Tienvarsimainosten vaikutukset liikenneturvallisuuteen

Hyvä kooste tutkimuksista:
Distraction caused by roadside advertising and information : SWOV Fact sheet (2012)

2016

A field study on the effects of digital billboards on glance behavior during highway driving
Belyusar D, Reimer B, Mehler B, Coughlin JF.
Accident Analysis and Prevention 2016; 88: 88-96. (Liikenneturvan kirjastossa)

Developments in lighting technologies have allowed more dynamic digital billboards in locations visible from the roadway. Decades of laboratory research have shown that rapidly changing or moving stimuli presented in peripheral vision tends to 'capture' covert attention. We report naturalistic glance and driving behavior of a large sample of drivers who were exposed to two digital billboards on a segment of highway largely free from extraneous signage.

RESULTS show a significant shift in the number and length of glances toward the billboards and an increased percentage of time glancing off road in their presence.

FINDINGS were particularly evident at the time the billboards transitioned between advertisements. Since rapidly changing stimuli are difficult to ignore, the planned increase in episodically changing digital displays near the roadway may be argued to be a potential safety concern. The impact of digital billboards on driver safety and the need for continued research are discussed.

2015

The Impact of Billboards on Driver Visual Behavior: A Systematic Literature Review
John S. Decker , Sarah J. Stannard , Benjamin McManus , Shannon M. O. Wittig , Virginia P. Sisiopiku , Despina Stavrinos
Traffic Injury Prevention Vol. 16, 3, 2015 pp 254-259. (Liikenneturvan kirjastossa)

OBJECTIVE:
External distraction appears to affect at least 6-9% of distraction-affected motor vehicle collisions. Billboards may be good models for studying external distraction in general, and it is also desirable to understand billboard-related distraction per se. However, there has not yet been a clear consensus on the scope of billboard-related distraction or its dynamics with respect to characteristics of drivers, billboards, traffic, and the roadway. To narrow these knowledge gaps, a systematic literature review was conducted on billboard-related changes in driver visual behavior.

METHODS:
A systematic literature search yielded 443 results, of which 8 studies met all inclusion criteria. Five studies meeting all inclusion criteria were later identified and added. RESULTS were analyzed in terms of 4 categories of visual behavior: (1) gaze variability (GV), glance pattern activity (GPA), and percentage of time

spent glancing at the forward roadway; (2) glances at unexpected drive-relevant stimuli; (3) glances at expected drive-relevant stimuli; and (4) glances at billboards.

RESULTS:
There was considerable evidence that about 10-20% of all glances at billboards were ≥0.75 s, that active billboards drew more glances and more long glances (≥0.75 s, ≥2.0 s) than passive billboards but did not attract a longer average glance, and that there was large variability among individual billboards within categories (e.g., active vs. passive). The extent to which billboards attracted glances ≥ 2.0 s was uncertain. There was tentative evidence that billboards did not affect GPA, glances at expected drive-relevant stimuli, or the proportion of time drivers spent glancing at the forward roadway and that they did affect vertical GV and glances at unexpected drive-relevant stimuli.

CONCLUSIONS:
Generally, billboard-related distraction appeared to be minor and regulated by drivers as the demands of the driving task changed. However, this review's findings suggest that this may not be true in all cases. Future research should emphasize the tails of the distribution in addition to average cases, in terms of both the analysis of visual behavior and the complexity of driving tasks. Further research is also needed to understand the effects of billboard design, driver characteristics, and road and traffic context.

Investigation of the Potential Relationship Between Crash Occurrence and the Presence of Digital Advertising Billboards in Alabama and Florida
Sisiopiku, Virginia P et al.
Transportation Research Board 94th Annual Meeting 2015 14 p.

Increase in the number and sophistication of digital advertising billboard signs on US roadways, raises safety concerns over potential contribution of such signs to traffic crashes. Various earlier crash analyses, and behavioral studies resulted in somewhat contradictory conclusions, indicating a need for further research. This paper describes an epidemiological study that analyzed historical crash records from the states of Alabama and Florida to examine potential correlations between crash locations and their proximity to digital advertising billboards. First, the research team identified locations of digital advertising billboards along major limited-access facilities in Alabama and Florida and selected eighteen suitable sites for analysis. Eighteen control sites immediately downstream of the digital billboard locations were also considered. Then, historical crash data were retrieved for all study sites and crash rates were calculated for digital advertising billboards influence zones and adjacent control sites. While variations were observed from site to site, the overall results were consistent between the two states. The crash data analyses revealed that the presence of digital billboards increased the overall crash rates at digital advertising billboard influence zones by 25% in Florida and 29% in Alabama compared to control sites. Moreover, sideswipe and rear-end crashes were found to be overrepresented at digital advertising billboard influence zones compared to control sites. This study presents a contribution to the traffic safety research as it provides objective and dependable evidence that can help to establish potential links between digital advertising billboard presence and crash occurrence. The study findings can help inform future public policy, and set the foundation for further regulation of digital advertising billboard use in the future.

