

Prevalence of engagement in single vs. multiple types of secondary tasks: Results from naturalistic data

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Research Objective:

Engagement in multiple secondary task types

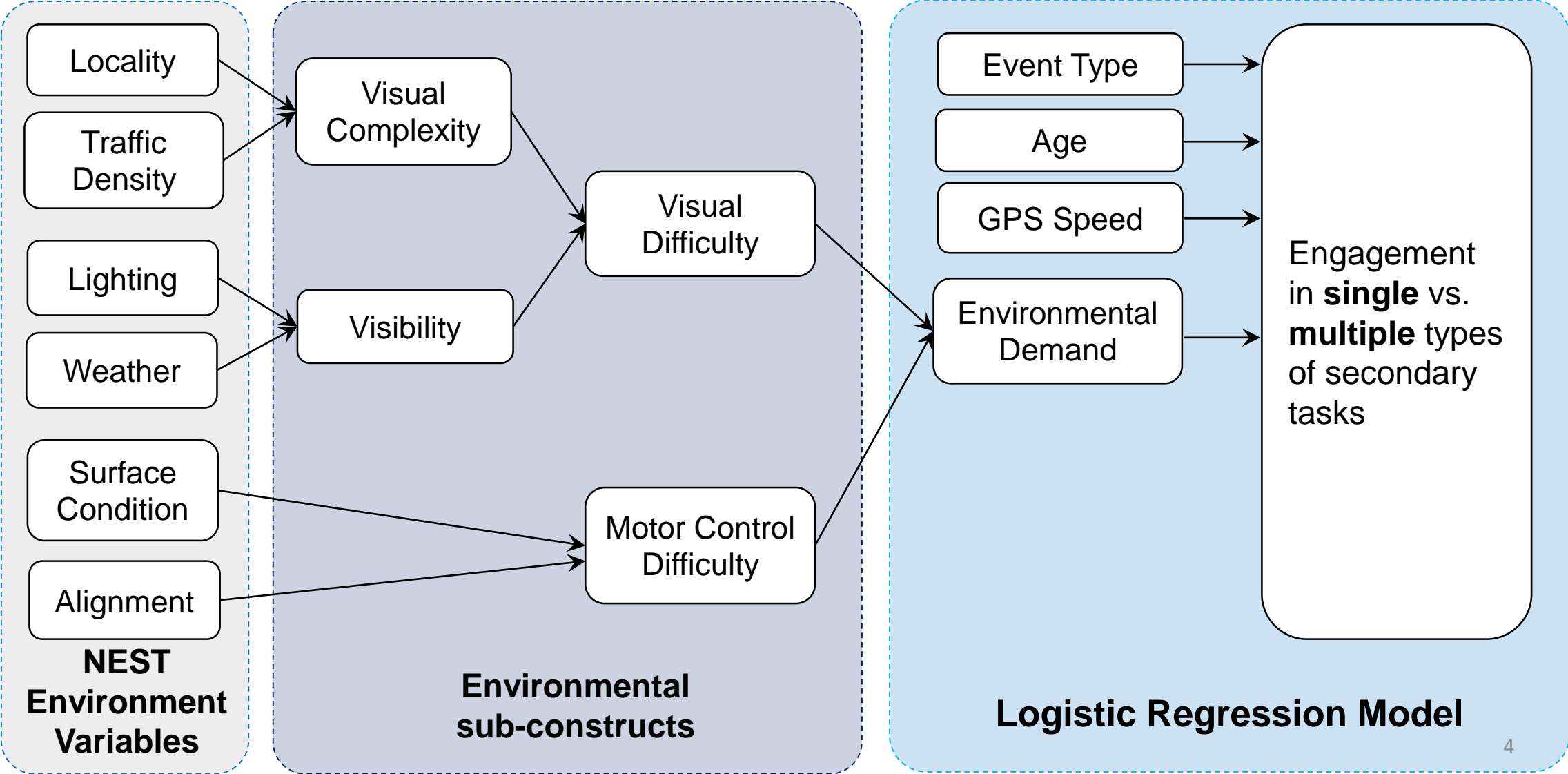
- Early descriptive analysis on the Naturalistic Engagement in Secondary Tasks (NEST) dataset, suggests that
 - drivers are engaging in more than one type of secondary task in relatively short periods of time (i.e., within 10s; Domeyer et al. 2016)
 - potentially being exposed to increased demands brought upon by multi-tasking and task-switching
 - crash risks reported in literature may be confounded by the presence of other secondary tasks
- **Objective:** Conduct inferential statistics, to compare the prevalence of engagement in single vs. multiple types of secondary tasks in distraction-affected safety-critical events and baselines reported in NEST

