

Are Parents Willing to Allow their Unaccompanied Children to Travel in Emerging & Future Travel Modes?

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Child Occupant Protection seminar: Latest knowledge & challenges in future mobility
Gothenburg, Sweden, September 21st 2022



BACKGROUND

An increasing global emphasis on emerging & future travel modes to provide **SAFE, AFFORDABLE, ACCESSIBLE, & SUSTAINABLE** transportation (United Nations, 2016).

- Unable to drive, or unable to obtain driver's licence, including: ageing adults, adults with medical conditions &/or physical or cognitive impairments, & children/adolescents (Koppel et al., 2019).



Rideshare (RS) & automated vehicles (AV) could provide mechanism for independent travel.

Research explored potential for travel modes to enhance mobility of ageing adults & adults with impairments (Abraham et al., 2017; Li et al., 2019; Musselwhite et al., 2015; Reimer, 2014).

- Limited research explored use of RS (Koppel et al., 2021) &/or AV to transport unaccompanied children/adolescents (Lee & Mirman, 2018; Tremoulet et al., 2020).

Understanding factors influencing parents' decision-making re: willingness to use transportation modes (i.e., trust unknown driver &/or driverless system) important for guiding development of policies & strategies that encourage their use.

WORKSHOP - 2019



BACKGROUND

Tremoulet et al. (2020) examined P' decisions re: using AVs to transport unaccompanied children/teens.

- Ps of 8-16 yrs rode in driving simulator in autonomous mode & interviewed re: views & features required to support child in AV.
- Benefit = convenience.
- Fear = Can't protect child during unplanned trip interruptions.
- Required vehicle features: 2-way audio & video feeds, seatbelt checks, automatic locking, secure passenger identification, & remote access to vehicle information.

Lee & Mirman (2018) used online survey & behavioural willingness to investigate Ps' willingness ('definitely' / 'might' / 'hesitant' / 'never') to use AVs to enhance children's mobility.

- Willingness related to technology readiness, parent (sex, residence area) & child (age, restraint system).
- Benefits = advance mobility & safety.
- Using AVs to transport children = likely ridership scenario.
- Concerns = losing active vehicle control & being alone in AV.

SPECIAL ISSUE: Human Factors and Advanced Vehicle Automation

Transporting Children in Autonomous Vehicles: An Exploratory Study

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Transportation Research Part C: Emerging
Technologies

Volume 96, November 2018, Pages 415-431



Parents' perspectives on using autonomous
vehicles to enhance children's mobility

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BACKGROUND

Online survey examined willingness (definitely/might/hesitant/never) to use AV to transport unaccompanied children/teen.

- 775 Ps lived with ≥ 1 child (≤ 17 years).
- Willingness to use AV to transport unaccompanied child:
 - I would definitely (7.7%)
 - I might (17.0%)
 - I would be hesitant (31.7%)
 - I would never (43.5%)
- Willingness (definitely/might/hesitant) associated with Ps' age, gender, education level, propensity for technology adoption, risky driving behaviours, perceived AV knowledge, & requirements for assurance-related features in AV.

Current study aimed to investigate Ps' willingness to allow unaccompanied children to travel in RS & AV.



Transportation Research Part F: Traffic Psychology
and Behaviour

Volume 78, April 2021, Pages 137-152



Key factors associated with Australian parents' willingness to use an automated vehicle to transport their unaccompanied children

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Article

Parents' Willingness to Allow Their Unaccompanied Children to Use Emerging and Future Travel Modes

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METHOD

Participants

Eligible if: aged ≥ 18 years; lived in Australia; drove ≥ 1 x week (pre-COVID-19), & lived with ≥ 1 children (aged ≤ 17 years).

Materials

Ps completed online survey (approx. 25 min).

Socio-Demographic Characteristics:

- age, gender, education level, household income.

Child Characteristics & Transport Patterns:

- # (& age) of children (≤ 17 years) living with them.
- youngest child's: age, gender, type of restraint (RF CRS, FF CRS, booster, seatbelt, no restraint), frequency of restraint use (1=Always; 6=Never), frequency of travelling in different modes, including RS (1=Daily; 8=Never).

Driving Characteristics:

- annual mileage (kms), driving frequency (1=Daily; 5 \leq 1 per week), crash &/or infringement history in past 2 years, frequency of seatbelt use (1=Always; 6= Never).



