

LED: Light Evoking Distraction?

A driving simulator study on the distracting effect of illuminated LED-advertising signs

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INTRODUCTION

- LED-advertising: highly present on street
- Some characteristics are negative
- Higher risk for traffic collisions (DaCoTA, 2012; Marciano & Yeshurun, 2012; Regan et al., 2012; Stelling & Hagenzieker, 2012; Young et al., 2009)
- Lack of international standards
- Focus on two characteristics for creating a practical guideline
 - Display time of the message (3s, 6s and 15s)
 - Distance from a pedestrian crossing (41m and 65m)



Presence of roadside advertising

Changes in glance behaviour

Distraction

Poor speed / brake / lateral control

Increased collision risk

Chaffington, Reed, Basaick, Flint, & Parkes (2009)

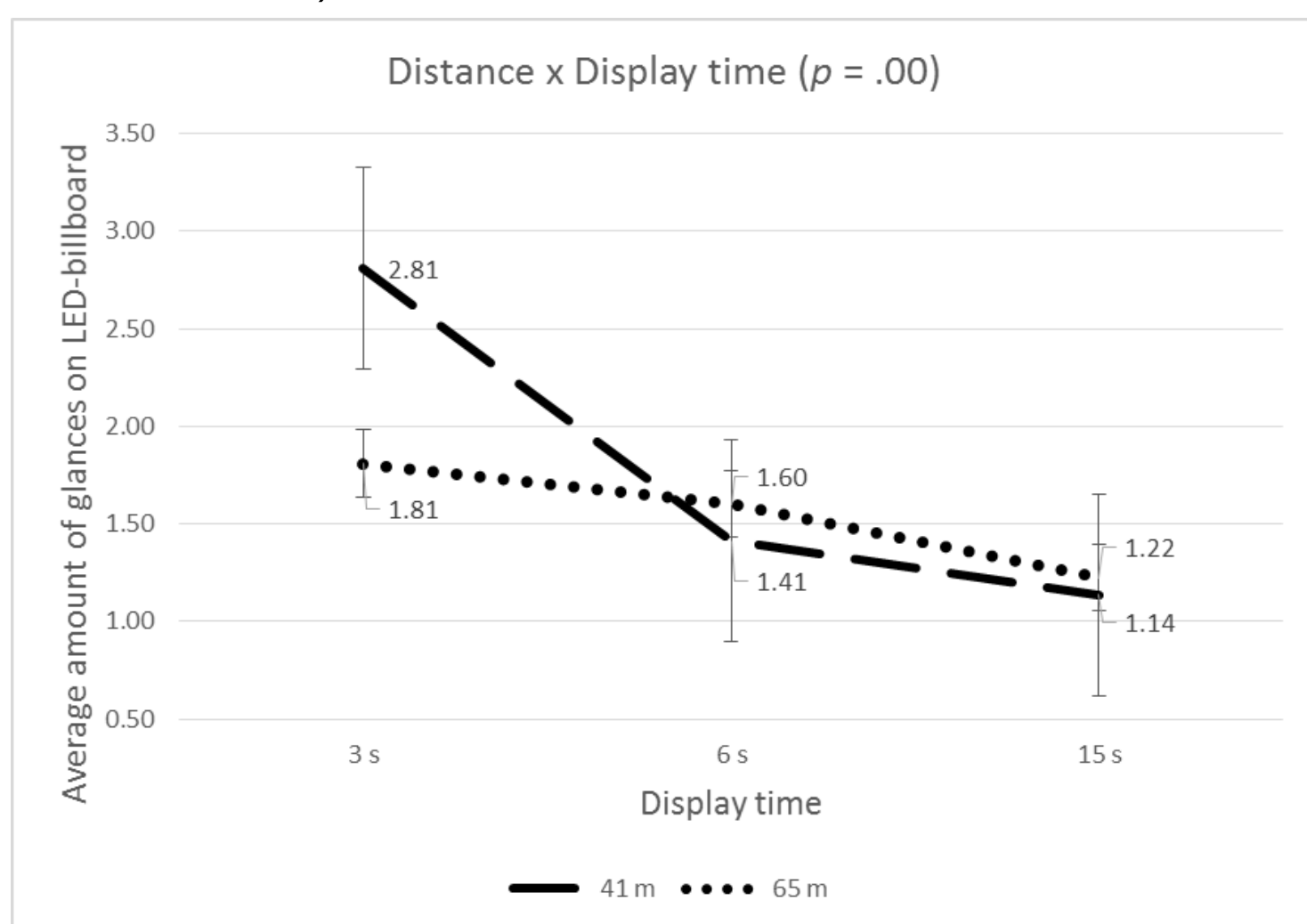
METHOD

- NADS MiniSim™ (version 2.0) driving simulator + Eye Tracker
- 7 routes: Presence (yes/no), Display time (3 levels), Distance from pedestrian crossing (2 levels) → 2 times a LED-advertising sign
 - Transition road to a built-up area (crossing pedestrian) & Zone with retail stores
- Within-subject design; 41 participants; usable sample of 35 participants (mean age 39 y)
- Outcome measures
 - Glance behaviour
 - Work load (RAW TLX) (Hart, 2006)
 - Driving behaviour: Speed, Standard Deviation of Lateral Position (SDLP), Behaviour towards the crossing pedestrian

