomes or a history of regularly purchasing new vehicles were more likely to view CAVs positively, often associating them with convenience and even social status (Sharma & Mishra, 2020). However, both drivers and pedestrians expressed reservations stemming from a limited understanding of how these vehicles operate. Many indicated a desire for more information from trusted, independent sources, such as government bodies or academic institutions, before they could place confidence in the technology.

5.3. Potential of CAVs for inclusive and sustainable mobility

Participants widely agreed that CAVs have the potential to significantly improve the quality of life for groups who currently face mobility barriers. Literature shows that CAVs could potentially alleviate mobility barriers for specific groups, such as individuals with disabilities (Milakis & van Wee, 2020), older adults (Faber & Lierop, 2020), and those unfit to drive (e.g., children) (Lee & Mirman, 2018). Furthermore, car drivers and pedestrians envision this novel technology as a convenient transport mode, offering enhanced productivity and the liberty to engage in other hobbies while travelling.

Regarding the public transport provision in Brisbane, it is important to note that while the levels of provision are indeed lower compared to Asian and European cities, our findings represent participant perspectives, which may or may not accurately reflect the actual provision levels in different parts of the city. The key point is that participants contextualised their views on the potential promises and challenges of CAVs within the broader framework of car dependency and lower public transport provision typical of the local context. This context is crucial as it highlights how participants perceive CAVs as part of the existing transport system rather than an isolated innovation. Understanding this contextualisation is essential for integrating CAVs effectively into the broader transport system and mitigating any potential unintended consequences on both the transport system and its users.

5.4. Safety limitations, ethical concerns, and recommendations

When discussing safety in the transport system, both car drivers and pedestrians acknowledged a shared understanding: no system is infallible, and CAVs, like any other technology, are vulnerable to failure. While existing literature suggests that CAVs may reduce the overall number of crashes, it also recognises that complete elimination of road incidents is unlikely, as no automated system can be considered entirely foolproof (Sepehri, Memarmontazerin & Saffarzadeh, 2021). Participants emphasised the need for further research into the real-world safety implications of CAVs. They expressed a desire for more robust, evidence-based arguments to better understand and communicate the technology's potential benefits and limitations. Importantly, they also highlighted the necessity of including all stakeholders in these conversations, from policymakers and researchers to everyday road users, to ensure a more inclusive and grounded understanding of the risks and opportunities that CAVs present.

A key ethical dilemma raised by participants was the idea of removing the human element from the driving task. For some, this created uncertainty about responsibility, decision-making, and the potential loss of human judgment in critical situations, concerns that echo previous findings in the literature (König & Neumayr, 2017). Additionally, participants voiced worries about the social justice implications of CAV deployment. While they recognised that it would be impossible to address every existing injustice within the transport system, they were clear in stating that these discussions must still take place. These concerns reflect broader issues in the current research landscape, which remains fragmented and often overlooks how CAVs interact with vulnerable road users (VRUs) (Martínez-Buelvas et al., 2022; 2024b). As such, there is a strong need for ongoing critical dialogue and collaborative policymaking that place justice and equity at the forefront of future transport planning.

To conclude, CAVs have the potential to enhance safety and mobility, but their deployment must prioritise equity to prevent exacerbating existing transport injustices. Infrastructure investments should integrate CAVs with pedestrian-friendly spaces, dedicated lanes for non-motorised transport, and enhanced public transit connections rather than reinforcing car dominance. Rigorous testing and regulatory oversight are necessary to ensure CAVs reliably detect and respond to all road users, including pedestrians, cyclists, and people with disabilities. Furthermore, financial barriers must be addressed through subsidies and shared services to prevent access from being limited to high-income users. Inclusive stakeholder engagement is essential in shaping policies that reflect the needs of vulnerable and underrepresented groups. Additionally, if CAVs are financially out of reach for most, limited exposure may hinder trust-

building and reinforce transport inequities. To counter this, transparent trials, public demonstrations, and the promotion of shared CAV services can facilitate wider acceptance. Early regulatory interventions that ensure affordability and equitable access are crucial to aligning CAV deployment with broader transport justice and sustainability goals.

6. Limitations

When interpreting the results of this study, it is important to acknowledge several methodological limitations, particularly those inherent in qualitative research. As is characteristic of such approaches, the relatively small sample size limits the extent to which findings can be generalised or used to draw broad population-level conclusions. In reflexive thematic analysis, the concept of data saturation is not considered a meaningful or appropriate benchmark for determining sample size (Braun & Clarke, 2021c). Instead, participant numbers were guided by the richness, relevance, and depth of the data collected, consistent with established principles of qualitative inquiry (Creswell, 1988; Terry et al., 2017; Qu & Dumay, 2011).