METHOD

Materials

Driving Behaviour Questionnaire (DBQ) (Reason et al., 1990):

- 28-items measuring frequency of engaging in risky driving behaviours (0=Never; 5=Always):
 - errors (e.g., Hit something when reversing that you hadn't noticed).
 - lapses (e.g., Forget where you left your parked car).
 - violations (e.g., Disregard the speed limit).
 - aggressive violations (e.g., Get angry at a driver and express your anger any way you can).
- Higher scores = higher frequency of risky driving behaviours.

Technology Readiness Index 2.0 (TRI 2.0) (Parasuraman et al., 2015):

- 16-items measuring technology readiness (1=Strongly Disagree; 5=Strongly Agree):
 - innovativeness (e.g., I keep up with the latest technological developments).
 - optimism (e.g., New technologies contribute to a better quality of life).
 - insecurity (e.g., People are too dependent on technology).
 - discomfort (e.g., I think technology systems are not designed for use by ordinary people).
- Higher scores = higher propensity for technology adoption.

Awareness of Automated Vehicles:

- Aware of 'automated vehicles' (e.g., Yes; Not sure; No).



METHOD

Materials

Importance of Vehicle Features (Lee et al., 2020):

- Importance of 25 features (1=Unnecessary; 4=Required) for transporting unaccompanied children:
 - route-control (i.e., GPS tracking to know where vehicle is at all times).
 - assurance (i.e., installation of camera/microphone to see/hear child in vehicle).
 - safety (i.e., ability to restrain child appropriately).
 - comfort (i.e., ability to control vehicle entertainment).

Willingness to Allow Unaccompanied Child to Travel (Lee & Mirman, 2018):

- Willingness to allow unaccompanied child to travel in RS & AV:
 - I would definitely
 - I might
 - I would be hesitant
 - I would never

Procedure

Study approved by Institutional ethics committee.

- Ps recruited through online & social media advertising.
- Survey administered from Aug – Nov 2020.



RESULTS

631 Ps (M=39.2 years, SD=10.5 years, Min=18 years, Max=70 years) completed online survey.

Socio-demographic characteristics		% (N)
Age (years)	18-34	38.5% (243)
	35-54	53.4% (337)
	55+	8.1% (51)
Sex	Male	36.6% (231)
	Female	63.4% (400)
Education level	Primary/Intermediate/High school	15.8% (100)
	Technical/Trade/Diploma	30.0% (189)
	Undergraduate/Postgraduate	54.2% (342)
Annual household income (\$AUD)	≤\$100,000	63.6% (385)
	≥\$100,001	36.4% (220)
	Prefer not to say	4.1% (26)

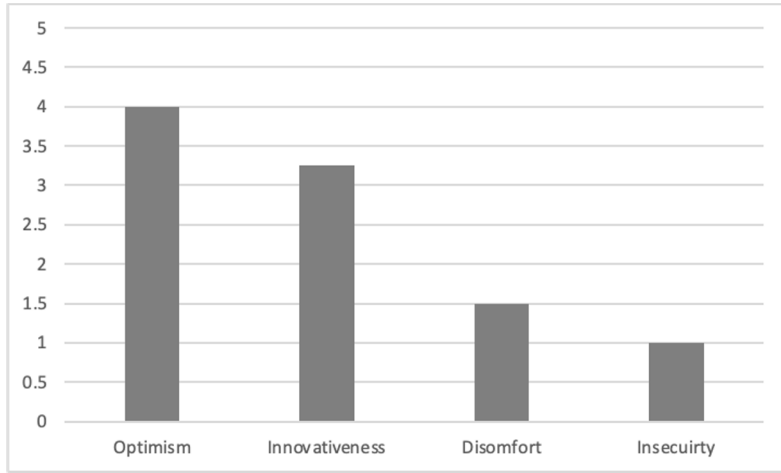
RESULTS

Driving Characteristics		% (N)
Driving frequency	Daily	56.3% (355)
	4–6 times per week	31.5% (199)
	2–3 times per week	9.5% (60)
	<1 time per week	2.7% (17)
Estimated annual mileage (kms)	<5,000 km	20.3% (128)
	5,001–15,000 km	46.6% (294)
	≥15,001 km	33.1% (209)
Seatbelt use	Always	92.6% (584)
	Almost always/Usually/Sometimes/Almost never/Never	7.4% (47)
Crash involvement (past 2 years)	No	90.6% (572)
	Yes	9.4% (59)
Driving infringements (past 2 years)	No	87.3% (551)
	Yes	12.7% (80)
Perceived AV knowledge	Yes	80.2% (506)
	No	19.8% (125)

