

simulator vs. on-road evaluation

on-road testing:



- + Has more face validity – real people driving on real roads.
- + Allows use of driver's own vehicle.
- + Produces large datasets for extensive analysis.
- + Can identify large trends in driving safety behavior.

- Provides limited repeatability – no two events are exactly the same.
- Produces results that are prone to confounding from variables that can't be controlled.
- Data collections spanning several months or years for naturalistic studies.
- Requires a great deal of money and time to mine data from naturalistic studies.
- Presents risk of crashes and injury to participants.
- Yields data prone to noise from sensors that don't perform well in varying conditions.
- Requires a lot of data to get enough events to analyze; a recent study showed that it takes 36,600 km of naturalistic driving to log a single crash, 4000 km to log a near crash, 400 km for a critical event.
- Is not suitable for responding to un-anticipated national emergencies that require a quick response.

- ⊕ Uses repeatable test protocols.
- ⊕ Provides control over experimental conditions such as weather, time of day, road conditions, traffic, participant's state.
- ⊕ Costs less and takes less time than naturalistic studies.
- ⊕ Allows drivers to be safely put into realistically risky driving situations.
- ⊕ Provides the ideal platform for looking at crash avoidance technologies or drugs and their effects on driving.
- ⊕ Makes multisite driving safety research possible across network of driving simulation research laboratories.
- ⊕ Can be quickly modified to assess new technologies.
- ⊕ Allows evaluations to be tailored to meet specific needs.
- ⊕ Provides ease of comparison across drivers, facilities, time, date, illness, injury, or weather.
- ⊕ Allows for focused evaluation of safety critical situations that are difficult to capture in naturalistic studies.
- ⊕ Provides actionable results in a shorter period.
- ⊕ Provides a safer environment to study risky behavior.

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simulation:



- Causes simulator sickness in some drivers.
- Has difficulty performing vehicle maneuvers like parking and backing up.
- May be perceived by some drivers as a game; this is particularly true for desktop simulators.