RESEARCH BRIEF

Effectiveness of Distracted Driving Countermeasures:

A Review of the Literature

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According to the National Highway Traffic Safety Administration, 3,166 people were killed in 2017 in motor vehicle crashes in the United States in which one or more drivers was reported as distracted (National Center for Statistics and Analysis, 2019). On a recent nationally-representative survey, 52% of respondents reported talking on a handheld cellphone while driving in the past 30 days, while 41% reported reading texts or emails and 32% reported typing texts or emails while driving (AAA Foundation for Traffic Safety, 2019). While it is generally acknowledged that distracted driving is underreported, it is clear that drivers on the road are engaging in non-driving related tasks. It is well-established that distracted driving interferes with safe driving and increases crash risk, though estimates of risk vary by specific behavior and context. Given the limited resources available for improving traffic safety, it is important to understand the effectiveness of various countermeasures against distracted driving that may be considered for implementation. The objective of this research brief is to review the current scientific evidence concerning the effectiveness of existing and emerging countermeasures against distracted driving.

METHOD

A search was conducted in April 2019 using the PubMed, Transport Research International Documentation (TRID), PsycARTICLES, PsycINFO, and PsycEXTRA databases for relevant scientific literature. The search targeted papers that combined key words related to (1) transportation modes (i.e., driving, walking, bicycling, motorcycling) and (2) distraction (both generally and including specific distracting behaviors). Articles were required to be written in English and to have been published between 2010 and 2019 — in order to better reflect current practices, conditions, available technology, and behavior.

The initial search yielded 15,000 articles. All titles and abstracts were reviewed for inclusion by four independent reviewers, based on the following criteria:

Inclusion criteria:

- Article addresses the effectiveness of one or more countermeasures specifically targeting distracted driving, as measured using crash data, observed behavior and/or behavior change, self-reported behavior and/or behavior change, behavioral intentions, risk perceptions, driving performance, eye glance behavior, awareness, and/or knowledge;
- Sourced from peer-reviewed journal articles, conference abstracts and proceedings, or reports from organizations such as the National Highway Traffic Safety Administration and the Insurance Institute for Highway Safety.

Exclusion criteria:

- Article addresses the effectiveness of one or more countermeasures to distracted driving, but only in terms of one more of the following: expert opinion, levels of acceptance, cost-effectiveness, technical performance, impact on work productivity, usage, exposure, etc.;
- Sourced from dissertations, news articles, trade magazines, or book reviews;
- Summary reports, for which the full report is also included in the results;
- Review articles, which were scanned for relevant references, which were then added to the results.

Inter-rater agreement on article inclusion among a subset used for training ranged from 97-99%. Title and abstract review reduced the number of potentially relevant papers to 205. The vast majority of studies omitted were not directly relevant to countermeasure effectiveness.

For the final set of articles, key information was distilled and summarized in a table using the abstract and/or full article as necessary (see associated file: Distracted Driving Countermeasure Effectiveness Summary Table). The information entered into the table included the countermeasure type(s), a description of the countermeasure; study sample; target behavior(s); study design, main outcome measure(s); results; notes, if applicable; and reference (source). Entering this information and consulting full texts further identified studies that were excluded due to not addressing countermeasure effectiveness, or being a review article or dissertation. A total of 102 articles were entered into the Summary Table.

RESULTS

Thirty-nine relevant articles were identified for educational and/or behavioral countermeasures, 43 for legislative countermeasures, three for enforcement countermeasures, and 18 for technology. Articles that touched on two countermeasure types, of which there were few, were considered under both types. The results are summarized below by countermeasure type; however, the reader is encouraged to refer to the Summary Table for a more comprehensive presentation of the relevant studies.

Educational and/or Behavioral Countermeasures

Many countermeasures have been deployed that seek to educate people of the dangers of distracted driving or to train them to drive distraction free. Metrics used to test the effectiveness of these countermeasures range from self-reports of attitudes and behavioral intentions to eye glance behavior in a simulator to observations of real world prevalence of distracted driving and crash counts. Some more basic research looks at theories of behavior in relation to countermeasure design while other studies examine full-scale educational campaigns or driver training initiatives. The variety of experimental designs and outcome measures used makes direct comparisons between studies difficult, although some trends do emerge.

