

Poster: Effects of Knowledge and Experience on Drivers' Intention to Use CAVs

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Introduction. The data exchange between Connected Autonomous Vehicles (CAVs) [3] and other systems aims to increase driving safety, enhance traffic efficiency and improve users' driving experience. However, with the rapid progress in data mining, the collected data can be used to infer potentially sensitive personal information which was previously believed to be impossible, such as image processing for fatigue detection [2]. Thus, a lack of awareness and knowledge of the data exchange in CAVs can result in an underestimate of the privacy risks and uninformed privacy decisions.

In this study, we examined whether priming and feedback would influence human drivers' intention to use the various advanced functions through sharing their data. Prior studies have examined the effect of priming and feedback on users' privacy behavior in the mobile settings (e.g., [1]) but not the CAV contexts. Moreover, we investigated whether their intentions were subject to change according to their prior experience in connectivity and driver assistance functions.

Method.¹ We conducted an online survey on Amazon MTurk ($N = 381$) to examine participants' data-sharing decisions in two types of CAV data collection scenarios (i.e., data collection for safety/security or convenience). Participants were randomly assigned into one of the three conditions: control, priming, and feedback condition. The control condition was the baseline. Participants in the priming condition needed to answer an extra multi-selection question asking about the possible inferences of the data collected in each scenario (e.g., photos) to prime them thinking about the potential privacy risks. Those in the feedback condition would further know the correctness of their answers to give them some knowledge of the possible inferences. All participants needed to fill in their prior experience with connectivity and driver-assistance technologies, based on which we categorized them into three experience levels (little, some, much).

For data analysis, we performed 3 (condition: control, priming, feedback) \times 2 (scenario: safety/security, convenience) \times 3 (experience: little, some, much) analysis of variances (ANOVAs) to check the main effects and their interactions on participants' privacy decision.

¹The submission is based on Cai, Z., & Xiong, A. Effects of Knowledge and Experience on Privacy Decision-Making in Connected Autonomous Vehicle Scenarios. USEC 2022.

TABLE I: Participants' Data-Sharing Decision

Experience	Condition	Scenarios	
		Convenience	Safety/Security
Little (106)	Feedback (40)	0.48 (0.05)	0.72 (0.04)
	Priming (34)	0.40 (0.06)	0.72 (0.05)
	Control (32)	0.56 (0.06)	0.81 (0.05)
Some (142)	Feedback (38)	0.54 (0.05)	0.74 (0.04)
	Priming (46)	0.53 (0.05)	0.83 (0.04)
	Control (58)	0.60 (0.04)	0.88 (0.04)
Much (133)	Feedback (47)	0.68 (0.05)	0.80 (0.04)
	Priming (48)	0.71 (0.05)	0.84 (0.04)
	Control (38)	0.63 (0.05)	0.92 (0.04)

Note. The numbers in the parentheses indicate the participants numbers (first 2 columns) and standard errors (last 2 columns).

Results. Participants showed a higher intention to share data in the safety/security scenarios (81.3%) than the convenience scenarios (57.7%, $F_{(1,378)} = 283.99$, $p < .001$), although they correctly selected more possible inferences in the safety/security scenarios (72.9%) than the convenience scenarios (67.2%). Providing the feedback led to more conservative data-sharing decisions in the safety/security scenarios only (76% vs. control: 88%), probably because their data-sharing intention was already low in the convenience scenarios (57% vs. control: 60%). The participants with more experience in connectivity and driver-assistance functions generally made more liberal decisions in all scenarios (Much: 76.2%, Some: 68.7%; Little: 61.4%, $F_{(2,372)} = 8.44$, $p = .001$), suggesting that prior experience mainly helped them know more about the utility instead of privacy risks.

Discussion. Our results show that priming itself is not sufficient to help participants make informed privacy decisions. An extra feedback is necessary to provide them with relevant knowledge about potential risks when making the decisions. Although participants were clear about the possible risks in the safety/security scenarios, their higher sharing intention indicates that their safety/security considerations outweighed their privacy concerns in the CAV contexts. The effect of participants' prior experience suggests that individual differences should be considered for the privacy design of CAVs.

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