



An Investigation of Distraction by Advertising Using a Driving Simulator

Presented by Dr Nick Reed
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Agenda

- 1 Definitions
- 2 Why use driving simulation?
- 3 Pre-trial content validation study
- 4 Simulator study

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Definitions

- Driver distraction (Basacik & Stevens, 2008):

"Diversion of attention away from activities required for safe driving due to some event, activity, object or person, within or outside the vehicle."

- Advertisement:

"Typically paid for communication medium designed to attract customers to or purchase (more of) a particular product or service"

- To attract customers, must attract attention...

Early work

- Used eye movement video recorders in real vehicles
 - Maurant, Rockwell, & Rackoff, 1969
- Lighting conditions
- Traffic
- Advertising sites
- Constraints on images

Driving simulation studies

- Drivers can be distracted with no risk
- Lighting levels can be held constant
- Levels of traffic can be manipulated
- Many target adverts can be placed along a route
- Unexpected safety critical events in the region of the advertising are enabled without putting the driver at risk
- Precise repeatability of task
- Other detailed information can be obtained:
 - brake reaction times
 - lane positioning
 - speed profiles

Distraction by advertising project

- Project commissioned by Transport for London
- Static vs. Video billboard advertising in an urban environment
- Content Validation Study
 - To determine the adverts to be used in the simulator study
- Simulator Study
 - To assess the relative distraction effect by advertising on driver behaviour

Content Validation Study

- Need to use a variety of adverts
- Critical to select Static and Video adverts that were:
 - Distracting
 - *Equally* distracting

Content Validation Study - Method

■ Adverts

- Images from past and current adverts were used
- 28 Static adverts (800×400 pixels) tested
- 24 Video adverts (320×240 pixels) tested
 - Approximately 5 seconds duration
 - Sound not critical

■ Participants

- 34 male and female drivers across a wide age range were tested

■ Procedure

- 2AFC presentation of pairs of adverts
- Selection of most attention grabbing

Content Validation Study - Analysis

- 2AFC procedure - common in psychophysical studies
- Number of times each advert selected recorded.
- Exceptionally high or low scoring adverts rejected
- High/low scoring adverts within a particular age/gender group were rejected
- Result – a set of Static and Video adverts with minimal variation in distraction level between adverts and across the factors of age and gender
- These adverts used in the simulator trial

Simulator Study

- Measure the distraction levels caused by roadside advertising:
 - Advert position relative to the road
 - Advert presentation medium (Static vs. Video)
- TRL DigiCar simulator
 - Full mission simulator
 - 2002 Honda Civic
 - Three front screens, one rear screen
 - 210° forward; 60° rearward field of view
 - 1280 × 1024 pixels per channel
 - Software: SCANeR, supplied by Oktal
 - 3DOF motion system
 - Heave, pitch and roll
 - SmartEye eye tracking system based on three IR cameras

TRL DigiCar



Simulator Study - Method

- 48 participants
 - 24M/24F drivers
 - Four age groups:
 - 17 – 25
 - 26 – 40
 - 41 – 55
 - 56+
- Two 13km routes created
- Each route driven in either direction giving four drives
- Seven billboard (6m × 3m) adverts encountered per drive
 - $4 \times 7 = 28$ advert presentations for analysis

Route design

- Drivers were also exposed to unexpected events:
 1. Car pulling out of a junction into or across the participant's path
 2. Pedestrian crossing the road in the participant's path
 3. Lead vehicle braking sharply and unexpectedly
 4. Traffic lights changing to red on approach

On a building to the left...



On a building to the right...



Over the road...



All three positions...