While a sample of 30 participants is considered adequate for generating detailed, in-depth insights into lived experiences, it is not intended to yield statistically representative claims. This study was exploratory, designed to enhance understanding of how CAVs' deployment is perceived by road users. However, the findings reflect a highly localised context with limited demographic variation, which further constrains the generalisability of the results. Most participants were drawn from a single urban setting, Brisbane, and shared broadly similar socio-economic backgrounds. This homogeneity limits the diversity of perspectives captured, especially about regional, rural, or culturally diverse communities. As such, the study provides a focused snapshot of road user views in one metropolitan context and should be interpreted as illustrative and context-specific rather than representative of the wider Australian population.

We therefore urge readers to approach the findings with caution. Qualitative research is, by its nature, situated and contextual. The value of this study lies not in producing universal conclusions but in generating grounded, exploratory insights that can inform further investigation (Leung, 2015). Transparency remains essential in qualitative work; however, linking it directly to replicability can be conceptually problematic (Pratt et al., 2020). This study prioritises methodological rigour and analytical depth, contributing to transparent scholarship through clear documentation of processes and rationale. Importantly, this research contributes a nuanced understanding of how CAVs are perceived by both drivers and pedestrians, with particular attention to equity, inclusion, and transport justice. Policymakers may draw on these findings to inform community engagement strategies and policy development, particularly in assessing whether the identified challenges, concerns, and benefits resonate beyond the study setting. Future research could build on these insights by replicating the study in car-dependent regional cities, such as Cairns or Townsville, where differing transport infrastructures and user needs may shape attitudes towards CAV deployment in distinct ways.

Another important limitation relates to participants' lack of direct experience with high-level vehicle automation. None of the individuals interviewed had the opportunity to observe or interact with a Level 5 CAV in real-world conditions. This absence of firsthand experience may have influenced their responses, potentially introducing bias. Perceptions, both positive and negative, were likely shaped by prior knowledge, assumptions, or media representations of CAVs, rather than by direct engagement with the technology. Future research would benefit from including participants who have interacted with varying levels of vehicle automation, as this could provide a more nuanced understanding of how familiarity with such systems influences attitudes and expectations.

The exclusion of cyclists from the sample also presents a noteworthy limitation. While cyclists, like pedestrians, are classified as VRUs, they experience distinct travel patterns, risk exposures, and interactions with transport systems. In Australia, cycling infrastructure is often separated from pedestrian pathways, shaping how cyclists are exposed to traffic conditions and how they might interact with automated vehicles (Thorpe et al., 2024). Cyclists also face particular equity challenges, including disparities in infrastructure investment, regulatory protections, and perceptions of safety. Although both groups navigate vehicle-dominated environments, this study focused on pedestrians due to their broader and more frequent interactions with motor vehicles, particularly in uncontrolled or mixed-use environments (Rod et al., 2021). Pedestrians also represent a more demographically diverse population, including older adults and people with disabilities, who are disproportionately affected by safety and accessibility barriers.

Finally, the potential influence of researcher subjectivity should be considered. In qualitative research, and especially within reflexive thematic analysis, the researcher's positionality, comprising their background, experiences, and interpretive lens, is not viewed as a limitation but as an integral part of the analytical process (Braun & Clarke, 2021a). Reflexivity enhances transparency and interpretive depth, although it also means that findings are necessarily shaped by the researcher's perspective. Acknowledging this influence is key to maintaining analytical integrity. In conclusion, while these limitations constrain the generalisability of the study, they do not diminish its contribution. This research offers important exploratory insights into how CAV deployment is perceived through a transport justice lens. Future research should build on these findings through mixed-methods approaches or larger, more representative samples to capture the broader impacts of CAVs on VRUs in diverse settings.

7. Conclusions

This study contributes to the growing body of research examining the societal implications of CAV deployment, with a specific focus on safety and justice as perceived by two key road user groups: car drivers and pedestrians. Through reflexive thematic analysis of 30 in-depth interviews, we identified three overarching themes: (1) independence as a valued outcome of transport choices and a potential benefit of CAVs, particularly for groups with limited mobility; (2) the transport system as a site of persistent safety concerns, including inadequate regulation, aggressive road behaviours, and the perceived limitations of CAVs in reliably addressing these issues; and (3) the transport system as a justice problem, highlighting systemic inequities in access, infrastructure, and opportunity, which

may be reinforced rather than mitigated by CAVs if equity is not prioritised in policy and design.

While participants expressed cautious optimism about the potential of CAVs, they also articulated clear concerns about their accessibility, affordability, and trustworthiness. The findings suggest that the successful integration of CAVs will depend not only on technological readiness but also on a commitment to addressing longstanding structural inequities in the transport system. Participants emphasised the need for inclusive planning, transparent public engagement, and robust regulatory oversight to prevent the marginalisation of vulnerable road users and ensure a more equitable distribution of benefits.