Awareness campaigns are one of the more researched approaches to educating about distracted driving. They can broadly be divided into single day events or more prolonged weeks- or months-long campaigns. Regardless of the time frame, common materials used to educate and change driving behavior are posters, demonstrations, guest speakers, video presentations, mass emails, and opportunities to sign pledges where one promises not to drive distracted. To evaluate these countermeasures, researchers rely on before and after treatment surveys, monitoring of driving behavior, and in one case, motor vehicle collision counts in the exposed locations.

Hospitals have been the site of several studies looking at effectiveness of distracted driving campaigns. Rana et al. (2018) observed distracted driving behavior of staff in the parking lot of a hospital before and after a month long awareness campaign. The campaign consisted of posters, flyers, an informational booth, and opportunities to sign an anti-distracted driving pledge. They found distracted driving behavior had significantly decreased after that one month and that the decrease persisted one year later (see also Joseph, Zangbar, et al., 2016).

Distracted driving awareness campaigns have also been administered and evaluated at high schools and colleges. In a study by Joseph, Haider, et al. (2016), a one-week campaign was held at a large university and involved displays in the cafeteria, mass educational emails, and group discussions with students. Following the intervention, researchers observed a significant reduction in distracted driving behavior; however, this failed to hold in a six-month, post-intervention, follow-up observation. Another study found short-term success on a college campus using a mix of fear appraisals, pledges and behavioral prompts but the lasting impact of the campaign is unknown (Fournier, Berry, & Frisch, 2016).

Some campaigns promote the active participation by the target population. For example, Larrea & Abdel-Rahim (2017) evaluated a campaign where high school students designed their own distracted driving public service announcements and had classmates vote on a winner. Student self-reports showed that after the experience they had more negative attitudes towards distracted driving. A study by Aguilar & Shoji (2013), saw a similar positive outcome in student self-reports while Allee et al. (2018) found no significant change from their student-led campaign.

Hospital-school education programs, where local hospitals bring in high school students for tours and educational presentations, have also been evaluated. One study by Unni et al. (2017) involved a hospital workshop followed by a yearlong student-led campaign. Both self-reports and observational data of students driving behavior showed a

significant decrease in distracted driving post intervention. Another study based around a student tour of a hospital found a decrease in motor vehicle collisions in the years after the intervention compared to a neighboring community without any type of intervention program (Layba, Griffin, Jupiter, Mathers, & Mileski, 2017).

Some educational countermeasures are based around a single class or event as opposed to multifaceted awareness campaigns mentioned above. These classes present information in the form of public service announcement (PSA) videos, interactive demonstrations, and group discussions. In general, testing the efficacy of these countermeasures involves administering surveys before and after the intervention to assess changes in attitudes, beliefs, and behavioral intentions. Some of these studies have found heightened awareness of distracted driving and intention to change ones behavior post intervention (Adeola, Omorogbe, & Johnson, 2016; Hassani et al., 2017; Hurwitz, Boyle, Abdel-Rahim, & Brown, 2014; Linden et al., 2019; Stewart, Harrington, Tanner, Polgar, & Girotti, 2010). Other studies have had less promising results. For example, Jacobsohn & Winston (2014) had students attend a presentation by trial lawyers on the dangers of cell phone use while driving and found no change in self-reported cell phone use behavior from pre- to post-intervention.

In some cases, classes take the form of a more hands-on demonstration to show the dangers of distracted driving. These demonstrations are facilitated with the help of computers or driving or walking simulators and their effectiveness is usually measured through pre- and post- demonstration surveys. The learning is thought to come from the experience of participating in the demo as opposed to passively listening to presentations. Studies of these countermeasures generally find that people's awareness, attitudes, and intentions towards driving distracted improve after the intervention (Downs, 2014; Downs et al., 2018; Jashami, Hurwitz, Abdel-Rahim, Bham, & Boyle, 2017; Maheshwari, 2016).

While promising, none of these studies included follow-up more than two weeks after treatment and none evaluated on-road driving behavior. A study done in virtual reality that demonstrated the dangers of texting and walking showed more awareness through self-reports but failed to see any change in observed community behavior (Schwebel, McClure, & Porter, 2017).

Teaching drivers how to maintain their visual and mental attention is another way to combat distracted driving. A series of studies (Divekar et al., 2013; Pradhan et al., 2011; Thomas et al., 2011) examined a computer-based training program called Forward Concentration and Attention Learning (FOCAL), developed to teach novice drivers to focus their gaze on the forward roadway. Evaluations were conducted on active roadways and in a driving simulator and found that drivers could be trained to maintain focus (eyes) on the road ahead.