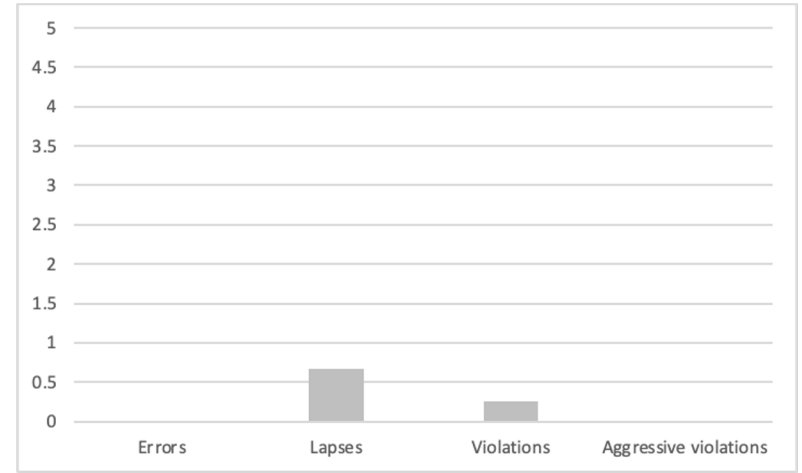
RESULTS

Youngest Child Characteristics		% (N)
Age	<1 year	5.2% (33)
	1–3 years	29.0% (183)
	4–7 years	23.0% (145)
	8–12 years	22.5% (142)
	13–17 years	20.3% (128)
Sex	Male	54.2% (342)
	Female	45.5% (287)
	Other	0.3% (2)
Frequency of vehicle travel	Daily	29.3% (185)
	4–6 times per week	38.8% (245)
	2–3 times per week	22.3% (141)
	≤1 time per week	9.5% (60)
Type of restraint	Rearward-facing CRS	11.3% (71)
	Forward-facing CRS	22.3% (141)
	Booster seat	21.7% (137)
	Seatbelt	41.8% (264)
	No restraint	2.9% (18)
Frequency of restraint use	Always	85.6% (540)
	Almost always/Usually/Sometimes	10.3% (65)
	Never	4.1% (26)