NEST Dataset: Naturalistic Engagement in Secondary Tasks

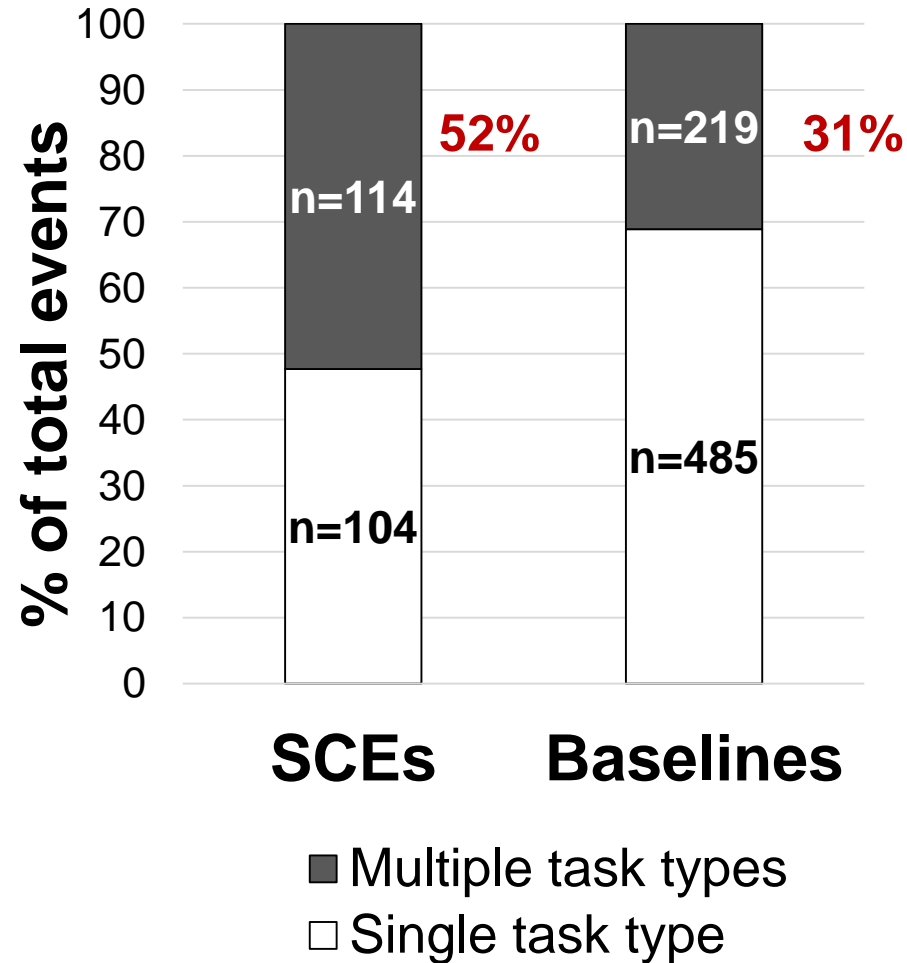
- Reduced from SHRP2 data by VTTI, contracted by Toyota Collaborative Safety Research Center (CSRC) (Owens et al. 2015)

Event Type	N	Description	Coding epochs
Safety critical events (SCEs) crashes and near-crashes	236	Secondary task engagement observed	<p>The diagram shows a horizontal bar representing a 30-second coding epoch, divided into three 10-second intervals by vertical dashed lines. Below the bar, arrows indicate the 10 s duration for each interval. The first interval is labeled 'start' and the last is labeled 'end'. A red starburst labeled 'Precipitating event' is positioned in the second interval, overlapping the boundary between the second and third intervals.</p>
Baseline events	944	Secondary task engagement may or may not have been observed	<p>The diagram shows a horizontal bar representing a 20-second coding epoch, divided into two 10-second intervals by a vertical dashed line. Below the bar, arrows indicate the 10 s duration for each interval. The first interval is labeled 'start' and the last is labeled 'end'.</p>

