THE UNIVERSITY OF ALABAMA AT BIRMINGHAM

Impacts of Digital Advertising Billboards on Traffic Safety

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UTC Conference for the Southeastern Region, Orlando, FL
April 4-5, 2013

SCOPE

- Investigate links between Advertising Billboards-Distraction-Traffic Safety Risk

- Synthesis of studies on billboard advertising and traffic safety
- On-going efforts to address issue at UAB and FIU

ROADSIDE ADVERTISING OPTIONS: Conventional Billboards

- Static billboards
  - the oldest form of mass media
  - 400,000 in US alone
- Advantages:
  - relatively low entry and operating costs
  - ability to appeal to the local market

ROADSIDE ADVERTISING OPTIONS: Digital billboards (DBB)

- Utilize light-emitting diode (LED) technology to provide vivid displays that can be updated every few seconds using computer input.
  - Fast growing market
  - 4,000 in US
- Advantages:
  - single board can advertise to far more clients than a traditional board
  - clients can update their advertisements frequently, and
  - targeted messaging

DBB UNIQUE FEATURES

- Brightness and contrast with surroundings
- Messages changing suddenly
- Large, imposing sizes
- Realistic imagery
- No driver acclimation with message
- Potential for message sequencing
- Potential for interactivity with driver

RESEARCH METHODS

- Meta-analysis studies
- Crash studies of historical trends
- Laboratory studies
- Naturalistic studies of driving behavior

NOTABLE RECENT META-ANALYSIS STUDIES AND FINDINGS

- Farbry et al., 2001
- Wallace, 2003
- Coetzee, 2003
- Birdsall, 2008
- Wachtel, 2009
- Molino et al., 2009 …

- **Meta-analysis studies** confirmed an association between crash rates and billboards at intersections

NOTABLE RECENT CRASH STUDIES AND FINDINGS

Examples include:

- Smiley et al., 2005
- Tantala and Tantala, 2010
- Yannis et al., 2012 …

- Most **crash studies** involving statistical analyses of historical data near DBB locations reported no statistically significant relationship with crash occurrence

NOTABLE RECENT LABORATORY STUDIES

Examples include:

- Young and Mahfoud, 2007
- Bendak and Al-Saleh, 2010
- Edquist et al., 2011
- Divekar et al., 2012
- Marciano and Yeshurun, 2012 …

LABORATORY STUDIES FINDINGS

- **Laboratory studies** confirmed that that the presence of DBBs decreased driver control, increased mental workload, and increased response time
  - Driver response to road signs delayed by 0.5-1 sec with advertising billboard presence
- DBBs caused drivers to be less observant of stopping cars ahead of them, and contributed to vehicle drifting into adjacent lanes.

NOTABLE RECENT NATURALISTIC STUDIES AND FINDINGS

Examples include:

- Akagi et al., 1996
- Kettwich et al., 2004
- Beijer et al., 2004
- VA Tech Transportation Institute, 2007
- Lee et al., 2007
- Ballidis, 2012 …

NATURALISTIC STUDIES FINDINGS

- **Naturalistic studies** reported mixed findings
  - Some concluded that that there was no substantial distraction caused by the advertising signs, and that gaze duration towards signs decreases as driving complexity increased
  - Other studies provided evidence of increased number of glances per sign and longer gazes in the presence of DDBs compared to static counterparts

LITERATURE REVIEW CONCLUSIONS

- Overall, the literature synthesis suggests that there is evidence of correlation between DDBs and increased driver distraction.
- However, local conditions, experimental settings, and other factors may play a role in the actual impact that advertising DBBs have on traffic safety
- Existing research is limited due to a lack of standardized methods and practices, data reliability, appropriate assumptions, relevant hypotheses, and objective intentions.

NEW RESEARCH ON THE WAY

DIGITAL ADVERTISING BILLBOARDS AND DRIVER DISTRACTION STUDY

- Project funded by the National Center for Transportation System Productivity and Management (NCTSPM, the Georgia Tech-led UTC)
- UAB and FIU Partnership with support from ALDOT and FDOT

APPROACH

Multi-state and multi-facet approach

- State-of-Practice-Synthesis
- Epidemiological Study
- Survey of Road Users
- Driving Simulator Study

STUDY TASKS

- Epidemiological Study:

  Analyze crash records from AL and FL and utilize appropriate statistical methods to examine the correlation between crash location occurrence and proximity to digital advertising billboards

- Survey of Road Users:

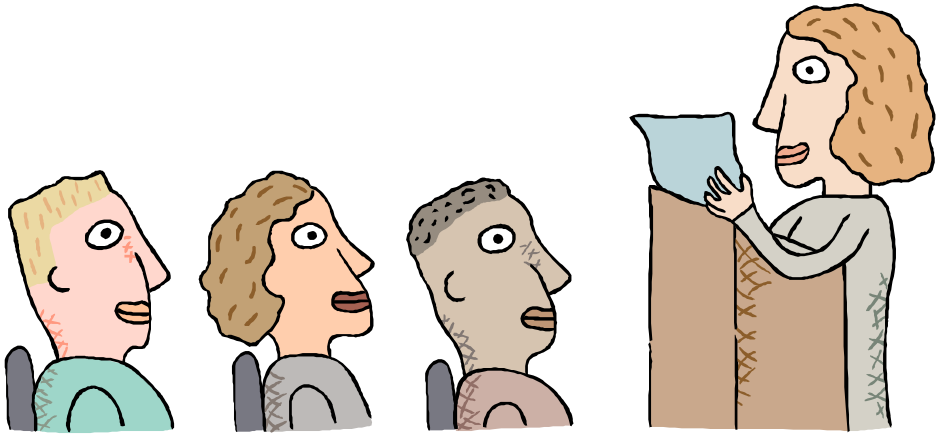
  Collect and analyze survey data on road users' perceptions and attitudes related to electronic and static billboards

- Driving Simulator Study:

  Study driving behaviors in various roadway settings with and without the presence of digital billboards in a driving simulator environment

ACCOMPLISHMENTS TO DATE

- Formed Project Advisory Committee
- Completed State of Practice Synthesis
  - Produced document summarizing findings
- Processed IRB approvals
- Developed and tested user survey instrument
- Constructed driving simulator scenarios
  - Produced document summarizing driving simulator protocol
- Funded 3 graduate students (2 in Civil Engineering; 1 Psychology)
- Technology Transfer



QUESTIONS AND COMMENTS