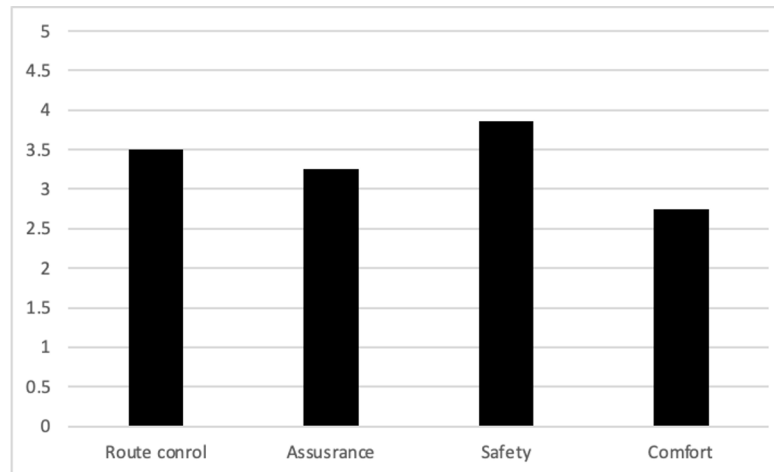
RESULTS



Technology Readiness Index 2.0



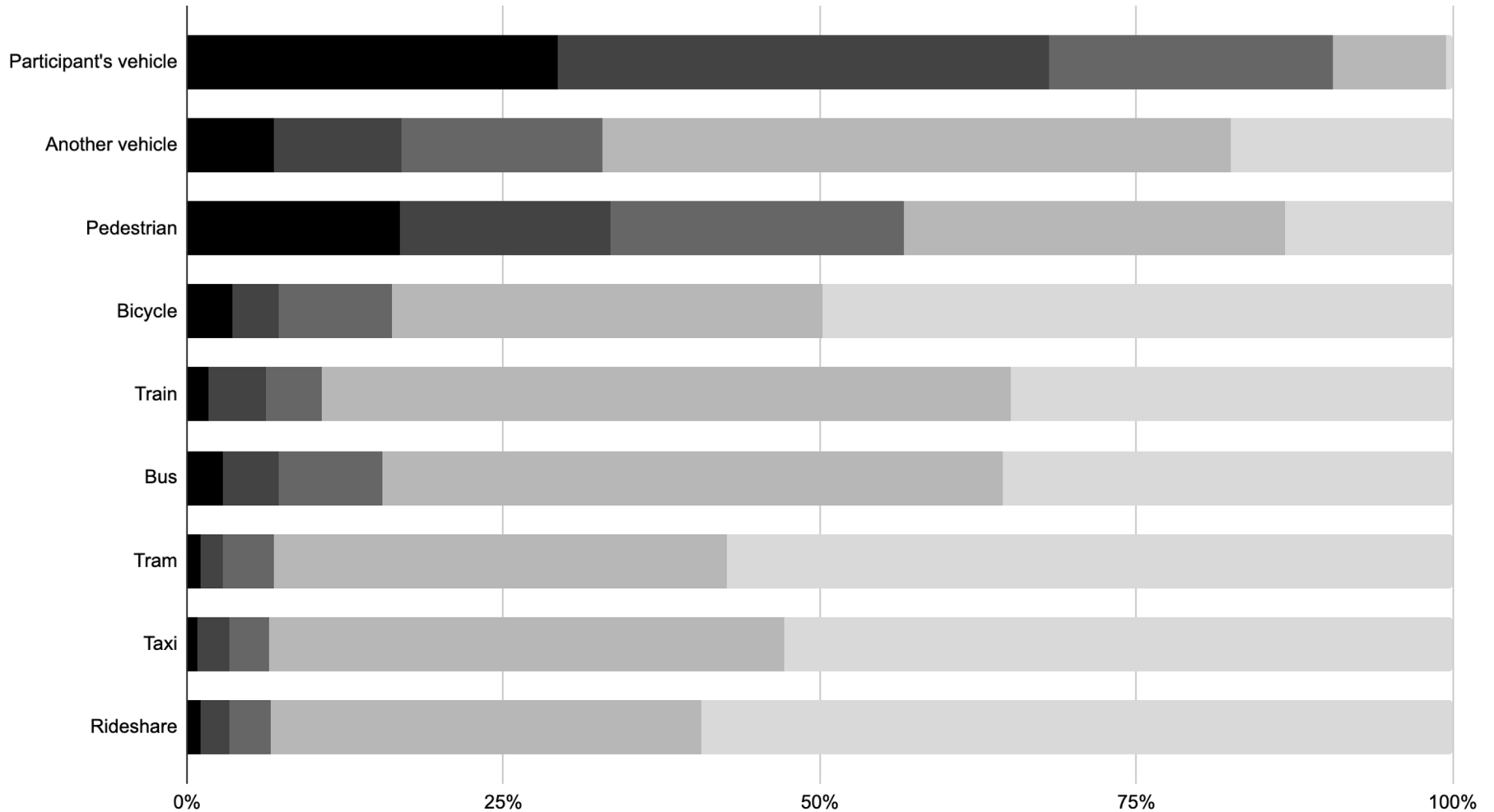
Driving Behaviour Questionnaire



Importance of Vehicle Features

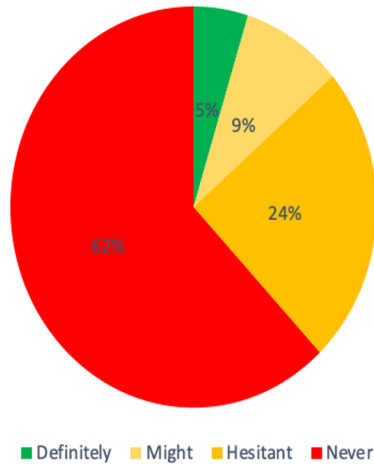
RESULTS

■ Daily ■ 4-6 days per week ■ 2-3 times per week ■ Once per week ■ Never

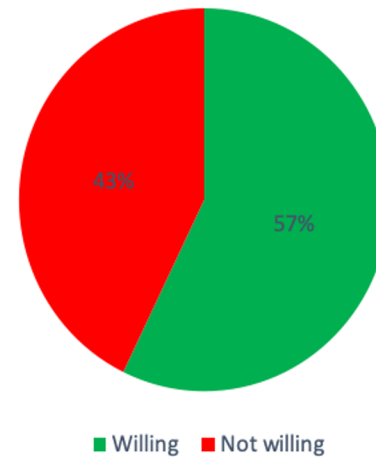
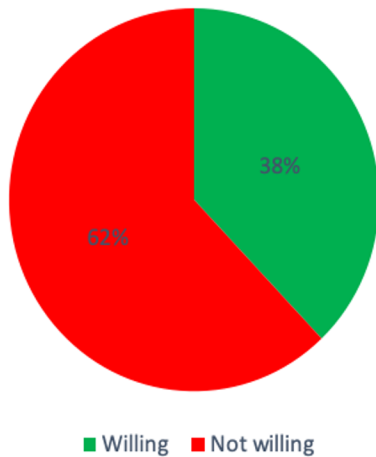
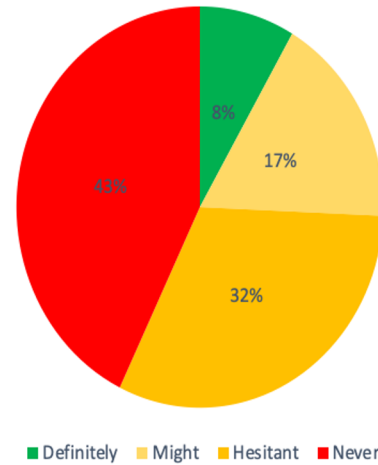