HEADLINES

SKY
NEWS



BARACK OBAMA ELECTED
PRESIDENT OF USA

REPUBLICAN JOHN MCCAIN
CONCEDES DEFEAT

skynews.com

Sky channel 501

JCDecaux

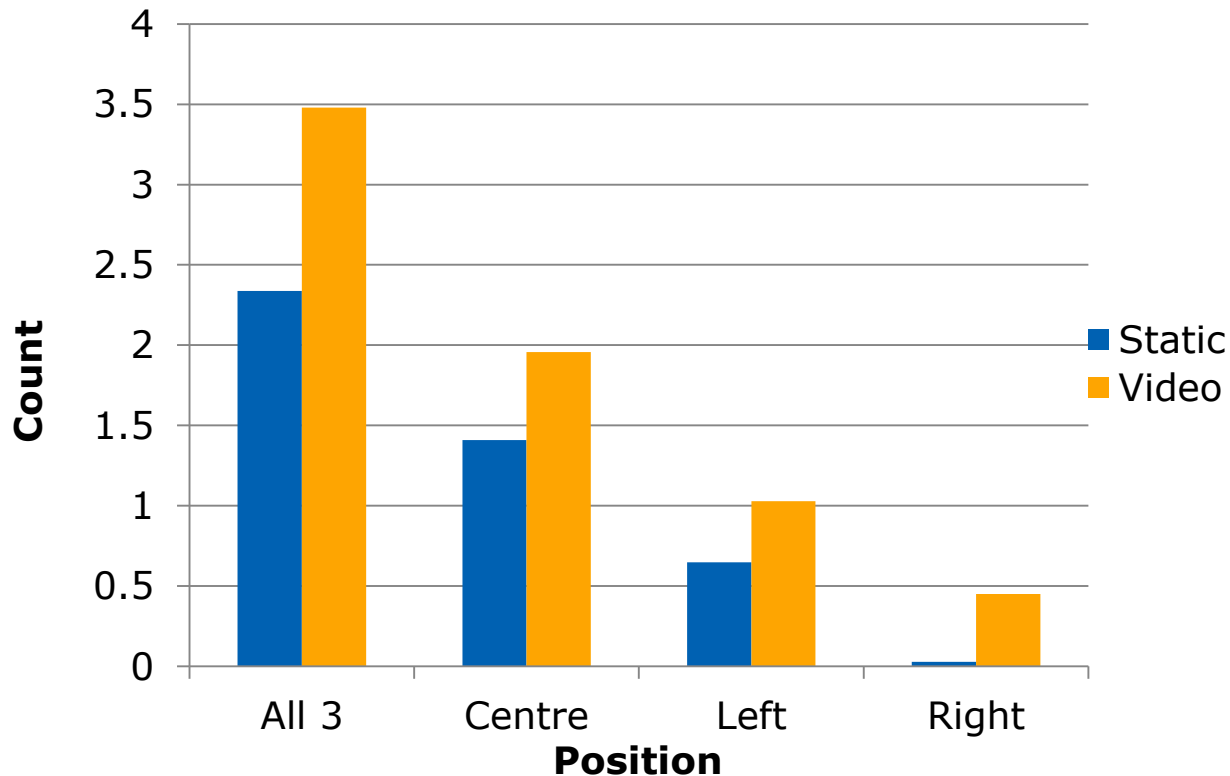
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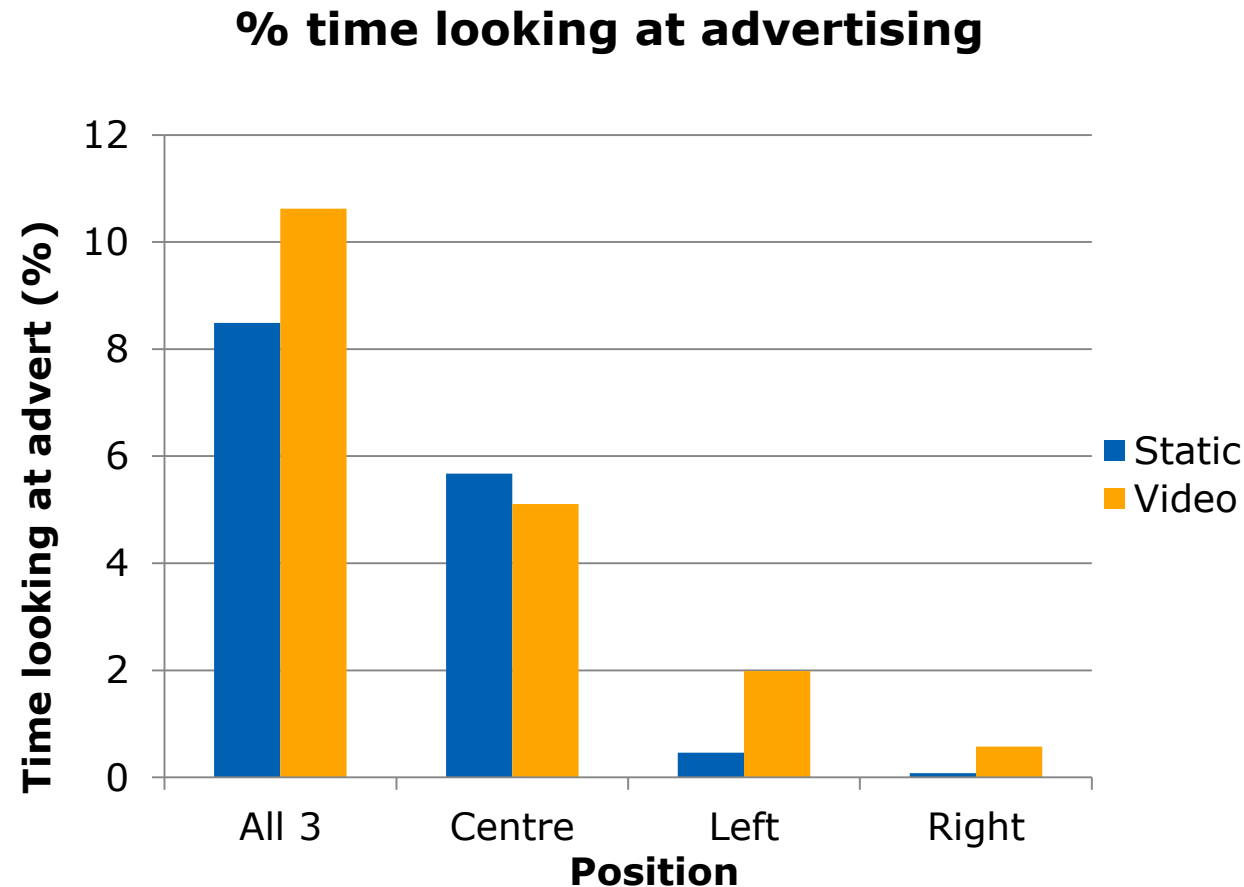
Results – Advertising Position

