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Distracted driving behaviors related to cell phone use among middle-aged adults

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ABSTRACT

Background: Distracted driving (DD), particularly cell phone use (texting or speaking), is associated with 26% of all crashes and is increasing in frequency. The purpose of this study was to characterize behavior and predictors of DD in middle-aged adults.
Methods: An anonymous online (SurveyMonkey) 60-question survey on DD attitudes and behaviors, particularly cell phone use, was administered to adults who were recruited via fliers posted around public locations (e.g. recreation centers) and email blasts from businesses. Participants were San Diego residents between 30–64 years old, who drove a car at least once a week and owned a cell phone ($n=715$). A DD Scale (DDS) based on 15 questions was created. Factor analysis was conducted and a single parsimonious factor with good reliability was determined (Cronbach's alpha .879).
Results: The majority of participants were white (69%), female (75%) and/or made > $50,000/year (68%). 65.1% reported texting while stopped at red lights. While driving on the freeway, 20.4% reported spending about 25% of the time on a cell phone. The DDS scores range from 0–54 (mean=12.92). DDS scores were analyzed as a continuous variable to determine if higher scores were associated with specific attitudes or beliefs. Significant predictors of higher scores on the DDS ($p > .05$) were: perceiving oneself as capable of talking on the phone while driving and/or texting while driving (i.e. overconfidence in driving abilities), and obligation to take work calls.
Conclusions: Work obligations and overconfidence in one's ability to drive while talking/texting are critical areas to intervene in and have large public health implications. Future studies should use the DDS among different populations to determine generalizability. There are numerous opportunities for education, policy and new technologies to expand on this research.

1. Introduction

Distracted driving (DD), particularly cell phone use while driving, increases driving risk for crashes, injuries and death. DD is defined as a "specific type of inattention. Distraction occurs when drivers divert their attention from the driving task to focus on some other activity" (NHTSA, 2014). The National Highway Traffic Safety Administration (NHTSA) has categorized three types of DD: visual (eyes off the road), manual (hands off the wheel) and cognitive (mind off of driving) in their policy statement (NHTSA, 2011).

DD is the cause of numerous injuries and fatalities each year in the US. In the US in 2012, 3328 people were killed due to distracted driving and about 421,000 were injured (NHTSA, 2014). In a naturalistic study of 100 cars over a year, the researchers concluded that nearly 80% of the crashes and near-crashes involved driver inattention (i.e. distraction) immediately prior to the crash (within 3 s) (Klauer et al., 2006). A near-crash was defined as a "rapid, evasive maneuver…to avoid a crash" and includes "steering, braking, accelerating, or any combination" (Klauer et al., 2006, p. xv).

At least 12% of the fatalities in 2012 were related to cell phone use (NHTSA, 2014), but because the data is hard to collect it is likely that more of the crashes involved cell phone usage. Simply talking on a cell phone (handheld OR hands-free) was found to reduce reaction time at least as much as a BAC of .08 (the legal limit in the US) (Strayer et al., 2006). Yet many individuals believe that hands-free is safer than handheld cell phone use while driving, particularly because hands-free cell phone use is legal in most states, including CA. However,

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several studies have found that talking on a cell phone (handheld or hands-free) while driving is associated with a four-fold increased risk of a crash (McEvoy et al., 2005; Redelmeier and Tibshirani, 1997). A naturalistic study found that drivers who engaged in complex secondary tasks (e.g. texting) are between 1.7–5.5 times as likely to be involved in a crash or near-crash than those who were not (Klauer et al., 2006).

Text messaging (i.e. any direct manipulation of handheld devices) while driving is considered especially problematic as the behavior combines manual, cognitive and visual forms of distraction. Sending or receiving a text message causes a driver to look away from the road for an average of 4–6 s (Olson et al., 2009), or the equivalent of the equivalent of driving the length of a football field blind at 55 mph (NHTSA Blueprint, 2012). However, the 2012 National Survey on Distracted Driving Attitudes and Behaviors (NSDDAB) found that 50% of drivers believed that talking on a phone while driving does not impact their driving, and 33% of the drivers who report texting and driving say that the behavior does not impact their driving (Schroeder et al., 2013).