RESULTS

Rideshare



AV



Ps willing to allow unaccompanied child to travel in RS more likely to allow unaccompanied child to travel in AV (79.1%) than Ps not willing to allow child to travel in RS (43.9%), $\chi^2(1)=75.16$, $p<0.001$.

RESULTS

Ps' willingness to allow unaccompanied child to travel in a RS significantly related to several factors, $\chi^2(7)=159.59$, $p<0.001$.

		Exp(B)	95%CI
Used RS with youngest child	No	-	-
	Yes	2.52	1.7, 3.7
Annual mileage (kms)	<5000	-	-
	5001–15,000	1.66	1.0, 2.8
	>15,001	1.87	1.1, 3.2
DBQ—VIOLATIONS		1.33	1.1, 1.6
TRI—OPTIMISM		1.09	1.0, 1.2
ROUTE CONTROL		0.59	0.4, 0.9
ASSURANCE		0.48	0.3, 0.7

Ps' willingness to allow unaccompanied child to travel in an AV significantly related to several factors, $\chi^2(6)=113.33$, $p<0.001$.

		Exp(B)	95%CI
Awareness of AV	No	-	-
	Yes	1.81	1.2, 2.8
Education level	Primary/High school	-	-
	Tech/Trade/Diploma	0.99	0.6, 1.7
	Under/Postgraduate	1.84	1.1, 3.0
TRI—INNOVATIVENESS		1.11	1.1, 1.2
TRI—OPTIMISM		1.10	1.0, 1.2
ROUTE CONTROL		0.47	0.4, 0.6

DISCUSSION

Most Ps would 'never' allow unaccompanied child to travel in a RS (62.1%) or an AV (42.8%).

Higher % would 'never' allow their unaccompanied child to travel in a RS:

- More willing to trust driverless system than unknown driver.
- Significant concerns over personal safety & security re: RS drivers (Bayne et al., 2021; Chaudhry, et al., 2018 Lee, et al., 2017), & low levels of trust in RS companies (Koppel, et al., 2021).

Similar factors predicted Ps' willingness to allow unaccompanied child to travel in RS or AV:

- Previous experience (of RS) or awareness (of AV).
- Higher levels of technology-related 'optimism'.
- Lower requirements for route-control vehicle features (i.e., GPS to track vehicle location, etc.).

Unique factors predicted Ps' willingness to allow unaccompanied child to travel in RS:

- Higher annual driving distances.
- Higher driving violation scores.
- Lower requirements of assurance features (i.e., camera/microphone to see/hear child in vehicle).

Unique factors predicted Ps' willingness to allow unaccompanied child to travel in AV:

- Higher levels of education.
- More positive views towards technology (i.e., view as innovative).

DISCUSSION

Several limitations should be noted.

Due to large % of Ps who would 'never' use either mode to transport their unaccompanied child(ren), remaining Ps classified as being 'willing' (i.e., 'definitely'/'might'/'would be hesitant').

- Likely differences between Ps who responded 'definitely' vs. 'might' vs. 'would be hesitant'.
- Future research should qualitatively explore differences between 'might' & 'would be hesitant'.

Findings based on Ps' anticipated willingness to use both modes to transport their unaccompanied children, without having experienced the mode in the real world.

- Penmetsa et al. (2019) reported that VRUs with experience interacting with AVs reported significantly higher expectations of safety benefits associated with AVs than individuals with no experience.
- Research should be replicated with increasing levels of RS & AV.



CONCLUSION

Despite potential for emerging or future travel modes to provide additional personal transportation options, results suggest Australian parents unwilling to use them to transport unaccompanied child/teen.

Identified some factors that may influence parents' decision-making to use these transportation modes:

- Willingness to trust a driver unknown to them & their child?
- Willingness trust a driverless system?
- Important for guiding development of policies & strategies that encourage their use





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