

2015

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Recommended Citation

Greenhouse, Eyal and Soki, Samah, "Learning to Drive a Simulator: Impact of Prolonged Practice" (2015). *Undergraduate Research Posters 2015*. 54.

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Learning to Drive a Simulator: Impact of Prolonged Practice

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Abstract

Most driving simulation experiments begin with a practice scenario, to allow participants to learn how to interact with the driving simulator. During practice, driving performance improves such that consistent steering and speed control is exhibited. It is unclear however, whether driver performance will degrade with prolonged practice, and whether the fidelity of the simulator contributes to this degradation. Therefore, a driving simulation experiment was conducted to examine the performance of drivers over one hour of driving, using two different simulators: DriveSafety RS-100 and RS-600 models. The RS-100 is made up of a Logitech steering wheel and pedals attached to a mock-up of a cab, with a single 24" LCD monitor. The RS-600 consists of force feedback controls inside a partial Ford Focus cab, with five HD flat screens.

Twenty participants, thirteen males and seven females, between the ages of eighteen and fifty-eight (average age of twenty-five), were asked to drive an uneventful (i.e. no traffic) road with a repetitive pattern of straight and curved sections. Participants were divided equally into two groups: half driving the RS-100 and the other half driving the RS-600. Various driving performance measures were recorded (e.g. velocity, lane position, acceleration, steering, etc.). The data was examined for trends in driving behavior over time, as well as differences between the two simulators. The results on both simulators indicate a short learning period after which participants maintain constant speed. Lane keeping data did not show any improvement over time; however, the data shows that it was easier to maintain lane position driving on straight segments and driving the RS-100 model.