UC San Diego
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From Fear to Trust

Transforming Passenger Perceptions of Autopilots with Human-Machine Collaboration

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Summary

Despite over 90 years of safety-enhancing autopilot use in air travel, **airline passenger trust in autopilot systems has remained elusive, underscoring the challenges ahead for newer automated vehicles**, and more general attempts at human-in-the-loop AI collaborations.

We refine existing literature by **pinpointing specific flight conditions where autopilot aversion occurs** in an online survey pre-test (N=885), then confirm that airline passengers feel less safe with autopilot usage in two pre-registered online studies (total N=2,431) while establishing that this effect is **not moderated by generalized anxiety, education level, or air travel experience.**

A pre-registered intervention **describing autopilot usage as a collaborative human-machine team increases passenger subjective safety**, (N=1,208) while a mediation analysis attributes this to the passengers' altered **perception of pilots as proactive rather than passive supervisors.**

Key Takeaways

✓ Airline passengers are most averse to autopilot usage in situations where it has proven safety advantages (low visibility, nighttime landings).

✓ Describing the interactive nature of autopilot operations (human-automation team) to passengers moderates autopilot aversion.

Methods (Study 1)

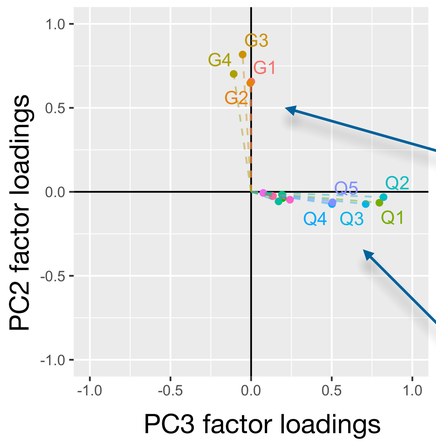
Participants reported their feelings of subjective safety in 12 different air travel scenarios (N=885)

Randomly assigned to control (no mention of pilot), human pilot, and autopilot conditions.

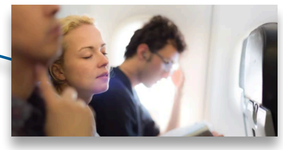
Survey responses submitted to principal component analysis (Varimax). A four-factor solution explained 67.24% of the total variance.

(Bartlett's test $\chi 2$ (120) = 5,928.85, p < .001)

Results (Study 1)



PC2: Interpersonal, health concerns (other passengers, disease)



PC3: Flight environment concerns (nighttime, fog, haze)

Main Effects of Manipulations

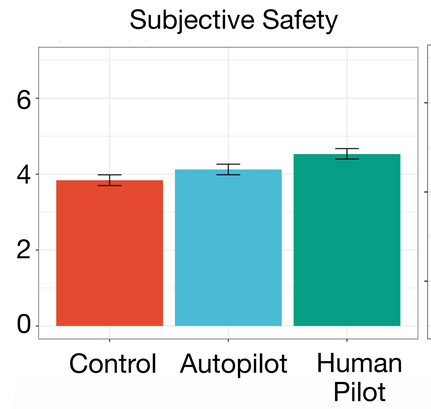
Principal Component	Human Pilot	Autopilot
1 Operational Safety	*p* > 0.1	*p* > 0.1
2 Interpersonal and Health	** *p* = 0.00576	*p* > 0.1
3 Flight Environment	** *p* = 0.00944	* *p* = 0.04896
4 Auditory and Visual	*p* > 0.1	*p* > 0.1

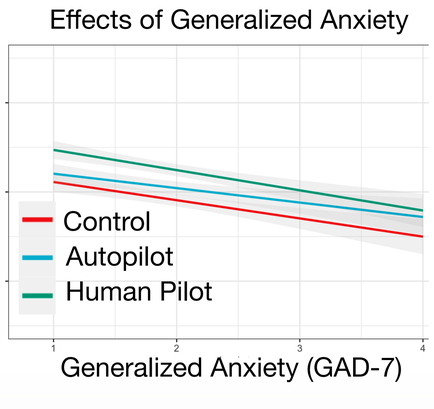
Methods (Studies 2 & 3)

Participants reported their feelings of subjective safety in an airliner landing at night in fog. (N=1,191, 1,240)

Randomly assigned to control (no mention of pilot), human pilot, and autopilot conditions.

Results (Studies 2 & 3)

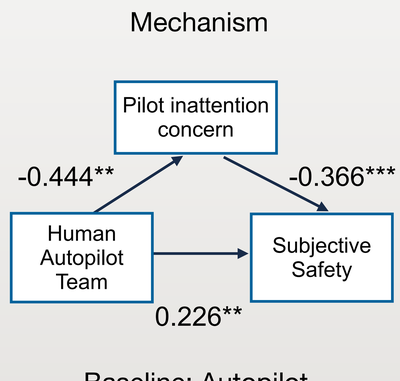




Methods & Results (Study 4)

Participants reported their feelings of subjective safety in an airliner landing at night in fog. (N=1,208)

Randomly assigned to human pilot, autopilot, and **human-autopilot team** conditions.



Baseline: Autopilot