Statistical Analysis

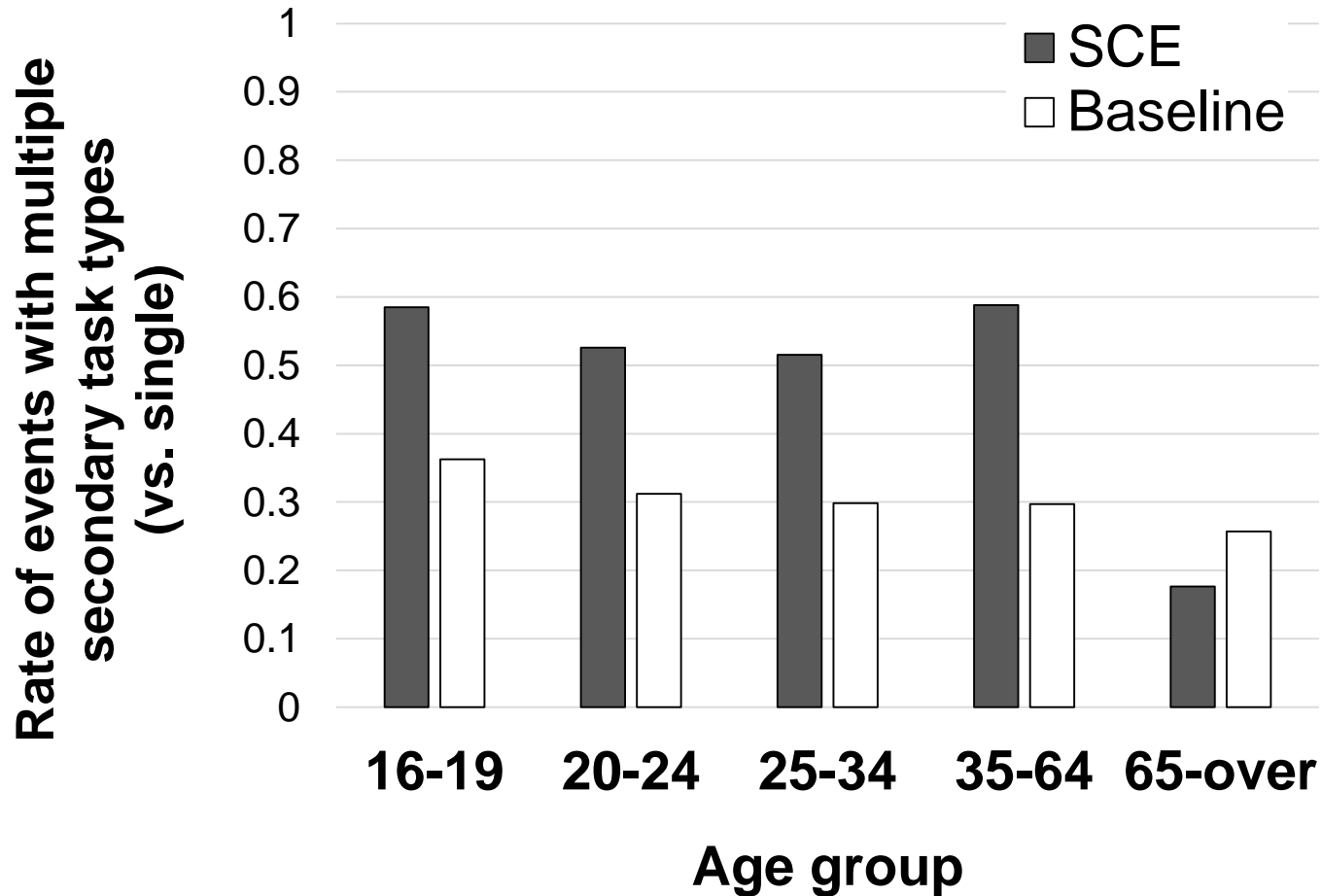


Event Type Significant; $\chi^2(2) = 30.75, p < .0001$



- Engagement in multiple (vs. single) secondary task types **more likely** to occur **during SCEs compared to baselines**:
 - Lower severity SCEs vs. baselines: OR = 2.33 [1.22, 4.47]
 - Higher severity SCEs vs. baselines: OR = 2.42 [1.70, 3.44]

Age Marginally Significant; $\chi^2(4) = 8.13, p = .09$



▪ **Drivers 65-over less likely to engage in multiple types of secondary tasks than**

- 16-19: OR = 0.45 [0.26, 0.78]
- 20-24: OR = 0.57 [0.34, 0.96]
- 25-34: OR = 0.61 [0.34, 1.12]
- 35-64: OR = 0.57 [0.30, 1.10]

Discussion

- Need to consider engagement in single vs. multiple types of secondary tasks when assessing distraction-related crash risk
- Drivers 65-over less likely to engage in multiple types of secondary tasks compared to younger drivers
 - Risk reducing compensatory behaviors (Donorfio et al. 2009; Reimer et al. 2013)
 - Cognitive saturation
 - Generational differences
- Environmental demand was not significant
 - Sample size; a general issue in this analysis
 - Categorization may need to be improved