A less-explored approach to preventing distraction is to have permanent messages displayed in places where distraction is likely to take place. One study found that people self-report fewer occurrences of distracted driving when a sticker saying "Drive in the Moment" is placed on the windshield (Rohl, Eriksson, & Metcalf, 2016). Another used sidewalk stencils to write "Heads up, Phones Down" near pedestrian crosswalks and observed a decrease in all distracted behaviors one week out and a sustained decrease in texting while walking four months post intervention (Barin et al., 2018).

In general, the focus and framing of educational and awareness campaigns requires careful consideration. The need to understand the best tone and wording of materials has led researchers to evaluate countermeasures through the lens of different behavioral theories or paradigms. For example, Henley et al. (2018) used regulatory focus theory as a framework for developing PSA messages. They found that ads that are congruent with an individual's style of pursuing goals are more effective—and that the interactivity of new media, such as the internet and smartphones, can be used positively for delivering such customized messaging. Others have oriented their approach towards specific distracting tasks; for example, Gauld, Lewis, White, Fleiter, & Watson (2017) found that campaign messages discouraging checking smartphones were more effective than ones discouraging sending text messages. Other studies have looked at Evaluative Conditioning (Kaye, Lewis, Gauld, & Nandavar, 2018), Theory of Planned Behavior (McDonald, Fargo, Swope, & Sommers, 2018), and the effectiveness of fear appraisals (Lennon, Rentfro, & O'Leary, 2010). It can be difficult to summarize findings across studies, but these theories can be a useful starting point in the development of countermeasures.

Legislative Countermeasures

Legislation regarding distracted driving typically falls into one or more of the following categories: all-driver handheld cellphone use bans, all-driver texting bans, and teen/intermediate license complete cellphone use bans. The effectiveness of these laws in various locations and for various populations has been considered to varying degrees—with divergent results. Relevant studies most often utilize before/after comparisons or comparisons with other jurisdictions (e.g., states), and outcome measures considered range from self-reported or observed phone use to fatal crashes or traffic fatalities.

Handheld cellphone use bans (all drivers)

All-driver handheld cellphone use bans have been subject to evaluation to a greater degree than texting bans and complete cellphone bans that apply only to a subset of drivers. The majority of these evaluations have indicated reductions in the outcome measures considered, while a limited number have found no effects or increases in unsafe behavior and/or associated consequences. Evaluations of handheld cellphone use bans that have utilized self-reported driver behavior have noted reductions in: handheld cellphone conversations (Rudisill, Zhu, & Chu, 2019); talking on the phone while driving (Braitman & McCartt, 2010); handheld and overall phone use (Carpenter & Nguyen, 2015); and cellphone conversation among most subgroups of adolescent drivers (Rudisill, Smith, Chu, & Zhu, 2018).

Studies that have utilized observations of handheld cellphone conversations among drivers have attributed reductions in the behavior among all drivers to handheld cellphone bans (Rudisill & Zhu, 2017; Starkey, Wilson, Charlton, & Thomson, 2013), including both immediate and long-term effects (McCartt, Hellinga, Strouse, & Farmer, 2010). Reductions in observed handheld phone use among young drivers has also been attributed to all driver handheld phone use bans (Zhu, Rudisill, Heeringa, Swedler, & Redelmeier, 2016).

Evaluations utilizing crash data have attributed reductions in fatal (Sampaio, 2010, 2014) and injury crashes (Sampaio, 2010), traffic fatalities (Anyanwu, 2012; Rocco & Sampaio, 2016), driver fatalities (Rudisill, Chu, & Zhu, 2018), and motorcycle fatalities (French & Gumus, 2018) to all driver handheld cellphone bans. Studies that have considered particular age cohorts have resulted in similar conclusions regarding fatal crashes among younger drivers (Lim & Chi, 2013b, 2013a). Increased hands-free cellphone use, however, may accompany reductions in handheld phone use (e.g., Carpenter & Nguyen, 2015).

In contrast, some evaluations have concluded that handheld cellphone bans are associated with a lack of effect or increase in the outcome measure(s) considered. No significant changes were attributed to handheld cellphone bans when considering call rates (Cayford, 2011), freeway crashes (Burger, Kaffine, & Yu, 2014), collision claims (Trempel, Kyrychenko, & Moore, 2011), and self-reported texting while driving among high school students (Qiao & Bell, 2016). In addition to the increase in self-reported hands-free phone use noted above, one study noted an increase in handheld cellphone crashes in addition to an increase in citations (Maher & Ott, 2013).