Given that CAV technology remains in its early stages, there is a critical window of opportunity to shape its development in line with principles of justice. For policymakers and practitioners, the results underscore the importance of embedding equity and safety considerations into the early phases of CAV planning, design, and governance. Doing so can help build public trust, support broader social acceptance, and ensure that the advantages of automation are equitably shared, rather than reinforcing existing disparities. This study also highlights the importance of understanding community travel patterns, existing transport challenges, and expectations surrounding automated mobility. These insights are particularly valuable for car manufacturers and technology developers seeking to design user-centred systems that reflect the needs and concerns of diverse populations.

Finally, to support more equitable and inclusive CAV deployment, we recommend that future research adopt longitudinal, interdisciplinary, and comparative approaches, examining how trust in CAVs evolves, assessing justice outcomes in real-world trials, and analysing transport justice frameworks across different cultural and geographic contexts. A more integrated research agenda drawing from ethics, public policy, urban planning, and human factors will be essential for realising a just and sustainable transition to automated mobility.

CRediT authorship contribution statement

Laura Martínez-Buelvas: Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Data curation, Conceptualization. **Andry Rakotonirainy:** Writing – review & editing, Supervision, Formal analysis. **Deanna Grant-Smith:** Writing – review & editing, Supervision, Formal analysis. **Oscar Oviedo-Trespalacios:** Writing – review & editing, Writing – original draft, Supervision, Formal analysis, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A

Demographics

- Age
- Gender
- Nationality
- How many days a week do you drive/walk? How many hours per day?
- Last week, how many kilometres did you drive/walk per day?

General experience driving/walking

- What are the advantages of being a car driver/pedestrian?
- Do you feel disadvantaged compared with other road users?
- What are the positives and negatives of driving/walking in Brisbane?
- Would you recommend this mode of transport to others? Why? Why not?
- What do you like and dislike about your experience as a car driver/pedestrian in Brisbane?

Perception of safety and justice

- What does justice in transport mean for you?
- Do you think the current transport system in Brisbane is just?
- What needs to change in the transport system to improve justice?
- What safety in transport means for you?

- What are the more significant threats to your safety as a car driver?
- Do you think the current transport system in Brisbane is safe?
- What needs to change in the transport system to improve safety?

Exploring interactions with Connected and Automated Vehicles (CAVs):

- Before today, have you heard of the term Connected and automated vehicles (CAVs)? (Show the definition to participants if they do not know)
- Please describe your immediate feeling towards CAVs
- What do you like and dislike about CAVs?
- How useful would you find CAVs?
- How would you feel about a CAV taking control away from you as the driver?
- How long would it take you to feel comfortable using a CAV?
- What would encourage/stop you to buy a CAV?
- Can you think of any potential problems or concerns you might have using a CAV?

Connected and Automated Vehicles (CAVs) justice problems:

- Before today, have you heard of any safety or justice problem that the deployment of CAVs could have in society? (Show some examples of injustices if they do not know)
- What do you think about the transport justice problems CAVs will bring in the future?
- Now that you are aware of some of the transport justice problems associated with CAVs, is there anything else that worries you about them and their implementation in Brisbane?
- Please share any suggestions regarding managing these issues (e.g., policy recommendations)

Appendix B

Table 1
Demographic characteristics of participants.

Participant Code	Type of road user	Age (years)	Gender	How many days a week do you drive/walk per week?	How many hours do you drive/walk per day?	How many kilometres do you drive/walk per day?
D1	Car driver	61	M	5 days	Less than 1 h	Less than 50 km
D2	Car driver	79	M	5 days	3 – 4 h	50 – 100 km
D3	Car driver	60	F	3 days	3 – 4 h	More than 100 km
D4	Car driver	46	M	3 days	More than 4 h	More than 100 km
D5	Car driver	78	F	5 days	Less than 1 h	Less than 50 km
D6	Car driver	42	M	5 days	Less than 1 h	50 – 100 km
D7	Car driver	57	F	4 days	Less than 1 h	50 – 100 km
D8	Car driver	70	F	7 days	3 – 4 h	50 – 100 km
D9	Car driver	25	NB	4 days	Less than 1 h	Less than 50 km
D10	Car driver	37	F	7 days	3 – 4 h	More than 100 km
D11	Car driver	26	F	7 days	More than 4 h	More than 100 km
D12	Car driver	53	F	3 days	2 – 3 h	50 – 100 km
D13	Car driver	20	M	4 days	Less than 1 h	Less than 50 km
D14	Car driver	58	F	7 days	2 – 3 h	50 – 100 km
D15	Car driver	34	F	3 days	Less than 1 h	Less than 50 km
D16	Car driver	36	F	3 days	2 – 3 h	Less than 50 km
D17	Car driver	20	F	4 days	More than 4 h	Less than 50 km
D18	Car driver	68	F	5 days	Less than 1 h	Less than 50 km
P1	Pedestrian	61	F	7 days	1 – 2 h	5 – 10 km
P2	Pedestrian	28	F	7 days	2 – 3 h	More than 10 km
P3	Pedestrian	29	F	7 days	More than 4 h	More than 10 km
P4	Pedestrian	23	M	7 days	2 – 3 h	More than 10 km
P5	Pedestrian	53	M	7 days	2 – 3 h	More than 10 km
P6	Pedestrian	54	F	3 days	2 – 3 h	Less than 5 km
P7	Pedestrian	37	F	7 days	1 – 2 h	Less than 5 km
P8	Pedestrian	18	F	7 days	Less than 1 h	Less than 5 km
P9	Pedestrian	32	F	7 days	1 – 2 h	More than 10 km
P10	Pedestrian	38	F	7 days	1 – 2 h	Less than 5 km
P11	Pedestrian	24	M	5 days	Less than 1 h	Less than 5 km
P12	Pedestrian	35	M	7 days	Less than 1 h	5 – 10 km

