



Display of HUD Warnings to Drivers: Determining an Optimal Location

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1 ISSUES

1. Does location affect response time and detection probability of HUD warnings?
2. Does the presence of a HUD (1) interfere with detection of and (2) alter response time to events on the road?
3. What are the best and worst locations for a HUD as reported by the subjects?

2 TEST PLAN

Subjects	Young (20-29)	Old (65-78)
Male	6	6
Female	6	6

Conditions: testing of road events and HUD warnings

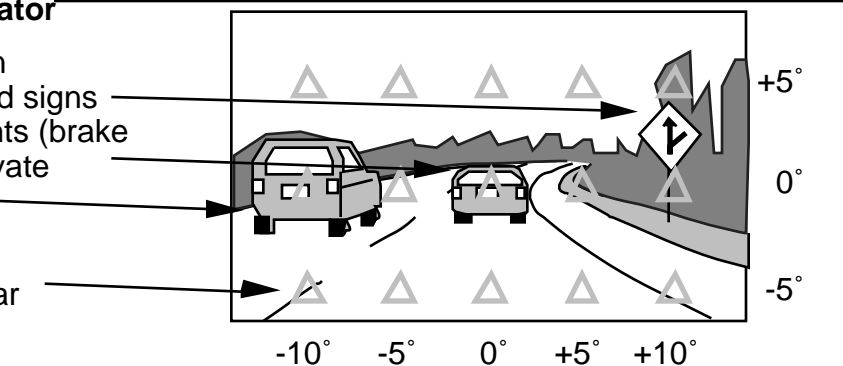
1. Pre-test road baseline (only road events tested)
2. Pre-test HUD baseline (only HUD warning tested)
3. Main experiment (road and HUD tested simultaneously)
4. Post-test baselines (same as pre-tests)

Driver Tasks in the Simulator

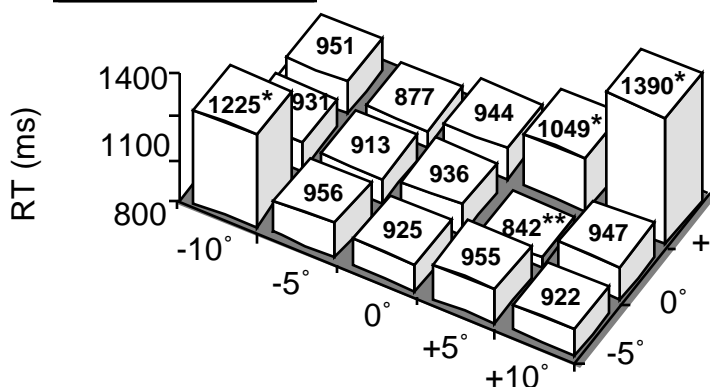
Press the "Road key" when

1. the lead car passes road signs
2. the lead car's signal lights (brake lights, turn signals) activate
3. cars pass the lead car

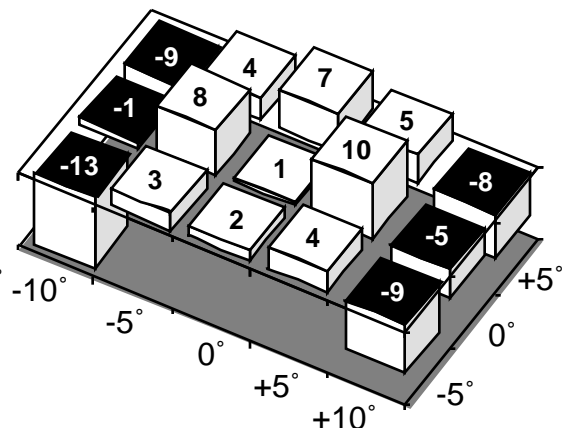
Press the "HUD key" when HUD warnings appear on the windshield



