

# Gap Acceptance Behavior at Priority Intersections in Mixed - Human Driven and Automated - Vehicle Traffic

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# Problem statement

- Gap acceptance at intersections
- Traffic safety and efficiency at intersections
- Mixed traffic conditions
- Behavioral adaptation

# Research question

How do the recognizability and driving style of AVs affect human drivers' critical gaps in mixed (automated and human-driven) traffic at priority T-intersections?

# Experiment set up

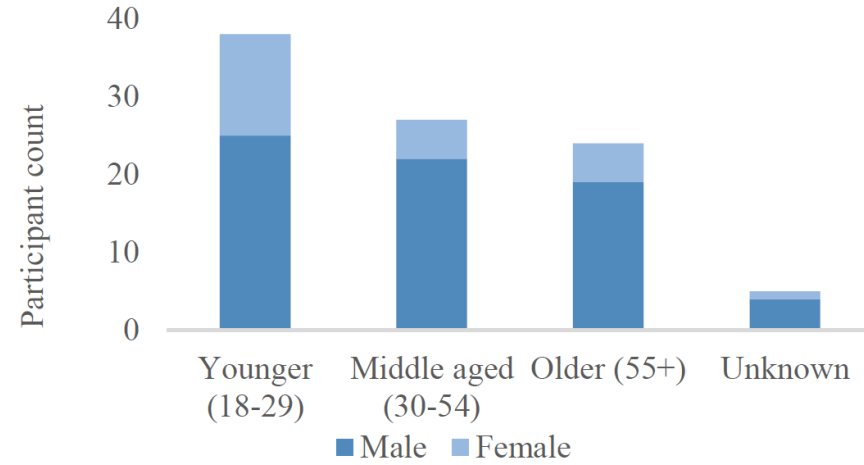
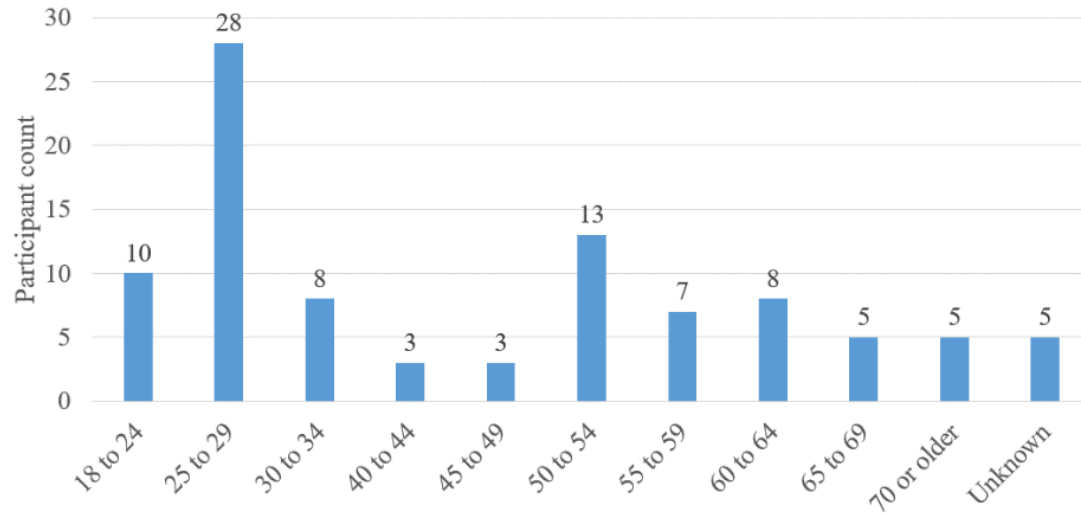