Data availability

The authors do not have permission to share data.

References

Adli, S. N., Chowdhury, S., & Shiftan, Y. (2019). Justice in public transport systems: A comparative study of Auckland, Brisbane, Perth and Vancouver. *Cities, 90*, 88–99. https://doi.org/10.1016/j.cities.2019.01.031

Anderson, J. M., Nidhi, K., Stanley, K. D., Sorensen, P., Samaras, C., & Oluwatola, O. A. (2014). *Autonomous vehicle technology: A guide for policymakers*. Rand Corporation.

Anjuman, T., Hasanat-E-Rabbi, S., Siddiqui, C. K. A., & Hoque, M. M. (2020). December). Road traffic accident: A leading cause of the global burden of public health injuries and fatalities. In *In Proceedings of the International Conference on Mechanical Engineering Dhaka Bangladesh* (pp. 29–31).

Arellana, J., Alvarez, V., Oviedo, D., & Guzman, L. A. (2021). Walk this way: Pedestrian accessibility and equity in Barranquilla and Soledad. *Colombia. Research in Transportation Economics, 86*, Article 101024. https://doi.org/10.1016/j.retrec.2020.101024

Barnett, R., Hume, C. M. & Taylor, A. (2021). Comparison of Connected Automated Vehicle to Pedestrian Interaction Systems to Reduce Vehicle Waiting Times. 2021 IEEE Systems and Information Engineering Design Symposium, SIEDS 2021.

Basu, N., Haque, M. M., King, M., Kamruzzaman, M., & Oviedo-Trespalacios, O. (2021). The unequal gender effects of the suburban built environment on perceptions of security. *Journal of Transport & Health, 23*, Article 101243. https://doi.org/10.1016/j.jth.2021.101243

Beyazit, E., Soh, E., & Martens, K. (2024). Rescuing Transport from Inequities: How Can Automated and Connected Transport Contribute to a More Inclusive Transport System? *Sustainable Automated and Connected Transport, 139–159*. https://doi.org/10.1108/s2044-994120240000019008

Blas, F., Giacobone, G., Massin, T., & Rodríguez Tourón, F. (2020). Impacts of vehicle automation in public revenues and transport equity: Economic challenges and policy paths for Buenos Aires. *Research in Transportation Business & Management, 100566*. https://doi.org/10.1016/j.rtbm.2020.100566

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Braun, V., & Clarke, V. (2021a). *Thematic analysis: A practical guide*. London: Sage Publications.

Braun, V., & Clarke, V. (2021b). One size fits all? What counts as quality practice in (reflexive) thematic analysis? *Qualitative Research in Psychology, 18*(3), 328–352. https://doi.org/10.1080/14780887.2020.1769238

Braun, V., & Clarke, V. (2021c). To saturate or not to saturate? Questioning data saturation as a useful concept for thematic analysis and sample-size rationales. *Qualitative research in sport, exercise and health, 13*(2), 201–216. https://doi.org/10.1080/2159676X.2019.1704846

Byrne, D. (2022). A worked example of Braun and Clarke's approach to reflexive thematic analysis. *Quality & Quantity, 56*(3), 1391–1412. https://doi.org/10.1007/s11135-021-01182-y

Bureau of Infrastructure, Transport and Regional Economics. *Road Deaths Australia.* (2023) Statistical Summary. Canberra, ACT, Australia: 2023.

Cameron, J., & Grant-Smith, D. (2005). Building citizens: Participatory planning practice and a transformative politics of difference. *Urban Policy and Research, 23*(1), 21–36. https://doi.org/10.1080/0811114042000335296

Cardullo, P., & Kitchin, R. (2019). Smart urbanism and smart citizenship: The neoliberal logic of citizen-focused'smart cities in Europe. *Environment & Planning C: Politics and Space, 37*(5), 813–830. https://doi.org/10.1177/0263774X18806508

Creswell, J. W. (1998). *Qualitative Inquiry and Research Design: Choosing Among Five Traditions*. Thousand Oaks, CA: Sage.

