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Comparing video-based techniques and driving simulation: A pre-registered study on the role of engine sound in speed perception

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Internal combustion cars are on the verge of becoming obsolete and of being replaced by Electric vehicles (EVs). In spite of the quick expansion of EVs, how drivers perceive and cognitively process some of their features remains largely unknown. This study focuses on the role of in-car sound, particularly artificial engine sounds, on drivers' speed perception and control. Previous research indicates that the removal or reduction of engine sound leads drivers to underestimate their speed, resulting in faster driving. Additionally, evidence suggests that specific sound frequencies may influence this effect, underscoring the significance of in-car sound characteristics. We evaluate the benefits and limitations of different research methodologies used in this field, primarily video-based techniques and driving simulations, and propose an experimental protocol to systematically investigate this phenomenon. Finally, we advocate for the broader application of psychophysical methods on video recordings to enhance research in this area and address some limitations of simulation studies.

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