# Scenarios and Groups

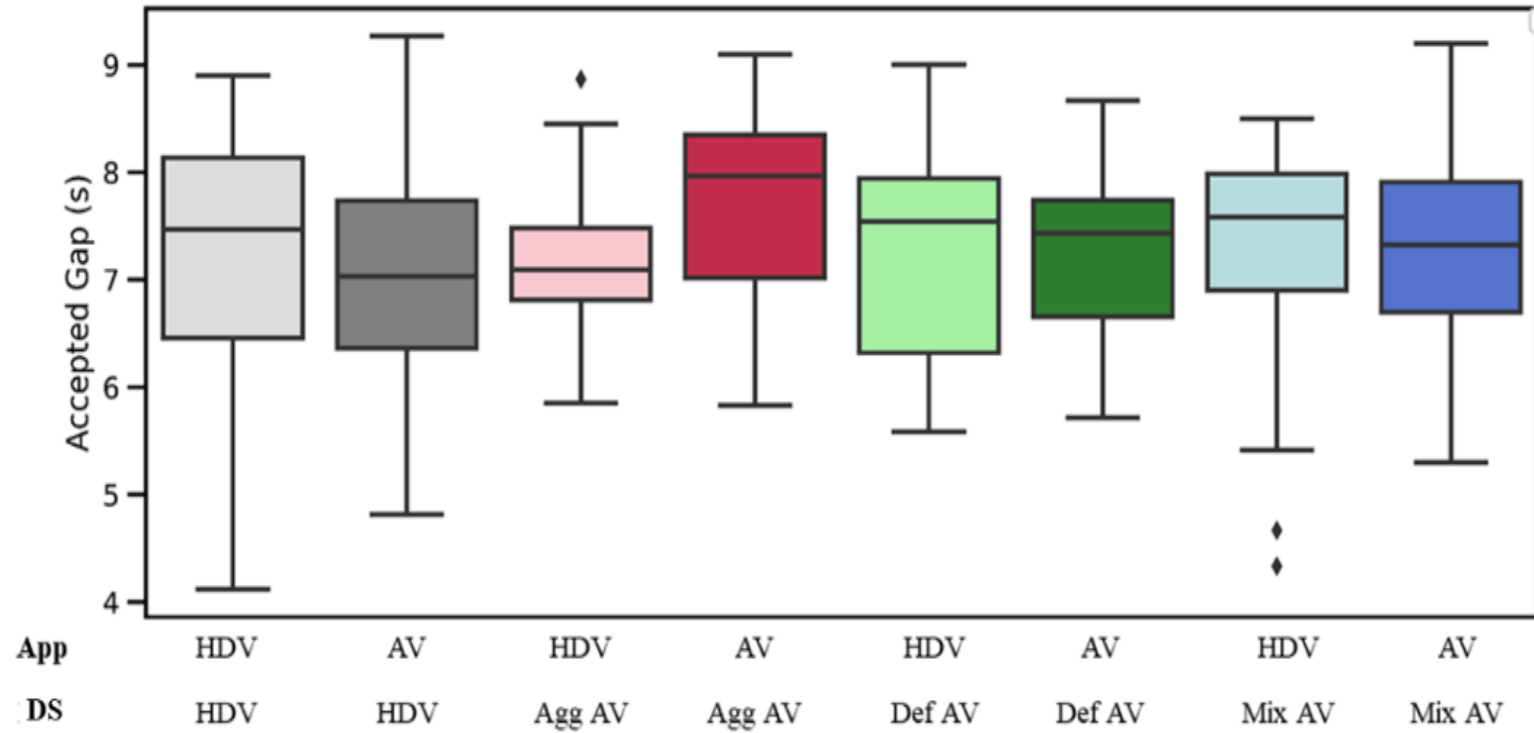
Scenario number	Description	Recognizability of AVs	Driving style of AVs
1	Only HDVs	-	-
2	HDVs and non-recognizable AVs	Not recognizable	AV
3	HDVs and recognizable AVs	Recognizable	AV
4	HDVs and recognizable AVs driving like HDVs	Recognizable	HDV

Vehicle	Desired speed	Desired car-following time gap (s)
HDVs	Between 90% and 110% of speed limit, drawn randomly	Minimum 0.5; Maximum 1.5; Truncated negative exponential distribution
Defensive AVs	Set to speed limit	3.5
Aggressive AVs	Set to speed limit	1.5
Mixed AVs	This group had both Defensive and Aggressive AVs in the volume ratio of 3:2	