Cugurullo, F., Acheampong, R. A., Gueriau, M., & Dusparic, I. (2021). The transition to autonomous cars, the redesign of cities and the future of urban sustainability. *Urban Geography, 42*(6), 833–859. https://doi.org/10.1080/02723638.2020.1746096

Department of Transport and Main Roads. (2019). *Queensland Walking Strategy 2019-2029*. https://www.tmr.qld.gov.au/travel-and-transport/pedestrians-and-walking/queensland-walking-strategy [28.04.2023].

De Sio, F. S. (2021). The European Commission report on ethics of connected and automated vehicles and the future of ethics of transportation. *Ethics and Information Technology., 23*, 713–726. https://doi.org/10.1007/s10676-021-09609-8

Dianin, A., Ravazzoli, E., & Hauger, G. (2021). Implications of autonomous vehicles for accessibility and transport equity: A framework based on literature. *Sustainability, 13*(8), 4448. https://doi.org/10.3390/su13084448

Dietrich, M. (2021). Addressing inequal risk exposure in the development of automated vehicles. *Ethics and Information Technology, 23*, 727–738. https://doi.org/10.1007/s10676-021-09610-1

Emory, K., Douma, F., & Cao, J. (2022). Autonomous vehicle policies with equity implications: Patterns and gaps. *Transportation Research Interdisciplinary Perspectives, 13*, Article 100521. https://doi.org/10.1016/j.trip.2021.100521

Epting, S. (2019). Automated vehicles and transportation justice. *Philosophy & Technology, 32*, 389–403. https://doi.org/10.1007/s13347-018-0307-5

Faber, K., & Van Lierop, D. (2020). How will older adults use automated vehicles? Assessing the role of AVs in overcoming perceived mobility barriers. *Transportation Research Part A: Policy and Practice, 133*, 353–363. https://doi.org/10.1016/j.tra.2020.01.022

Faisal, A., Kamruzzaman, M., Yigitcanlar, T., & Currie, G. (2019). Understanding autonomous vehicles. *Journal of Transport and Land Use, 12*(1), 45–72. https://doi.org/10.5198/jtlu.2019.1405

Fagnant, D. J., & Kockelman, K. (2015). Preparing a nation for autonomous vehicles: Opportunities, barriers and policy recommendations. *Transportation Research Part A - Policy and Practice, 77*, 167–181. https://doi.org/10.1016/j.tra.2015.04.003

Finlay, L., & Gough, B. (2008). *Reflexivity: A practical guide for researchers in health and social sciences*. John Wiley & Sons.

Flatt, L., & Odinsman, J. (2015). *The institutionalisation of cycling: A case study of Sydney and Melbourne*. Lund University. Master's Thesis.

Fraser, N. (1995). Recognition or redistribution? A critical reading of Iris Young's Justice and the Politics of Difference. *Journal of Political Philosophy, 3*(2), 166–180. https://doi.org/10.1111/j.1467-9760.1995.tb00033.x

Geurs, K. T., & Van Wee, B. (2004). Accessibility evaluation of land-use and transport strategies: Review and research directions. *Journal of Transport Geography, 12*(2), 127–140. https://doi.org/10.1016/j.jtrangeo.2003.10.005

Glasgow, N., & Blakely, R. M. (2000). Older nonmetropolitan residents' evaluations of their transportation arrangements. *Journal of Applied Gerontology, 19*(1), 95–116. https://doi.org/10.1177/0733464800019001

Grossi, G., & Pianezzi, D. (2017). Smart cities: Utopia or neoliberal ideology? *Cities, 69*, 79–85. https://doi.org/10.1016/j.cities.2017.07.012

Hancock, P. A. (2020). Driving into the Future. *Frontiers in Psychology, 11*, Article 574097. https://doi.org/10.3389/fpsyg.2020.574097

Haworth, N., Schramm, A., & Twisk, D. (2021). Comparing the risky behaviours of shared and private e-scooter and bicycle riders in downtown Brisbane. *Australia. Accident Analysis & Prevention, 152*, Article 105981. https://doi.org/10.1016/j.aap.2021.105981

Jefferson, J., & Mcdonald, A. D. (2019). The autonomous vehicle social network: Analysing tweets after a recent Tesla autopilot crash. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 63*, 2071–2075. https://doi.org/10.1177/1071181319631510

Karner, A., London, J., Rowangould, D., & Manaugh, K. (2020). From transportation equity to transportation justice: Within, through, and beyond the state. *Journal of Planning Literature, 35*, 440–459. https://doi.org/10.1177/0885412220927691

Kaye, S. A., Buckley, L., Rakotonirainy, A., & Delhomme, P. (2019). An adaptive approach for trialling fully automated vehicles in Queensland Australia: A brief report. *Transport Policy, 81*, 275–281. https://doi.org/10.1016/j.tranpol.2019.07.007

Kymlicka, W. (2002). *Contemporary political philosophy: An introduction* (2nd ed.). Oxford: Oxford University Press.