Number of glances at advertising



- Main Effects – Ad, Position
- Significant differences between video and static in all positions
- Significant difference between all positions

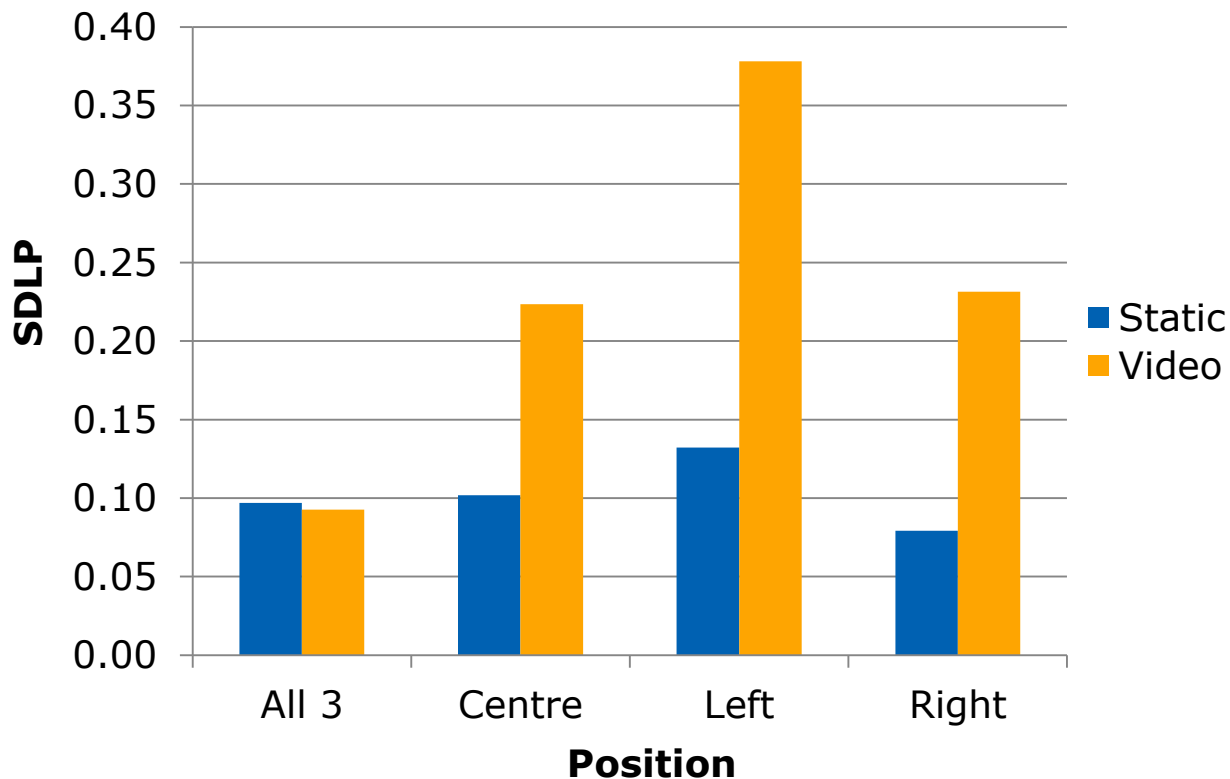
Results – Advertising Position



- Main effect of position
- No significant difference between video & static (C,R)
- Significant difference when "All 3" & Left

