Driver distraction is an under-reported cause of road accidents: An examination of discrepancy between police officers' views and road accident reports

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Abstract: Police records represent the primary source of data on the role of driver distraction in crashes. It is commonly assumed that officers attending the crash scene tend to underreport driver distraction as a contributing factor in crashes. However, this assumption has never been explicitly tested. Thus, the goal of this study was to empirically estimate the presence of underreporting bias of driver distraction in police crash reports. We also explored whether such underreporting vary with respect to the age and gender of the driver. To this end, we presented police officers with hypothetical crash scenarios involving drivers from different age and gender groups. For each scenario, officers estimated the possible factors they believed to have contributed to the collision. We assessed the under-reporting of distraction-related crashes by comparing police officers' views with real crash reports. Our findings show that officers more often viewed distractive behaviours inside the vehicle as a cause of collisions than was evident in the crash reports. This difference was particularly pronounced with respect to mobile phone use as a cause of crashes. In contrast, officers' views and accidents records were similar with regard to the involvement of outside-vehicle distraction in crashes. Overall, the results substantiate claims that police reports do not provide reliable information on the role of driver distraction in crashes. In particular, the dangers of mobile phone use whilst driving have been severely underestimated.

1. Introduction

1.1 Scope and aim

Driver distraction has long been recognized as a concern for road safety. Crashes attributable to driver distraction have increased in recent years, with prevalence varying widely from 1-2% to 14% of crashes [1-5]. Accurate assessment of the extent of distraction-related crashes is essential to guide policy development and identify effective prevention measures. However, epidemiological studies are typically based on police accident reports, which could be vulnerable to biases in reporting practices. [1-2,5-9] Specifically, driver distraction is often assumed to be an underreported factor in crashes because officers are unable to verify the occurrence of distracted driving at the time of the crash. Consequently, the real magnitude of the problem is likely to be underestimated.[1,5] The purpose of this paper is to determine the extent to which distraction is an underreported contributing factor in police crash reports. Using a vignette-based questionnaire, we evaluated whether officers' perceptions of the involvement of distraction in crashes reflect actual accident figures.

1.2 Background

Much of the road safety literature has focused on inside-vehicle distraction, and particularly mobile phone use, as a contributing factor in crashes [10-11]. For example, some studies have shown that engaging in a mobile phone conversation whilst driving quadruples the risk of severe and minor injury crashes [7,12]. External distractions deriving from outside the vehicle are also implicated in road traffic accidents. [5,10-11,13] A study of accident statistics in the United States estimated that approximately 30% of all distraction-related crashes were caused by outside-vehicle distraction. [5]

Distracted crashes, especially due to mobile phone use, is typically found among young drivers.[4-5,13-14] Epidemiological evidence concerning gender differences is scarce and inconclusive, but suggests men are more likely to be involved in distraction-related crashes. [5]

1.3 Police crash records

Police records represent the primary source of information on driver distraction as a contributing factor in crashes. As noted above, previous research [1-2,5-9] has proposed that distracted driving crashes are difficult to identify, and therefore may not be accurately recorded in police crash databases. Specifically, drivers involved in crashes may be reluctant or unable to report their distraction contributed to the crash. In addition, officers may feel they do not have enough evidence to identify the occurrence of distracting activities at the time of the crash. In the U.K., officers attending a crash scene indicate on their report form the factors they believe to have contributed to a collision. Although, the contributing factor report is intended to convey the officer's subjective views, these data are disclosable in court with implications for the allocation of blame. Consequently, officers may be reluctant to report on factors that they believe would be difficult to defend in court. [2] Therefore, it is likely that police records of crashes where distraction was a contributory factor represent a small proportion of the actual number of distraction-related crashes.

Some indirect support for the underreporting of distraction-related crashes comes from studies of driver surveys showing high prevalence of distracting activities whilst driving. For example, half of respondents in one survey reported occasional or frequent use of a mobile phone whilst driving, with younger drivers reporting the most frequent use. [15] This is also evident from naturalistic observations that documented various distracting behaviours among drivers. [16-17] There are also results from studies using driving simulators, which show that distracting activities, such as mobile phone conversations, worsen driving performance. [18-19] Given the frequent reports and observations of distractive behaviours while driving and its relation to impaired driving performance, one might expect driver distraction to account for a substantial proportion of crashes. However, UK accident figures suggest that only 1-2% of crashes were attributed to driver distraction. [1-2] This could indicate that either the problem of driver distraction is relatively minor or that driver distraction is being underreported in police records.