König, M., & Neumayr, L. (2017). Users' resistance towards radical innovations: The case of the self-driving car. *Transportation Research Part F: Traffic Psychology and Behaviour, 44*, 42–52. https://doi.org/10.1016/j.trf.2016.10.013

Lee, I. M., & Buchner, D. M. (2008). The importance of walking to public health. *Medicine & Science in Sports & Exercise, 40*(7), S512–S518.

Lee, Y. C., & Mirman, J. H. (2018). Parents' perspectives on using autonomous vehicles to enhance children's mobility. *Transportation Research Part C: Emerging Technologies, 96*, 415–431. https://doi.org/10.1016/j.trc.2018.10.001

Lee, D., & Hess, D. J. (2020). Regulations for on-road testing of connected and automated vehicles: Assessing the potential for global safety harmonisation. *Transportation Research Part A: Policy and Practice, 136*, 85–98. https://doi.org/10.1016/j.tra.2020.03.026

Lee, D., & Hess, D. J. (2022). Public concerns and connected and automated vehicles: Safety, privacy, and data security. *Humanities and Social Sciences Communications, 9*(1), 1–13. https://doi.org/10.1057/s41599-022-01110-x

Leung, L. (2015). Validity, reliability, and generalizability in qualitative research. *Journal of Family Medicine and Primary Care, 4*(3), 324–327. https://doi.org/10.4103/2249-4863.161306

Longhurst, R. (2010). Semi-structured interviews and focus groups. In N. Clifford, M. Cope, T. Guillespie, & S. French (Eds.), *Key Methods Geogr* (3rd ed., pp. 143–156). London: SAGE.

Loke, S., & Rakotonirainy, A. (2021). *The Automated City: Internet of Things and Ubiquitous Artificial Intelligence*. Switzerland, Springer: Cham.

Lucas, K., & Jones, P. (2012). Social impacts and equity issues in transport: An introduction. *Journal of Transport Geography, 21*, 1–3.

Manivasakan, H., Kalra, R., O'Hern, S., Fang, Y., Xi, Y., & Zheng, N. (2021). Infrastructure requirement for autonomous vehicle integration for future urban and suburban roads–Current practice and a case study of Melbourne, Australia. *Transportation Research Part A: Policy and Practice, 152*, 36–53. https://doi.org/10.1016/j.tra.2021.07.012

Martens, K. (2017). *Transport justice: Designing fair transportation systems*. New York: N.Y., Routledge.

Marsh, P. E., & Collett, P. (1986). *Driving passion: The psychology of the car*. Faber & Faber (January 1, 1987).

Martínez-Buelvas, L., Rakotonirainy, A., Grant-Smith, D., & Oviedo-Trespalacios, O. (2022). A transport justice approach to integrating vulnerable road users with automated vehicles. *Transportation Research Part D: Transport and Environment, 113*, Article 103499. https://doi.org/10.1016/j.trd.2022.103499

Martínez-Buelvas, L., Rakotonirainy, A., Grant-Smith, D., Oviedo-Trespalacios, O. (2024a). Impact of Connected and Automated Vehicles on Transport Injustices. *2024 IEEE Intelligent Vehicles Symposium (IV), Jeju Island, Korea, Republic of,* 1609-1614. doi: 10.1109/iv55156.2024.10588552.

Milakis, D., & van Wee, B. (2020). Implications of vehicle automation for accessibility and social inclusion of people on low income, people with physical and sensory disabilities, and older people. *In Demand for emerging transportation systems* (pp. 61-73). doi: 10.1016/B978-0-12-815018-4.00004-8.

Milakis, D., Van Arem, B., & Van Wee, B. (2017). Policy and society related implications of automated driving: A review of literature and directions for future research. *Journal of Intelligent Transportation Systems, 21*(4), 324–348. https://doi.org/10.1080/15472450.2017.1291351

Martínez-Buelvas, L., Rakotonirainy, A., Grant-Smith, D., & Oviedo-Trespalacios, O. (2024b). A multi-road user evaluation of the acceptance of connected and automated vehicles through the lenses of safety and justice. *Transportation Research Part F: Traffic Psychology and Behaviour, 107*, 521–536. https://doi.org/10.1016/j.trf.2024.09.011

Milakis, D., Kroesen, M., & van Wee, B. (2018). Implications of automated vehicles for accessibility and location choices: Evidence from an expert-based experiment. *Journal of Transport Geography, 68*, 142–148. https://doi.org/10.1016/j.jtrangeo.2018.03.010

Morse, J. M. (2001). Using shadowed data. *Qualitative Health Research, 11*(3), 291–292. https://journals.sagepub.com/doi/pdf/10.1177/104973201129119091.