3 RESULTS

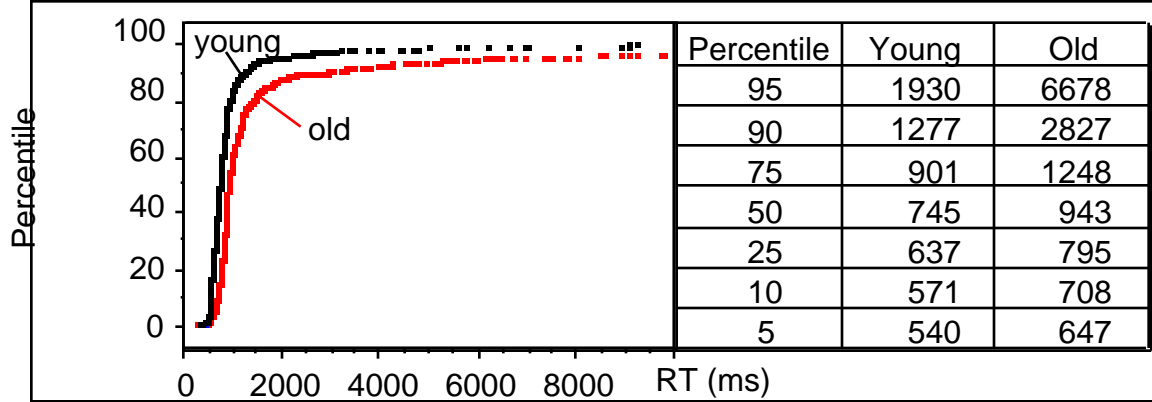


HUD response time for each location
(* = significantly different than all others,
** = significantly different than some)

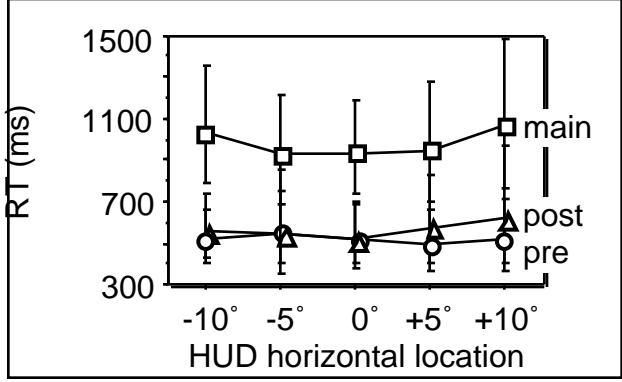


A sum of subject responses for "best" and "worst" locations for HUD

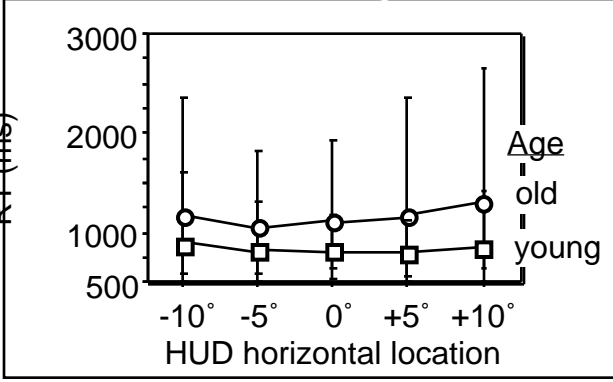
HUD cumulative RT



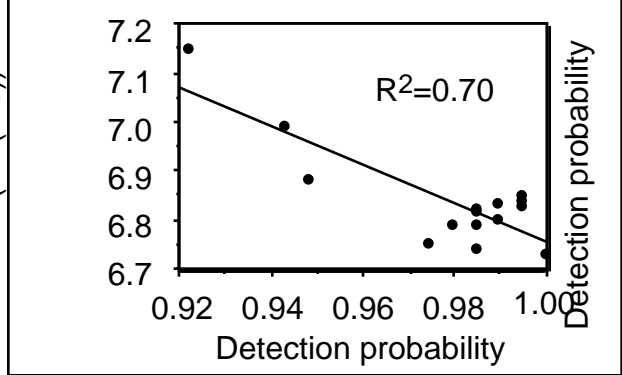
Effects of location & task: HUD RT



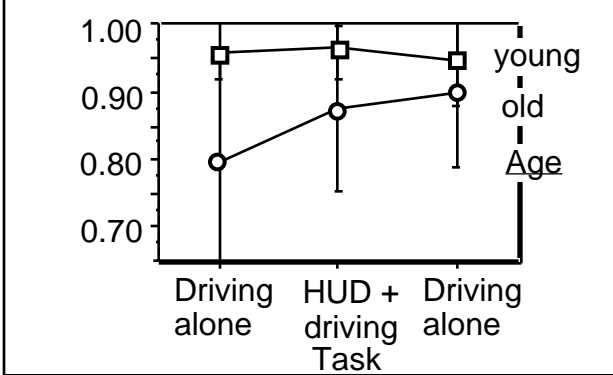
Effects of location & age: HUD RT



Correlation of RT & detection prob.: HUD



Effects of age & task: car signal detection



4 CONCLUSIONS

1. Response times and detection probability of center locations were generally consistent. The fastest response time was located 5 degrees to the right of center.
2. Some interference effects of the HUD were evident in this experiment. However, response times and detection probabilities to road events were not significantly worse when performed concurrently with the HUD detection task.
3. Subjects did not like locations that were farther than 5 degrees horizontally from the center. They preferred locations where overlap with road events was minimal.