2014

Effect of static electronic advertising signs on road safety: an experimental case study
Izadpanah P, Omrani R, Koo S, Hadayeghi A
Journal of Orthopaedic Trauma2014; ePub

As technology continues to advance, the outdoor advertising industry is taking advantage of electronic signs, some of which are Static Electronic Signs (SES), with the ability to automatically change the message shown on the sign at regular intervals. Research studies indicate that SES has a negative impact on drivers' visual attention and on vehicle control. However, the actual effects of the SES on the number of collisions have been difficult to prove conclusively. The objective of this paper is to generate a clear understanding of the safety impacts of SES on the number collisions by conducting a before-and-after analysis with comparison groups. The analysis was based on a total of 10 SES along the Highway 27 and the Gardiner Expressway of the City of Toronto. The results of the before-and-after study revealed there was not enough evidence to suggest that these signs have any impact on road safety along the adjacent roadway sections at a 95% confidence interval. The same results were obtained by comparing collisions occurred during daylight and artificial light.

2013

Effects of electronic billboards on driver distraction
Dukic T, Ahlstrom C, Patten C, Kettwich C, Kircher K.
Traffic Injury Prevention 2013;14(5):469-76 (Liikenneturvan kirjastossa)

OBJECTIVE:
There is an increase in electronic advertising billboards along major roads, which may cause driver distraction due to the highly conspicuous design of the electronic billboards. Yet limited research on the impact of electronic billboards on driving performance and driver behavior is available. The Swedish Transport Administration recently approved the installation of 12 electronic billboards for a trial period along a 3-lane motorway with heavy traffic running through central Stockholm, Sweden. The aim of this study was to evaluate the effect of these electronic billboards on visual behavior and driving performance.
METHOD:
A total of 41 drivers were recruited to drive an instrumented vehicle passing 4 of the electronic billboards during day and night conditions. A driver was considered visually distracted when looking at a billboard continuously for more than 2 s or if the driver looked away from the road for a high percentage of time. Dependent variables were eye-tracking measures and driving performance measures.
RESULTS:
The visual behavior data showed that drivers had a significantly longer dwell time, a greater number of fixations, and longer maximum fixation duration when driving past an electronic billboard compared to other signs on the same road stretches. No differences were found for the factors day/night, and no effect was found for the driving behavior data.
CONCLUSION:
Electronic billboards have an effect on gaze behavior by attracting more and longer glances than regular traffic signs. Whether the electronic billboards attract too much attention and constitute a traffic safety hazard cannot be answered conclusively based on the present data.

Roadside Advertising Affects Driver Attention and Road Safety
Lene Herrstedt, Poul Greibe and Puk Andersson
Proceedings of the 3rd International Conference on Driver Distraction and Inattention, September 4-6, 2013, Gothenburg, Sweden

For many years, roadside advertising along rural roads has been strongly restricted in Scandinavian countries, mostly for safety reasons and aesthetic considerations. But during the last decades, a growing pressure on road authorities caused by significant financial interests has resulted in a rapidly increasing number of advertising signs along rural roads. The signs are placed with the purpose of capturing drivers' visual attention. Every time the drivers' visual attention is distracted away from the road and towards competing advertising signs, the time available for the drivers' response to avoid a crash if something unexpected occurs is reduced. In this perspective, it is relevant to ask whether roadside advertising affects driver attention and road safety. With the purpose of clarifying this question, a literature study followed by empirical studies has been carried out. The empirical studies were made by use of an instrumented car equipped with a camera system to track eye movements, GPS for registration of speed behaviour, and laser scanner for measurement of distances to other road users. The overall results of the empirical studies show that advertising signs do affect driver attention to the extent that road safety is compromised.

A statistical analysis of the impact of advertising signs on road safety
George Yannis, Eleonora Papadimitriou, Panagiotis Papantoniou & Chrisoula Voulgari
International Journal of Injury Control and Safety Promotion Volume 20, Issue 2, 2013 p. 111-120.
Liikenneturvan kirjastossa.