Nordhoff, S., Van Arem, B., & Happee, R. (2016). Conceptual model to explain, predict, and improve user acceptance of driverless podlike vehicles. *Transportation Research Record, 2602*(1), 60–67. https://doi.org/10.3141/2602-08

O'Hern, S., Stephens, A. N., Young, K. L., & Koppel, S. (2020). Personality traits as predictors of cyclist behaviour. *Accident Analysis & Prevention, 145*, Article 105704. https://doi.org/10.1016/j.aap.2020.105704

Osborne, N., & Grant-Smith, D. (2021). In-depth interviewing. In S. Baum (Ed.), *Methods in Urban Analysis*. Singapore: Springer. https://doi.org/10.1007/978-981-16-1677-8_7.

Pereira, R. H., Schwanen, T., & Banister, D. (2017). Distributive justice and equity in transportation. *Transport Reviews, 37*(2), 170–191. https://doi.org/10.1080/01441647.2016.1257660

Pires, C., Torfs, K., Areal, A., Goldenbeld, C., Vanlaar, W., Granié, M. A., & Meesmann, U. (2020). Car drivers' road safety performance: A benchmark across 32 countries. *IATSS Research, 44*(3), 166–179. https://doi.org/10.1016/j.iatssr.2020.08.002

Pratt, M. G., Kaplan, S., & Whittington, R. (2020). Editorial essay: The tumult over transparency: Decoupling transparency from replication in establishing trustworthy qualitative research. *Administrative Science Quarterly, 65*(1), 1–19. https://doi.org/10.1177/0001839219887663

Qu, S. Q., & Dumay, J. (2011). The qualitative research interview. *Qualitative research in accounting & management, 8*(3), 238–264. https://doi.org/10.1108/11766091111162070

Queensland Government. (2017). Cooperative and Automated Vehicle Initiative. Online at: https://www.qld.gov.au/transport/projects/cavi/cavi-project [30.07.2024].

Rawls, J. (1999). *A theory of justice (revised edition.)*. Cambridge, Mass: Belknap Press of Harvard University Press.

Rebalski, E., Adelfio, M., Sprei, F., & Johansson, D. J. (2022). Too much pressure? Driving and restraining forces and pressures relating to the state of connected and autonomous vehicles in cities. *Transportation Research Interdisciplinary Perspectives, 13*, Article 100507. https://doi.org/10.1016/j.trip.2021.100507

Rod, J. E., Oviedo-Trespalacios, O., Senserrick, T., & King, M. (2021). Older adult pedestrian trauma: A systematic review, meta-analysis, and GRADE assessment of injury health outcomes from an aggregate study sample of 1 million pedestrians. *Accident Analysis and Prevention, 152*, Article 105970. https://doi.org/10.1016/j.aap.2021.105970

Rod, J. E., King, M., & Oviedo-Trespalacios, O. (2023). The impact of perceived injury risk and psychosocial factors on walking equity. *Transportation Research Part D: Transport and Environment, 116*, Article 103590. https://doi.org/10.1016/j.trd.2022.103590

Rosenfield, E. (2018). Tempe police release video of deadly Uber accident. Online at: https://www.cnbc.com/2018/03/21/uber-pedestrian-accident-tempe-police-release-video.html [31.03.2022].

Saeidizand, P., Fransen, K., & Boussauw, K. (2022). Revisiting car dependency: A worldwide analysis of car travel in global metropolitan areas. *Cities, 120*, Article 103467. https://doi.org/10.1016/j.cities.2021.103467

Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research methods for business students*. Pearson Education.

Schwall, M., Daniel, T., Victor, T., Favaro, F., & Hohnhold, H. (2020). Waymo public road safety performance data. *arXiv preprint arXiv:2011.00038*. doi: 10.48550/arXiv.2011.00038.

Schwanen, T. (2020). Low-carbon mobility in London: A just transition? *One Earth, 2*(2), 132–134. https://doi.org/10.1016/j.oneear.2020.01.013

Schweitzer, L., & Valenzuela, A., Jr (2004). Environmental injustice and transportation: The claims and the evidence. *Journal of Planning Literature, 18*(4), 383–398. https://doi.org/10.1177/0885412204262958

Sen, A. (2009). *The idea of justice*. Cambridge, Mass: Belknap Press of Harvard Univ. Press.

Sepehri Rad, A., Memarmontazerin, S., & Saffarzadeh, M. (2021). Effect of connected and autonomous vehicles on traffic safety. *Road, 29*(108), 51–62.

Sharma, I., & Mishra, S. (2020). Modeling consumers' likelihood to adopt autonomous vehicles based on their peer network. *Transportation Research Part D: Transport and Environment, 87*, Article 102509. https://doi.org/10.1016/j.trd.2020.102509

Shay, E., Khattak, A. J., & Wali, B. (2018). Walkability in the Connected and Automated Vehicle Era: A US perspective on research needs. *Transportation Research Record, 2672*, 118–128. https://doi.org/10.1177/0361198118787630

Society of Automotive Engineers. (2021). *SAE levels of driving automation™ refined for clarity and international audience.* Online at: https://www.sae.org/blog/sae-j3016-update [30.07.2024].