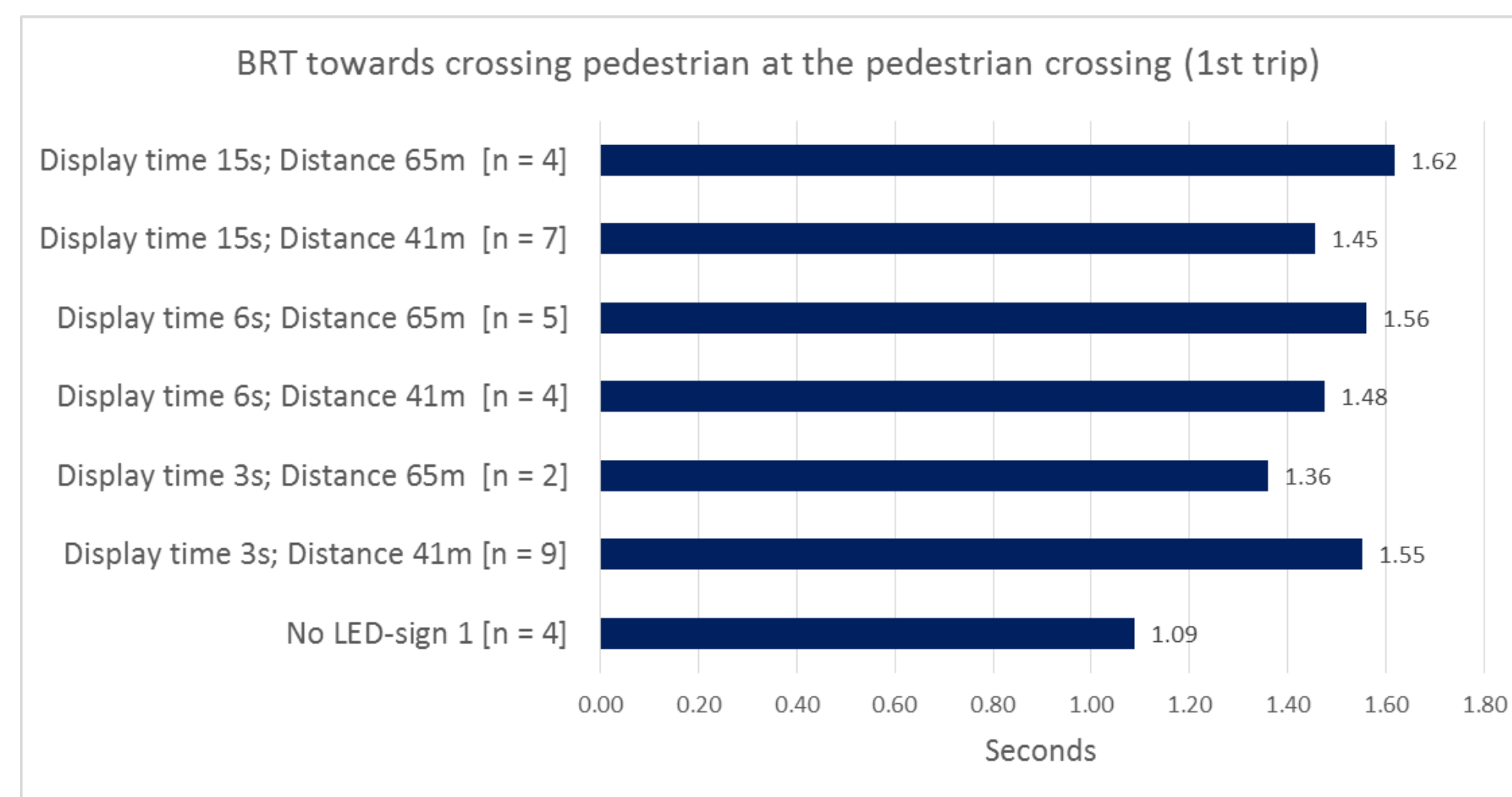


RESULTS & DISCUSSION

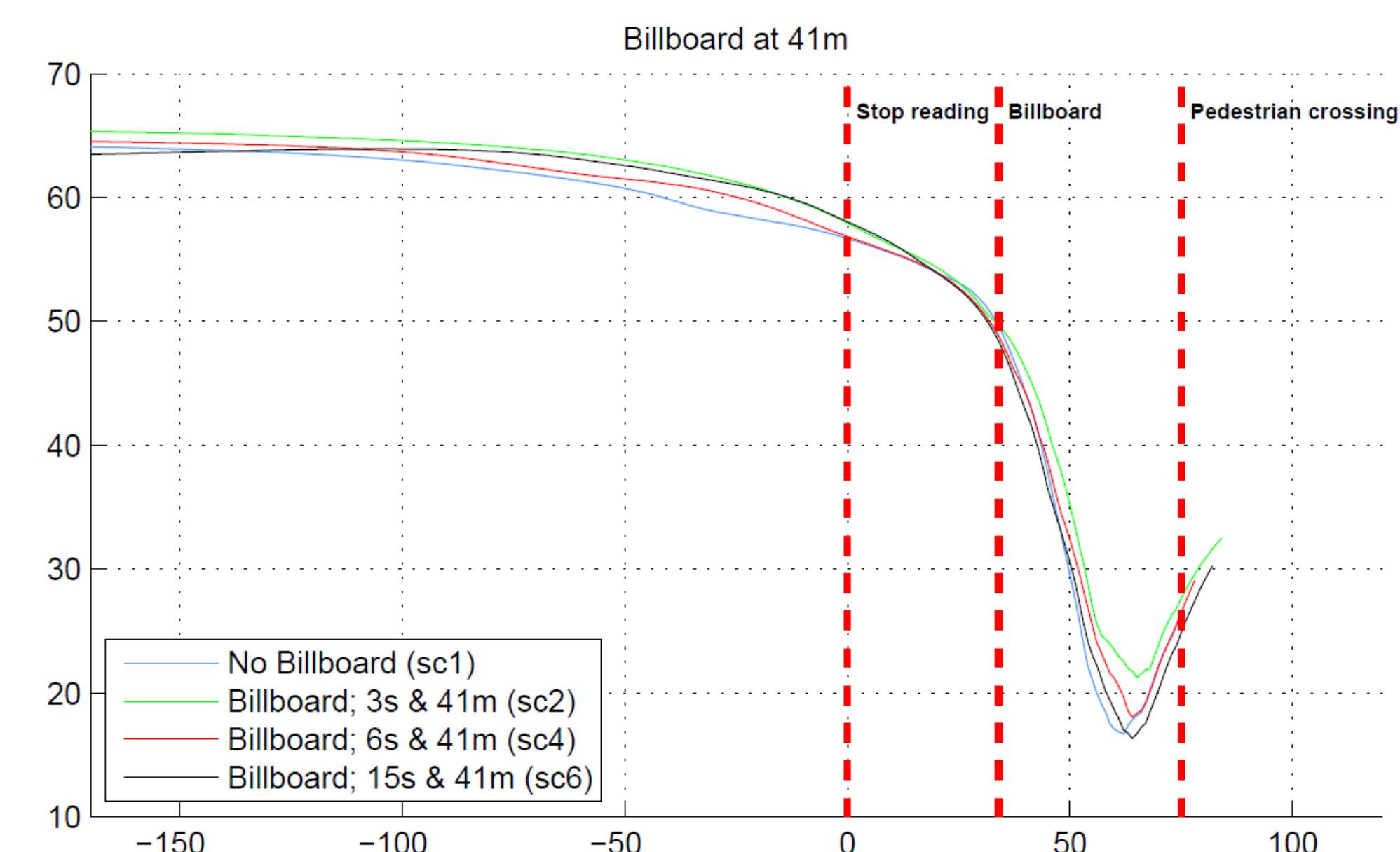
- Average fixation time per glance on LED-advertising sign
 - No significant differences between routes
 - < 2 s = safe (Klauer et al., 2006)
- Amount of glances on LED-advertising
 - Significantly more in zone with retail stores
 - Significantly more when short display time
 - Curiosity about message (cfr. Molino et al., 2009)



- 100% noticed a LED-advertising sign & 49% could recall one or more messages
- Work load
 - Significantly higher mental demands & lower rating of own performance when LED-advertising sign present
- Behaviour towards the crossing pedestrian
 - Tendency for a higher Brake Reaction Time (BRT) when LED-advertising sign present



- 42% mentioned LED-advertising signs as one of the top five items that catch attention in real driving (cfr. Lee et al., 2007)
- Standard Deviation of Lateral Position
 - Tendency to be smaller in zone of 150 m before when no LED-advertising sign present
- Speed
 - Minimum approaching speed towards crossing pedestrian reached later & was higher when LED-advertising sign present
 - Higher collision risk & increased severity



CONCLUSION

- LED-advertising signs lead to (visual) distraction and has road safety consequences
- Larger effects when shorter display time
- Larger effects when nearby 'locations where increased attention is needed'
- Flemish Road Administration will adapt their guidelines