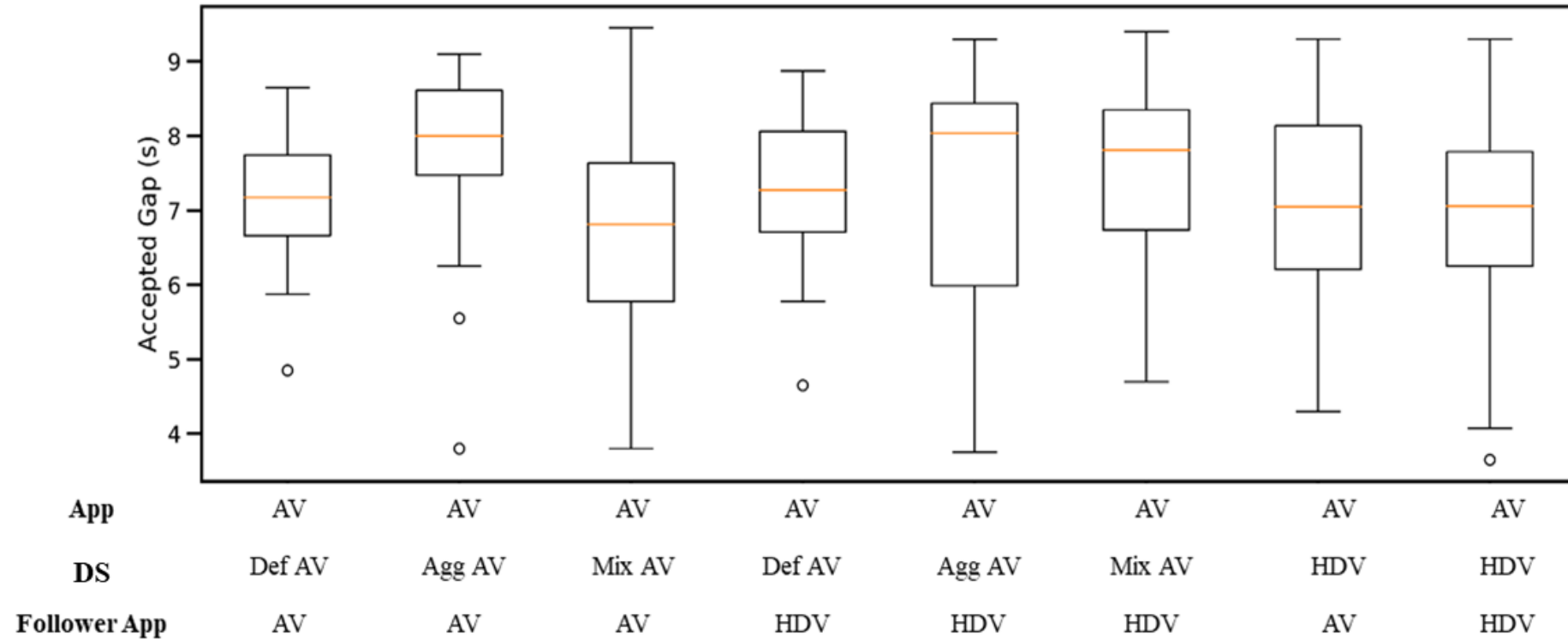
# Participants



# Descriptives



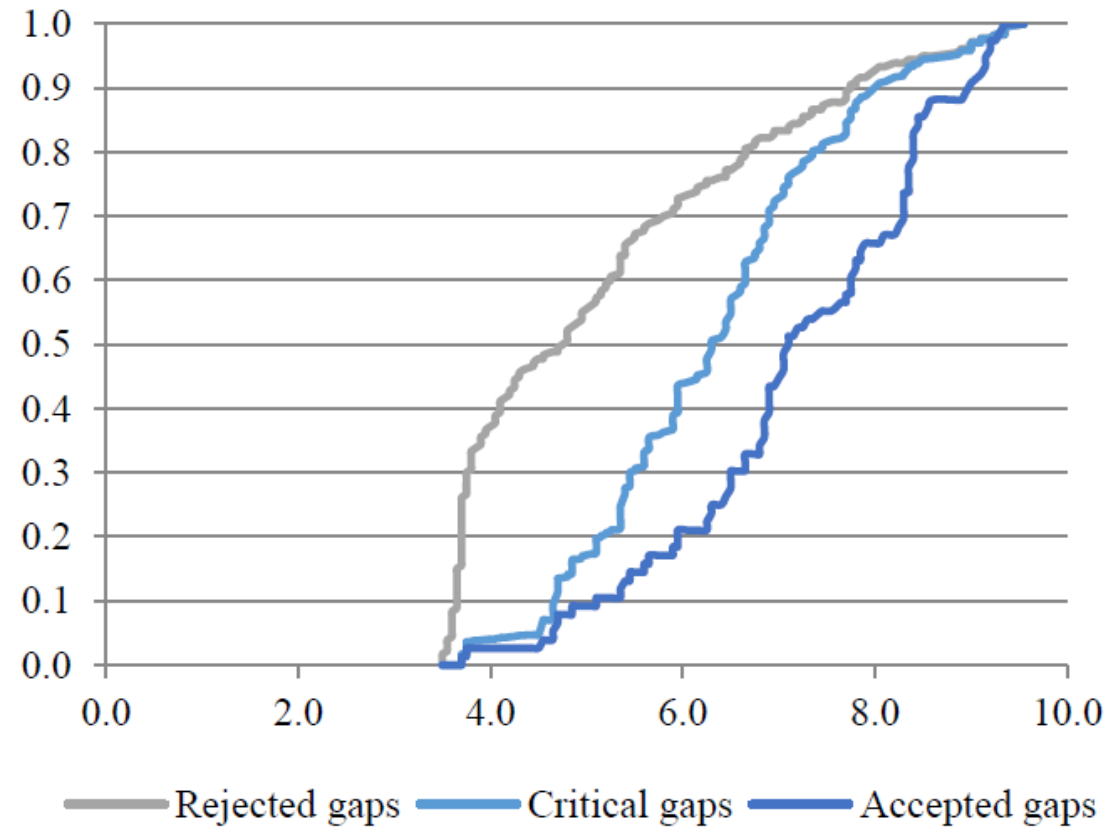
# Descriptives

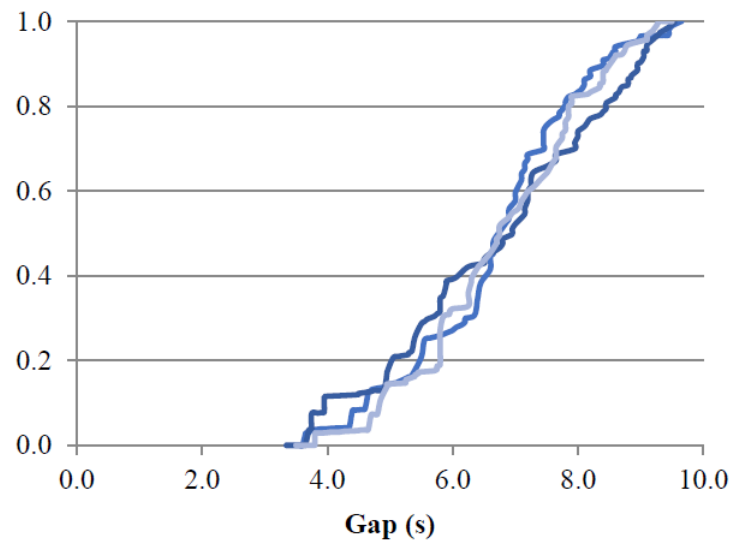




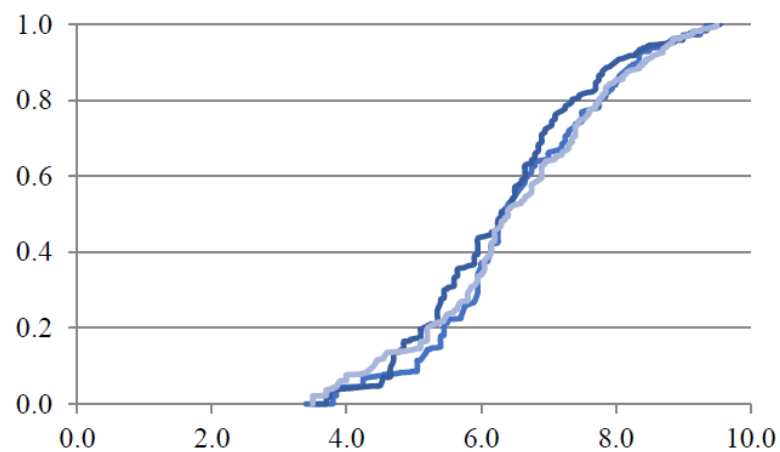
# Critical gap

- Estimated using Wu's method

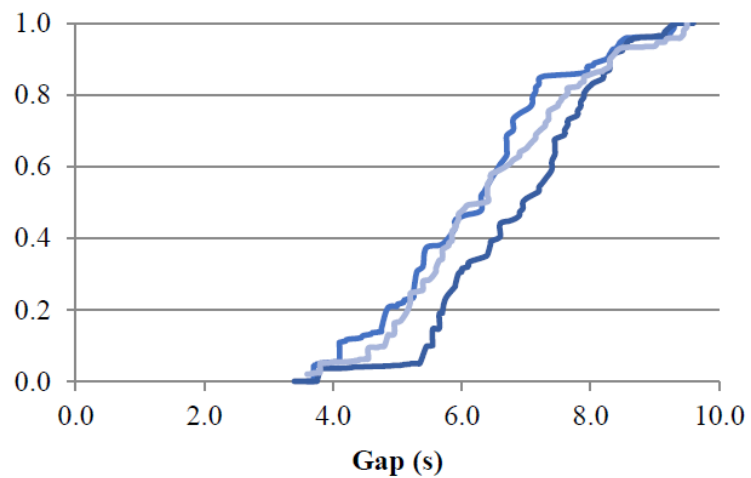




- App (AV) DS (Def AV) Foll App (HDV)
- App (AV) DS (Agg AV) Foll App (HDV)
- App (AV) DS (Mix AV) Foll App (HDV)



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- App (AV) DS (Agg AV) Foll App (AV)
- App (AV) DS (Mix AV) Foll App (AV)