While few evaluations have assessed the effectiveness of primary versus secondary handheld cellphone bans, findings have indicated that primary bans are more effective than secondary bans (e.g., Dong, Nambisan, Clarke, & Sun, 2017; Dong, Nambisan, Xie, Clarke, & Yan, 2017) or the lack of such a ban (Dong, Nambisan, Clarke, et al., 2017).

Texting bans (all drivers)

Evaluations of all-driver texting bans have yielded conflicting conclusions. Results were roughly split between those indicating a reduction in one or more outcome measures (e.g., self-reported texting while driving, traffic fatalities, etc.) and those specifying no effect or an increase in such measures.

Studies noted reductions in: self-reported texting while driving among men and individuals of race/ethnicity other than white non-Hispanic (in stratified, fully adjusted models) (Rudisill et al., 2019); teens' self-reported texting and talking on the phone while driving (Ehsani, Simmons-Morton, Perlus, Xie, & Albert, 2015); emergency department visits (Ferdinand, Aftab, & Akinlotan, 2019); crash-related hospitalizations for all age groups, with significant reductions for ages 22-64 and 65 and older and marginal reductions for adolescents (Ferdinand et al., 2015); possible injury/property damage only (PDO) crashes (Ehsani, Bingham, Ionides, & Childers, 2014); and motorcycle fatalities (French & Gumus, 2018).

Other studies have noted increases in: collision claim frequency (Highway Loss Data Institute, 2018); fatal/

disabling and non-disabling crashes (Ehsani et al., 2014); and distraction-related crashes (Dube, Fitzpatrick, Gazzillo, & Knodler, 2016). The latter result may also be attributable to increased awareness and reporting of driver distraction involved in crashes (Dube et al., 2016), though reporting of driver distraction in crashes is generally thought to be unreliable. Similarly, a small number of studies have indicated texting bans have no effect on self-reported texting while driving among adults (Rudisill et al., 2019) and adolescents (Rudisill, Smith, et al., 2018), as well as on driver fatalities (Rudisill, Chu, et al., 2018).

In addition, several studies have specifically compared the effectiveness of primary texting bans to that of secondary or no texting bans. These studies have generally indicated that primary bans are associated with reductions in all crashes (Abouk & Adams, 2013), fatal crashes (Dong, Nambisan, Clarke, et al., 2017), and traffic fatalities (Ferdinand et al., 2014; Rocco & Sampaio, 2016), while secondary bans are not associated with changes in all crashes (Abouk & Adams, 2013) or traffic fatalities (Ferdinand et al., 2014). Rocco & Sampaio (2016) noted that the reduction in traffic fatalities associated with primary texting bans was smaller than that associated with handheld bans.

Teen/intermediate license complete cellphone use bans

Evaluations of the effects of complete cellphone use bans that apply only to teens and/or intermediate licensees have yielded varied results. Intermediate license cellphone bans were associated with a significant reduction in traffic fatalities, while teen cellphone bans were associated with a non-significant reduction in such fatalities (Anyanwu, 2012). When only fatal crashes involving drivers under 21 years of age were considered, young driver cellphone bans had no effect (Lim & Chi, 2013a). Some young driver cellphone bans include delays in progression to the next stage of licensure for violations of the ban. While this feature has been associated with a reduction in self-reported texting among young drivers (e.g., Rudisill & Zhu, 2015), the results of an observational study that included a control state for comparison suggest that the law did not have a long-term effect on teen driver phone use and increased physical phone manipulation (Goodwin, O'Brien, & Foss, 2012).

Enforcement Countermeasures

Only three articles were identified that assessed the effectiveness of enforcement countermeasures against distracted driving, and all addressed high visibility enforcement (HVE) of bans on handheld cellphone use and texting while driving. HVE aims to reduce a particular traffic safety problem through a combination of targeted, proactive enforcement and visibility elements including paid and earned media. Findings regarding the effectiveness of HVE for handheld bans varied depending on the outcome measure considered. Analyses of crash data and collision claims found no significant effects (Chaudhary et al., 2015; Highway Loss Data Institute, 2013). Decreases in handheld phone use were observed in both intervention and comparison areas; however, in most cases the reductions were greater in the intervention area (Chaudhary et al., 2014, 2015).