Strömberg, H., Ramos, É. M. S., Karlsson, M., Johansson, M., Ekman, F., Bligård, L.-O., & Bergstad, C. J. (2021). A future without drivers? Comparing users', urban planners' and developers' assumptions, hopes, and concerns about autonomous vehicles. *European Transport Research Review, 13*, 44. https://doi.org/10.1186/s12544-021-00503-4

Taiebat, M., Brown, A. L., Safford, H. R., Qu, S., & Xu, M. (2018). A review on energy, environmental, and sustainability implications of connected and automated vehicles. *Environmental Science & Technology, 52*(20), 11449–11465.

Tan, S. Y., & Taeihagh, A. (2021). Adaptive governance of autonomous vehicles: Accelerating the adoption of disruptive technologies in Singapore. *Government Information Quarterly, 38*(2), Article 101546. https://doi.org/10.1016/j.giq.2020.101546

Terry, G., Hayfield, N., Clarke, V., & Braun, V. (2017). Thematic analysis. In C. Willig, & W. Stainton Rogers (Eds.), *The SAGE Handbook of Qualitative Research in Psychology* (2nd edition,, pp. 17–37). London: SAGE:

Thorpe, A., Johnson, M., Hercus, C., Rudge, T., Boufous, S., & Chong, D. (2024). Infrastructure, regulation and the experiences of delivery cyclists in Australian cities. *Nature Cities, 1–9*. https://doi.org/10.1038/s44284-024-00145-2

United Nations. (2015). *Transforming our world: The 2030 Agenda for Sustainable Development,* A/RES/70/1, Online at: https://www.refworld.org/docid/57b6e3e44.html [14.09.2022].

Useche, S. A., Peñaranda-Ortega, M., Gonzalez-Marin, A., & Llamazares, F. J. (2021). Assessing the effect of drivers' gender on their intention to use fully automated vehicles. *Applied Sciences, 12*(1), 103. https://doi.org/10.3390/app12010103

Useche, S. A., Gonzalez-Marin, A., Faus, M., & Alonso, F. (2022). Environmentally friendly, but behaviorally complex? A systematic review of e-scooter riders' psychosocial risk features. *PLoS one, 17*(5), Article e0268960. https://doi.org/10.1371/journal.pone.0268960

Vahidi, A., & Sciarretta, A. (2018). Energy saving potentials of connected and automated vehicles. *Transportation Research Part C: Emerging Technologies, 95*, 822–843. https://doi.org/10.1016/j.trc.2018.09.001

Vanoutrive, T., & Cooper, E. (2019). How just is transportation justice theory? The issues of paternalism and production. *Transportation Research Part A: Policy and Practice, 122*, 112–119. https://doi.org/10.1016/j.tra.2019.02.009

Verlinghieri, E., & Schwanen, T. (2020). Transport and mobility justice: Evolving discussions. *Journal of Transport Geography, 87*, Article 102798. https://doi.org/10.1016/j.jtrangeo.2020.102798

van Holstein, E., Wiesel, I., & Legacy, C. (2022). Mobility justice and accessible public transport networks for people with intellectual disability. *Applied Mobilities, 7*(2), 146–162. https://doi.org/10.1080/23800127.2020.1827557

Vlassenroot, S., & Brookhuis, K. (2018). Socio-psychological factors that influence acceptability of intelligent transport systems: A model. In *Driver Acceptance of New Technology* (pp. 35–50). CRC Press.

Walle, A. H. (2015). *Qualitative research in business: A practical overview*. Cambridge Scholars Publishing.

Wang, S., & Li, Z. X. (2019). Exploring the mechanism of crashes with automated vehicles using statistical modeling approaches. *Plos One, 14*(3), Article e0214550. https://doi.org/10.1371/journal.pone.0214550

Webb, N., Smith, D., Ludwick, C., Victor, T., Hommes, Q., Favaro, F., ... & Daniel, T. (2020). Waymo's safety methodologies and safety readiness determinations. *arXiv preprint arXiv:2011.00054*. doi: 10.48550/arXiv.2011.00054.

World Health Organization. (2023). Advocates Around the World #SpeakUp for #RoadSafety. Online at: https://www.who.int/teams/social-determinants-of-health/safety-and-mobility/global-status-report-on-road-safety-2023 [25.01.2024].

Xu, X., & Fan, C.-K. (2019). Autonomous vehicles, risk perceptions and insurance demand: An individual survey in China. *Transportation Research Part A: Policy and Practice, 124*, 549–556. https://doi.org/10.1016/j.tra.2018.04.009

Young, I. M. (1990). *Justice and the Politics of Difference*. Princeton University Press.