This research aims to investigate the impact of advertising signs on road safety. An exhaustive review of international literature was carried out on the effect of advertising signs on driver behaviour and safety. Moreover, a before-and-after statistical analysis with control groups was applied on several road sites with different characteristics in the Athens metropolitan area, in Greece, in order to investigate the correlation between the placement or removal of advertising signs and the related occurrence of road accidents. Road accident data for the 'before' and 'after' periods on the test sites and the control sites were extracted from the database of the Hellenic Statistical Authority, and the selected 'before' and 'after' periods vary from 2.5 to 6 years. The statistical analysis shows no statistical correlation between road accidents and advertising signs in none of the nine sites examined, as the confidence intervals of the estimated safety effects are non-significant at 95% confidence level. This can be explained by the fact that, in the examined road sites, drivers are overloaded with information (traffic signs, directions signs, labels of shops, pedestrians and other vehicles, etc.) so that the additional information load from advertising signs may not further distract them.

Liikenneviraston esite Mainos tieympäristössä (2013)

2012

Tienvarsimainonta ja lupamenettely
Antti Pirttijoki
Pirkanmaan ELY-keskus 6.3.2012

2011

Tienvarsimainonnan käytänteet suhteessa lainsäädäntöön, Ruotsin ohjeistukseen ja liikenneturvallisuuteen
Nylund, Maiju
Vaasan ammattikorkeakoulu 2011 (opinnäytetyö)
- tässä on sivulla 43 Tienvarsimainonta ja liikenneturvallisuus"
- sivulla 53 "Digitaalisen mainostaulun vaikutukset liikenneturvallisuuteen"

2010

Tienvarsimainonta : organisaatioiden tietous tienvarsimainonnan luvanvaraisuudesta
Herranen, Marjut
Tampereen ammattikorkeakoulu 2010 (opinnäytetyö)
- digitaalisista mainoksista vähän s. 18-19

Tienvarsimainonta : poikkeuslupamenettelyohje
Liikennevirasto, 2010. - 21 s.

Ulkomainoslaitteet, sijoittamisperiaatteet rakentamistapaohje 22. 5. 2007
Helsingin kaupunki, Rakennusvalvontavirasto, Marraskuu 2010

Inverkan av elektroniska reklamskyltar på trafi ksäkerhet : En studie på E4 i Stockholm
Tania Dukic et al.
VTI 2011

Denna rapport presenterar fyra delstudier som genomfördes med syftet att utvärdera hur elektroniska reklamskyltar (ERS) påverkar trafiksäkerheten.

Delstudie 1 är en litteraturstudie som undersökte påverkan av ERS på trafiksäkerhet. Slutsatsen var att rörliga bilder samt placering av skyltarna har en stor inverkan på förarens beteende och att i mörker och i ogynnsamma väderförhållanden kan ljusbilden upplevas som bländande vilket försvårar körningen speciellt för äldre förare.

Den andra och tredje delstudien jämförde trafiken före och efter installation av ERS. En jämförelse av hastighet och olyckor gjordes. Inga skillnader i trafikflöde och medelhastighet som beror på ERS kunde påvisas. Sammantaget fanns inget i det studerade olycksmaterialet som tyder på att olycksutfallet påverkats av ERS.

Den fjärde delstudien är en fältstudie som undersöker förares beteende i verklig miljö när de passerar ERS på motorvägen. Mätningar av visuellt beteende samt körbeteende visar flera fall av visuell distraktion vid passage av ERS. Effekter på kördata kunde inte påvisas. Resultaten visar också en negativ inställning till ERS för en majoritet av förarna.

Sammanfattningsvis kan ingen påverkan från ERS på trafiksäkerhet ses på makronivå. Dock måste effekterna på visuell distraktion tas i beaktning och undersökas närmare innan det beslutas huruvida ERS blir en verklighet på svenska vägar.
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The present report presents four studies that were conducted with the aim to evaluate how electronic billboards (ERS) affect traffic safety.

Study 1 is a literature review to examine how billboards impact road safety. The conclusions from the review showed that animated pictures and the location of the billboards have a major impact on driver behaviour as well as that darkness and adverse weather conditions can create glare which makes driving difficult especially for older drivers.

The second and third studies compared the speed and the number of accidents before and after the installation of the billboards. Neither differences in traffic volume nor in average speed could be demonstrated. There was nothing in the studied accidents to suggest that the accident was affected by a billboard.

The fourth sub-study is a field study investigating 41 drivers (driving and visual behaviour) on the E4 as they pass the billboards. Results showed several cases of visual distraction. The results also show a negative attitude to the billboards for a majority of the drivers.