# Critical gaps Mean and STD

Condition no.	Description	Critical gap (s)	
		Mean	SD
1	App (HDV) DS (HDV)	6.43	1.43
2	App (HDV) DS (AV)	6.44	1.36
3	App (AV) DS (AV)	6.59	1.42
4	App (AV) DS (HDV)	6.33	1.52
5	Def	6.43	1.42
6	Agg	6.41	1.42
7	Mix	6.51	1.46
8	App (AV) DS (Def AV) Follower App (AV)	<b>6.15</b>	1.38
9	App (AV) DS (Agg AV) Follower App (AV)	<b>6.86</b>	1.22
10	App (AV) DS (Mix AV) Follower App (AV)	6.32	1.64
11	App (AV) DS (Def AV) Follower App (HDV)	6.66	1.37
12	App (AV) DS (Agg AV) Follower App (HDV)	6.69	1.69
13	App (AV) DS (Mix AV) Follower App (HDV)	6.76	1.34
14	App (HDV) DS (Def AV) Follower App (HDV)	6.53	1.30
15	App (HDV) DS (Agg AV) Follower App (HDV)	6.31	1.30
16	App (HDV) DS (Mix AV) Follower App (HDV)	6.48	1.43

# Conclusion

- Larger critical gap in Aggressive AV traffic than in Defensive AV traffic when merging in front of recognisable AV
- No difference in critical gaps between Aggressive AV traffic and Defensive AV traffic when merging in front of HDV
- Larger critical gap in Defensive AV traffic than in Aggressive AV traffic when AVs are non-recognisable