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)

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 sign
  • Significantly more in zone with retail stores
  • Significantly more when short display time → Curiosity about message (cf. 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 (cf. 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