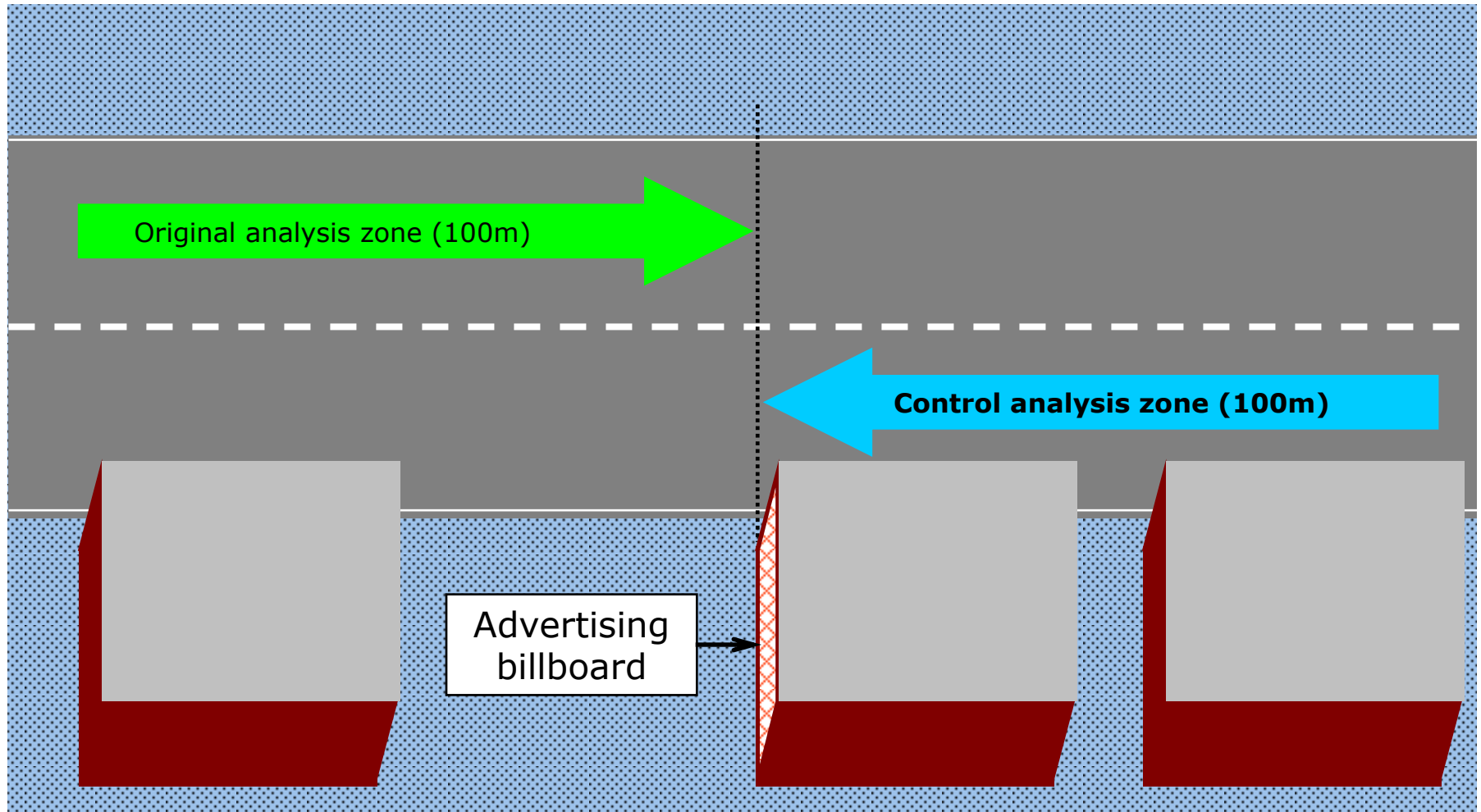
Results – Advertising Position

Standard deviation of lane position

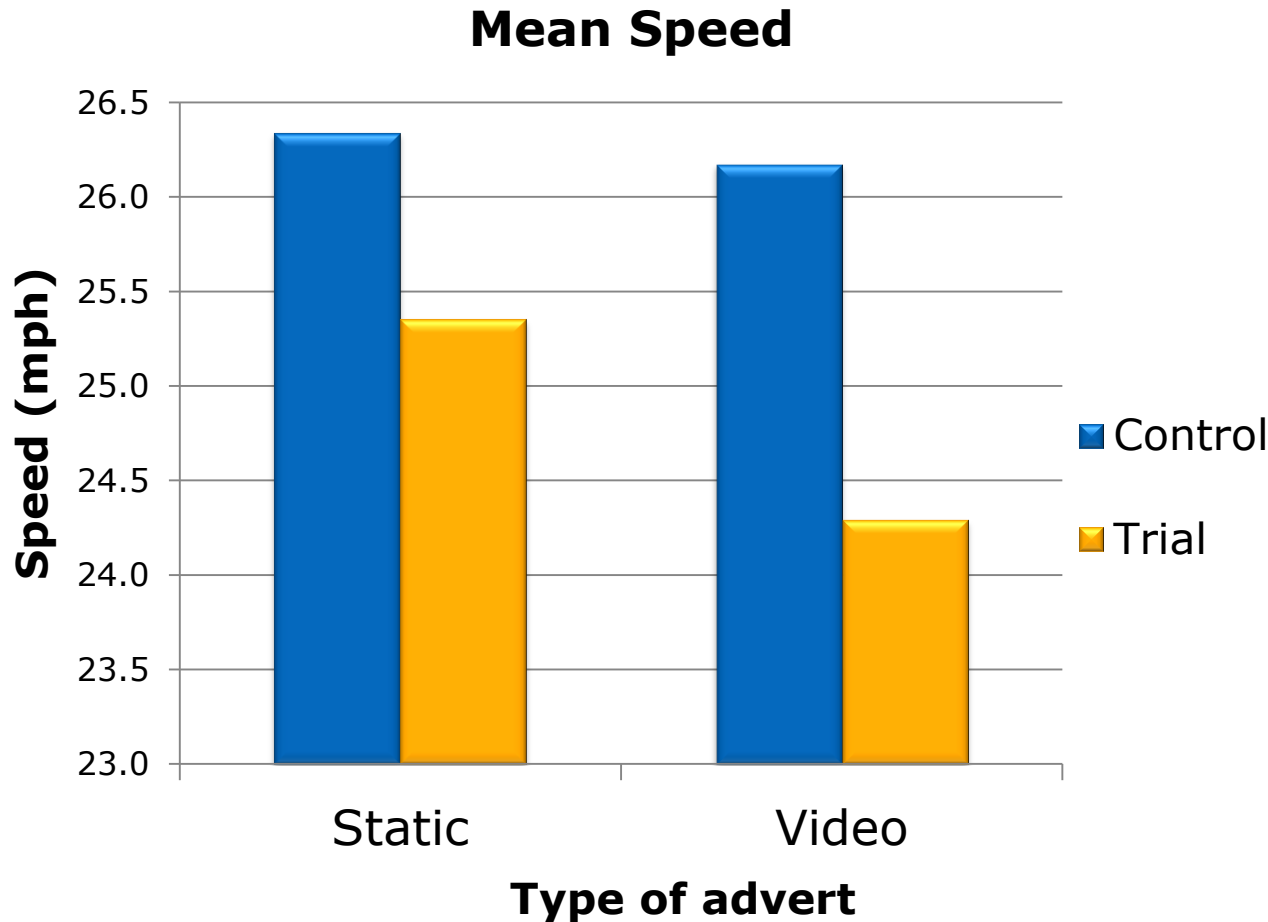


- Main Effects – Ad, Position (+interaction)
- There was no significant difference between static in any position
- Higher Lane SD in C,L,R positions

Creating "control" data



Results – Type of Advert



- Main Effects
 - Advert type
 - Presence of adverts
- Significant difference between control data and adverts

Drivers slow significantly more around video adverts

Implications

- Simulator and eye tracker successfully used to make a relative comparison of static and video adverts
- Video adverts clearly more distracting
- TfL provided with a clear evidence base with which to answer requests to activate video billboards
- Is it sufficient? Until...



**Any
Questions?**

Thank you!

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DDI, Gothenburg – September 2011
Tel: +44 1344 770046
Email: nreed@trl.co.uk