Technology Countermeasures

There have been a number of different approaches to mitigating distraction using technology, including the use of cellphone-blocking technology as well as driver monitoring and feedback systems. In general, studies of these technologies have shown some promise in curbing the ability of drivers to engage in distracting tasks.

Based on the current review, the most widely studied technology is phone-based blocking technology, which often use the phone-based GPS or gyroscope to determine that the person is in a vehicle that is in motion. At such times, the cellphone will block calls or notifications from messaging apps and other features. Often, drivers (and/or passengers) can override the blocks by indicating that they are "not driving." Several studies have shown that such technologies have positive impacts in terms of opinions regarding the efficacy of the technology as well as decreased use and interactions with phones that have blocking technology (actual and self-reported; e.g., Creaser, Edwards, Morris, & Donath, 2015; Reagan & Cicchino, 2018). Some studies have noted, however, that the reliability of the technology as well as the compliance of drivers can be problematic, with many drivers not using the available features (e.g., Reagan & Cicchino, 2018) or reverting to their original behavior once the app is no longer in place (e.g., Funkhouser & Sayer, 2013).

Other forms of technology monitor driver's behavior (e.g., eye glances) or performance (e.g., vehicle control) as well as their phone usage and provide feedback either in real-time (via alerts) or post-trip (via driving scores

or coaching tips) aimed at reducing distraction. In some cases, feedback is also sent to a third party, such as the parents of a teen driver. Some studies have shown higher driver support for post-drive feedback compared with real-time feedback (e.g., Roberts, Ghazizadeh, & Lee, 2012); however, these studies revealed mixed support for the efficacy of feedback-based systems (e.g., Lee et al., 2013). Often, one challenge is sustaining the drivers' engagement in the app or feedback over time, though incentive-based approaches have shown some merit (Munira, Henk, & Tisdale, 2018). Although not intended as distraction countermeasures per se, other studies have shown the benefits of collision avoidance or alerting systems in improving the responses of drivers who were initially distracted (e.g., Anzagira et al., 2016; Ho, Gray, & Spence, 2014).

There have been other innovative approaches used as well, including sharing a video of a driver's viewpoint to the person who is calling (not in the vehicle; e.g., Gaspar et al., 2014) or approaches that target distracted pedestrians with vehicle-to-pedestrian communication (e.g., Rahimian, O'Neal, Zhou, Plumert, & Kearney, 2018). In other cases, technology-based approaches are combined with other countermeasures, such as education and social norming approaches (e.g., comparing self-reported behaviors of teen drivers with that of their parents; Merrikhpour & Donmez, 2017).

Many different technology-based approaches have been advanced and evaluated in the scientific literature; however, the depth of coverage for the separate approaches is generally sparse. Moreover, while some studies have shown promising outcomes in terms of reducing distraction, much more work is needed to further corroborate the utility in broader applications and with different populations (i.e., whether the modestly sized studies can be scaled to larger groups). In particular, teen and young driver compliance and continued use of technology-based approaches remains a noteworthy challenge (e.g., Benden, Fink, & Stafford, 2012; Delgado et al., 2019).

DISCUSSION

Research on distraction while driving dates back to the 1960s and, in that time, there have been several hundred studies — if not more — that have documented many of the effects on driving performance, risks, attitudes, and many other behaviors and perceptions. In contrast, the body of scientific literature looking at the effectiveness of countermeasures against distracted driving is modest by comparison. The current review identified roughly 100 studies related to different types of distraction countermeasures. Studies assessing the effectiveness of countermeasures that educate and/or train drivers in order to reduce distracted driving have utilized a wide variety of approaches and metrics and have yielded varying results. For example, evaluations of distracted driving awareness campaigns have had mixed results. Multifaceted campaigns have been credited with short- and longer-term reductions in observed distracted driving among employees in hospitals (Joseph, Zangbar, et al., 2016; Rana et al., 2018); short-term reductions in the same behavior at colleges and universities (Fournier, Berry, & Frisch, 2016; Joseph, Haider, et al., 2016); and reductions in self-reported and observed distracted driving (Unni et al., 2017) as well as collisions (Layba, Griffin, Jupiter, Mathers, & Mileski, 2017) in hospital-school programs. Assessments of education on distracted driving delivered through a single event have shown limited success, with some finding positive increases in awareness and behavioral intentions. Studies of demonstration countermeasures utilizing computers or simulators have found positive improvements in awareness, attitudes, behavioral intentions, and attention to the forward roadway in the short term but have not addressed impacts in the longer-term nor on actual driving behavior (e.g., Downs et al., 2018; Jashami et al., 2017; Pradhan et al., 2011).