In summary, no effects from the billboards on traffic safety could be showed at the macro level. However, the effects of visual distraction must be taken into consideration and investigated further before deciding whether billboards will be implemented on Swedish roads.

Effects of advertising billboards during simulated driving
Edquist J, Horberry T, Hosking S, Johnston I.
Applied Ergonomics 2011 May;42(4):619-26

There is currently a great deal of interest in the problem of driver distraction. Most research focuses on distractions from inside the vehicle, but drivers can also be distracted by objects outside the vehicle. Major roads are increasingly becoming sites for advertising billboards, and there is little research on the potential effects of this advertising on driving performance. The driving simulator experiment presented here examines the effects of billboards on drivers, including older and inexperienced drivers who may be more vulnerable to distractions. The presence of billboards changed drivers' patterns of visual attention, increased the amount of time needed for drivers to respond to road signs, and increased the number of errors in this driving task.

Conflicts of interest: The implications of roadside advertising for driver attention
Young, Mark S.; Mahfoud, Janina M.; Stanton, Neville A.; Salmon, Paul M.; Jenkins, Daniel P.; Walker, Guy H.
Transportation Research Part F: Traffic Psychology and Behaviour, Vol. 12 No. 5 2009, p. 381-388.
(Liikenneturvan kirjastossa)

There is growing concern that roadside advertising presents a real risk to driving safety, with conservative estimates putting external distractors responsible for up to 10% of all road traffic accidents. In this report, we present a simulator study quantifying the effects of billboards on driver attention, mental workload and performance in Urban, Motorway and Rural environments. The results demonstrate that roadside advertising has clear adverse effects on lateral control and driver attention, in terms of mental workload. Whilst the methodological limitations of the study are acknowledged, the overriding conclusion is that prudence should be exercised when authorising or placing roadside advertising. The findings are discussed with respect to governmental policy and guidelines.

Driver distraction from roadside advertising: The clash of road safety evidence, highway authority guidelines and commercial advertising pressure
Regan, Michael A, Edquist, Jessica, Horberry, Tim
First International Conference on Driver Distraction and Inattention, 2009, 14 p.

This paper examines possible driver distraction from billboards and other 3rd party roadside advertising - including both electronic/digital and traditional static advertising signage. It considers three conflicting data sources/stakeholders: road safety evidence produced by the research community, the role of road authorities to develop balanced, defensible and robust guidelines to regulate advertising (often such advertising is also revenue raising for the authorities), and the role of commercial advertisers and advertising bodies who seek to maximize the exposure of their billboards. Where it exists, the research literature has generally found that such advertising in the road environment has negative safety effects. Despite this, there is still a lack of conclusive research evidence upon which to form comprehensive guidelines or standards about how much distraction from advertising is ‘safe’. This might explain why the situation regarding roadside advertising restrictions around the world is varies widely, ranging from complete bans, to little regulation. Given the lack of both comprehensive research evidence and

international regulatory agreement, road authorities may therefore be justified in using the best research information available (albeit incomplete) coupled with engineering judgement. Different guidelines from selected countries around the world are reviewed, and the current and draft guidelines in the Australian State of Queensland are considered in more depth as a case study. Finally, more independent research tohelp better inform roadside advertising policy and guidelines is sorely needed.

Samojen kirjoittajien artikkeli "Using road safety evidence and 'safety in design' approaches to regulate driver distraction from roadside advertising" on kirjassa Driver distraction and inattention : advances in research and countermeasures : volume 1 / Michael A. Regan, John D. Lee, Trent W. Victor (ed.). 2013 (Liikenneturvan kirjastossa).

2009

The Effects of Commercial Electronic Variable Message Signs (CEVMS) on Driver Attention and Distraction: An Update
Molino, John A et al.
Federal Highway Administration 2009, 96 p.

The present report reviews research concerning the possible effects of Commercial Electronic Variable Message Signs (CEVMS) used for outdoor advertising on driver safety. Such CEVMS displays are alternatively known as Electronic Billboards (EBB) and Digital Billboards (DBB). The report consists of an update of earlier published work, a review of applicable research methods and techniques, recommendations for future research, and an extensive bibliography. The literature review update covers recent post-hoc crash studies, field investigations, laboratory investigations, previous literature reviews, and reviews of practice. The present report also examines the key factors or independent variables that might affect a driver's response to CEVMS, as well as the key measures or dependent variables which may serve as indicators of driver safety, especially those that might reflect attention or distraction. These key factors and measures were selected, combined, and integrated into a set of alternative research strategies. Based on these strategies, as well as on the review of the literature, a proposed three stage program of research has been developed to address the problem. The present report also addresses CEVMS programmatic and research study approaches. In terms of an initial research study, three candidate methodologies are discussed and compared. These are: (1) an on-road instrumented vehicle study, (2) a naturalistic driving study, and (3) an unobtrusive observation study. An analysis of the relative advantages and disadvantages of each study approach indicated that the on-road instrumented vehicle approach was the best choice for answering the research question at the first stage.