Cell phones are increasingly commonplace; as of 2014, 90% of American adults reported owning some kind of mobile phone, and 64% owned smartphones (Pew, 2014), which was up from the 39% of adults who owned smartphones in 2011 (Smith, 2011). In June 2011, 196 billion text messages were sent or received in the US, which increased by almost 50% from June 2009 (Smith, 2011). Wilson and Stimpson (2010) examined trends in DD fatalities from 1999 to 2008 and concluded that after 2005, DD fatalities increased by 28%. Using multivariate analyses, the increased amount of texting was associated with an increase of over 16,000 road fatalities from 2001 to 2007. Additionally, regression estimates by Wilson and Stimpson (2010) suggest that DD fatalities would "increase 75.6% in an average state for every 1 million additional text messages sent per month." Based on data from the National Occupant Protection Use Survey (NOPUS), drivers visibly text-messaging or visibly manipulating hand-held devices increased significantly from .9% in 2010 to 1.3% in 2011; thus, 100,000 drivers are texting while driving at any typical daylight moment (NHTSA, 2013). Smartphones provide additional opportunities for distractions, including games, GPS or directions, email, social media access and more.

Despite all the information on the risk of using a cell phone while driving, there are few studies ascertaining prevalence among different age groups. Indeed, much focus has been on younger drivers, however that focus may be missing a significant amount of people >30 years old who are also engaging in dangerous distracted phone use while driving. In terms of proportions of drivers talking on their cell phones while driving, a study found no significant differences in the prevalence of DD between drivers aged 35–44 and drivers aged 18–24 (AAA, 2008), however a slower reaction time was found among older drivers (Caird et al., 2004). Existing studies assessing adults (>18 years) behaviors are limited, and either assess attitudes (Trisko and Ferraro, 2014) or only behaviors, with limited detail (Hoff et al., 2013).

The current study developed a survey to determine DD due to cell phone use among middle-aged San Diego County residents (between 30–64 years of age). The survey focused on frequency of behaviors, attitudes and beliefs towards DD to create a more complete picture of how attitudes and DD behaviors, specifically cell phone use, are related. A distracted driving scale (DDS) was developed to determine predictors of greater amounts of DD related to cell phone use.

2. Methods

2.1. Survey development

A DD survey was developed using modifications from a validated survey deployed the prior year for college students (Hill et al., 2015). Inclusion criteria to participate included: 1) ages 30–64, 2) own and use a cell phone, 3) drive a vehicle at least one day a week, and 4) be a resident of San Diego County residency. The goal sample size was 500.

The study was initially piloted with 20 San Diego middle-aged adults using a mix of random-sampling and convenience sampling, incentivized with a $20 gift card. The pilot feedback was used to assess face validity and modify the survey accordingly. The University of California at San Diego's IRB approved all study materials, measures and activities.

2.2. Survey implementation

The DD survey was advertised through fliers in highly trafficked places around San Diego County (e.g. YMCAs, hospital and company cafeterias and staff lounges, business park complexes, company elevators, an article in a local community paper and the San Diego State University and University of California at San Diego employee listserves). Participation was voluntary and incentivized through a lottery drawing for one of five items: an iPad, Kindle, and three Amazon.com gift cards in the amount of $100 each.

The final survey was implemented from February through March, 2013 using the online program SurveyMonkey. Web-based surveys are commonly used and are comparable to paper-based surveys (Hayslett and Wildemuth, 2005). Additionally, online surveys can prevent items from being skipped; thus all questions, except for demographics, were required in order to continue through the survey and be entered for the raffle.

Seven hundred and eighty eight (788) participants accessed the survey and 715 (91%) completed the survey and met eligibility criteria and thus were included in the present analyses.

2.3. Distracted driving scale (DDS)—psychometrics and exploratory factor analysis (EFA)

To best determine predictors of DD, a distracted driving scale (DDS) was created. The DDS was created by summing responses on DD questions in terms of frequency of behavior (e.g. "how often do you text while stopped at red lights?" with 5 Likert-scale response options (0=never, 1=rarely, 2=sometimes, 3=often, 4=frequently). An exploratory factor analysis (EFA) was conducted to determine if the scale had multiple factors (e.g. hypothesized texting behaviors vs. talking behaviors).

Though 17 questions were hypothesized as relevant for the scale, 3 questions were eliminated because they did not load with the single factor due to low commonality scores ($<10\%$) and/or factor loadings <3. A single parsimonious factor was identified and used for the final DDS 14-item scale (see Appendix A). The final DDS had a Cronbach's alpha of .879. The scale appeared to have acceptable validity after checking discriminant and convergent validity using other survey items.

2.4. Analyses

Analyses were run in SPSS vs. 22.0 using a p-value of .05 to determine significance. Descriptives of participant characteristics were assessed, as well as the frequency of engaging in different DD behaviors, and attitudes and beliefs pertaining to DD. Spearman correlations were run to first assess bivariate relationships between hypothesized variables and the DDS. After determining variables of interest based on significant correlations, general linear model regressions (i.e. using the UNIANOVA command in SPSS) were used to assess the relationships between DDS scores and independent variables (e.g. work obligation, self-efficacy in self), and other variables or potential covariates (e.g. age, gender, children at home).