Legislative efforts to curb distracted driving tend to fall into three types: all-driver handheld cellphone bans, all-driver texting bans, or complete cellphone bans that apply to a subset of drivers. Evaluations of all-driver handheld cellphone bans have found reductions in self-reported or observed phone use while driving and, in some cases, fatal and injury crashes. However, these outcomes are not universal. Studies of these bans have sometimes failed to document reductions in call rates, freeway crashes, or collision claims. Moreover, increases in handheld cellphone crashes and self-reported, hands-free phone use have also been documented in studies of handheld bans. All said, the majority of evaluations of all-driver handheld cellphone bans have indicated favorable reductions in handheld phone use. Evaluation looking at fatal or injury crashes are less conclusive.

Assessments of all-driver texting bans have been less decided. While some evaluations have found significant decreases in self-reported texting while driving and crash-related hospitalizations among some demographic groups and total emergency department visits and possible injury/PDO crashes, others have found no effects on self-reported texting and driver fatalities, and in some cases, increases in crashes and collision claims.

Evaluations of complete cellphone bans that apply to only a subset of drivers have been limited and produced mixed results: significant reductions in traffic fatalities have been attributed to intermediate license cellphone bans while only non-significant reductions in such fatalities were seen for teen cellphone bans. Young driver cellphone bans were found to have no effect on fatal crashes involving drivers under age 21.

The few studies that have assessed the effectiveness of HVE of handheld cellphone and texting bans have found decreases in observed handheld phone use but no significant effects on crashes or collision claims. Enforcement of distracted driving laws is necessary but can be quite challenging (Coben & Zhu, 2013), particularly those that apply to only a subset of drivers (Buckley, Chapman, & Sheehan, 2014) or only certain types of phone manipulation (Delgado, Wanner, & McDonald, 2016; McCartt, Kidd, & Teoh, 2014).

Evaluations of technology countermeasures that aim to reduce distracted driving have demonstrated potential success. While there have been issues with the reliability of and compliance with cellphone blocking technology (e.g., Funkhouser & Sayer, 2013; Reagan & Cicchino, 2018), reductions in actual and self-reported phone use have been noted (e.g., Creaser, Edwards, Morris, & Donath, 2015; Reagan & Cicchino, 2018). Mixed results were found regarding the efficacy of technology that monitors and provides feedback on driver behavior.

The purpose of the current review was to capture the current state of knowledge concerning the effectiveness of driver distraction countermeasures in the scientific literature. In considering the outcomes and summaries, three important things should be noted.

First, while the number of studies covered in the review is not insignificant, it is important to note that in many cases the number of studies looking at a specific countermeasure is small, and within the categories and sub-categories there are many differences across the studies. As such, drawing firm conclusions or comparisons can sometimes be a challenge. Further efforts to replicate some of the findings is certainly merited.

Second, the studies included in this review are themselves subject to various limitations. While many include comparisons with control groups, pre- and post-intervention outcome measures, and/or control for potential confounders, finding appropriate controls and identifying and measuring confounders can be very difficult. In addition, outcome measures are subject to biases that vary depending on the method of measurement. In most cases, further research is needed to determine whether promising outcomes translate to different and larger populations as well as over time with changes in the nature and prevalence of distractions and driver behavior.

Lastly, the current review is limited to those studies yielded by the search strategy (i.e., scientific databases). As such, it does not fully consider the range of potential countermeasures for which the scientific evaluation is non-existent or only nascent. While distracted driving is not limited to use of cellphones, most of the existing countermeasures, and thus most of the evaluations of countermeasure effectiveness, focus on cellphone use while driving. As new and potentially innovative approaches to curb the problem of distracted driving emerge, rigorous evaluations will be necessary. Along these lines, many have noted the need to implement combinations of different types of countermeasures against distracted driving (e.g., Ahlström et al., 2013; Delgado et al., 2016), though there is limited knowledge of how countermeasures interact (Young & Salmon, 2015). Others have advocated for a systems-based approach to distraction, rather than an approach that focuses on particular components (e.g., handheld phones) or uses (Young & Salmon, 2015).

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