2007

Driving Performance and Digital Billboards : final report
Suzanne E. Lee, Melinda J. McElheny and Ronald Gibbons
Center for Automotive Safety Research 22, 2007

The results of a naturalistic study showed that several driving performance measures in the presence of digital billboards are on a par with those associated with everyday driving, such as the on-premises signs located at businesses. These performance measures included eyeglance performance, speed maintenance, and lane keeping. The current study was conducted in Cleveland, OH following the model of a previous study conducted in Charlotte, NC (which showed no measurable effects of on conventional billboards on eyeglance patterns, speed maintenance, or lane keeping). Thirty-six drivers drove an instrumented vehicle

on a 50-mile loop route in the daytime along some of the interstates and surface streets in Cleveland. Participants were not informed about the true purpose of the experiment, and were told that the purpose was to help understand the way people drive in a natural environment. Along the route, participants encountered five digital billboards, 15 conventional billboards, 12 comparison sites (similar to items you might encounter in everyday driving), and 12 baseline sites (sites with no signs). Twelve participants returned for a nighttime session to explore the potential effects of the digital billboards at night.

The eight seconds leading up to the events of interest were then analyzed in terms of eyeglance patterns, speed maintenance behavior, and lane keeping behavior. In a post-drive questionnaire, 42% of drivers mentioned billboards as one of the top five items that caught their attention (out of 18 choices). Eyeglance results showed that there were no differences in the overall glance patterns (percent eyes-on-road and overall number of glances) between event types. Drivers also did not glance more frequently in the direction of digital billboards than in the direction of other event types, but drivers did take longer glances in the direction of digital billboards and comparison sites than in the direction of conventional billboards and baseline sites. However, the mean glance length towards the digital billboards was less than one second. Various researchers have proposed that glance lengths of 1.6 seconds, 2.0 seconds, and longer may pose a safety hazard. An examination of longer individual glances showed no differences in distribution of longer glances between the four event types. There were only minor differences in speed maintenance or lane keeping performance for the four event types.

The overall conclusion, supported by both the eyeglance results and the questionnaire results, is that the digital billboards seem to attract more attention than the conventional billboards and baseline sites. Because of the lack of crash causation data, no conclusions can be drawn regarding the ultimate safety of digital billboards. Although there are measurable changes in driver performance in the presence of digital billboards, in many cases these differences are on a par with those associated with everyday driving, such as the on-premises signs located at businesses.

2004

Tienvarsimainosten liikenneturvallisuusvaikutukset
Tiehallinto, 2004. - 29 s.

... Onnettomuustutkijalautakuntien vuosina 2000 ja 2001 tutkimista kuolemaan johtaneista 405:sta tutkimushetkellä saatavilla olleissa onnettomuudesta kuudessa tapauksessa mainonnan arvellaan olevan osasyynä onnettomuuden syntyyn. Onnettomuuksissa kuoli 9 ja loukkaantui 2 henkilöä. Neljässä tapauksessa mainoksen arvellaan olleen näkemäesteenä ja yhdessä tapauksessa onnettomuuden arvellaan johtuneen osittain kuljettajan mainokseen kiinnittyneen huomion vuoksi. Yhdessä tapauksessa uskotaan mainoksen olleen sekä näkemäeste että vieneen kuljettajan huomion pois muista tielläliikkujista. Kaikki onnettomuudet tapahtuivat liittymissä. Kaikissa tapauksissa onnettomuuden pääaiheuttaja oli yli 55 -vuotias henkilöauton kuljettaja, joka ajoi liittymän väistämisvelvolliselta suunnalta etuajo-oikeutettua valta- tai kantatietä liikkuneen ajoneuvon eteen. Osassa onnettomuuksista tilanteen syntymiseen vaikuttaneet mainokset olivat ohjeiden vastaisesti näkemäalueella. Joissain tapauksissa mainosten sijoituspaikka oli ohjeiden mukainen, mutta tästä huolimatta niiden arvellaan olleen osasyynä onnettomuuksien syntyyn... s. 3, tiivistelmä.