The overall aim of the current study was to examine whether driver distraction is an under-reported factor in UK police crash reports, and whether such reporting bias vary across driver's age and gender. To achieve this, we presented traffic officers with hypothetical crash scenarios involving drivers from different age and gender groups. For each scenario, we asked them to assess the possible factors that contributed to the crash. In the current study, we compared officers' estimated rates of distraction-related accidents to actual statistics from police crash reports. Specifically, we focused on three distraction codes that exist in the UK crash form: (1) Outside-vehicle distraction; (2) Inside-vehicle distraction; and (3) Mobile phone use.

It is hypothesized that the proportion of distraction-related accidents will be higher based on officers' views compared to officers' crash reports. Further, it is assumed that these discrepancies will be more pronounced for inside-vehicle distraction and mobile phone use categories, as these are more likely to reflect voluntary distracting behaviours. Another question was whether the characteristics of the crash-involved driver influence officers' reporting bias. Here, we do not have prior expectations about how driver's age and gender may influence the magnitude of discrepancies between police views and crash statistics.

A secondary objective was to estimate crash risk due to driver distraction, after controlling for exposure differences across driver groups. That is, in addition to estimating the prevalence of crashes attributed to distraction, we also calculated measures of crash risk measures. To achieve this, we used a novel approach that adequately adjusts for differences in the population size and amount of travel done by age and gender driver groups. Thus, we compare estimates of distraction-related crashes based on both prevalence measures and crash risk measures.

To our knowledge, no studies have empirically examined the existence of underreporting bias of driver distraction in police crash reports. Thus, our findings will provide valuable information on the reliability of crash data with regard to the role of driver distraction in road accidents.

2. Methods

2.1. Police views

Participants. The research protocol was approved by University of Essex Ethics Committee. Seventy-seven officers (82% male; age 24-58 years; mean age 43.5) were recruited from three U.K. road-policing forces. Participants were invited to take part via email and the study was completed online, lasting around 15 minutes. A £5 charity donation was made on behalf of each participant as compensation for their contribution. The majority (n=54; 70%) indicated that they worked within a specialist policing unit. Among these, the majority (n=40; 74%) identified road policing as their speciality. Most (n=69; 90%) indicated that they had reported on at least one road accident in the past year. Among these, the mean number of reported road accidents in the previous year was 52 (*SD*=83). All officers held a driver license (mean years of possession; 25; *SD*=8). Officers indicated that they made a mean of 45 (*SD*=69) trips per week.

Materials and procedure. Participants were shown six scenarios to obtain their views on the typically causes of collisions involving drivers of various ages (young, middle-aged, elderly) and gender (male, female). All combinations of driver age and gender were used across the six scenarios. In order to introduce some variety to the scenario setting and to balance effects of other factors (e.g., nature of the collision, time of day), we manipulated collision type (one-vehicle, two-vehicle) and time of day (day, evening, night) across scenarios as a subordinate factor. This meant that six versions of each of the sets of six scenarios (containing all levels of age and gender) were generated in total, such that each level of the subordinate factors was balanced across the six versions of the survey. For each vignette, the participant was asked to list up to six factors that they thought could possibly have contributed to the collision. Box 1 provides an example scenario.

The factors generated by participants were classified by S.R. and J.R. into contributing factor categories (e.g., fatigue, mobile phone use). The categories were generated based on participants' responses according to their shared characteristics. For example, the "fatigue" category included all factors related to fatigue (e.g., sleep deprivation, tiredness). This process generated 25 factor categories that included all participants' responses. Inter-rater reliability was assessed for a sample of 50 responses, which included two example factors selected at random from each of the 25 factor categories. The percentage of agreement was high for both raters (S.M.=81% and another rater =84%;).

Box 1: Road accident scenario

Please imagine the following scenario:

A driver is involved in a single car collision. The driver is seriously injured. The driver is a [*young, middle-aged, elderly driver*] aged between [*17 and 20 years, 40 and 49 years, 70 years or older*] and is [*male, female*]. The collision occurred during the [*day, evening, night*] between the hours of [*6am and 6pm/ 6pm and 9pm/ 9pm and 6am*].

Given this information, please list up to six factors that you think could possibly have contributed to this collision.

For our current purposes, we focussed on distractions related to mobile phone use, inside- and outside-vehicle distractions. Factors referring to distraction from an unspecified source were not included in our analysis as the U.K. road accident reports do not provide a general distraction factor for comparison. Mobile phone use included calls and messaging. Inside-vehicle distraction included driver distractions within the vehicle (e.g., distracted by a passenger, applying cosmetics, operating in-vehicle technology) other than mobile phone use. Outside-vehicle distraction included factors related to driver distractions occurring outside the vehicle (e.g., distraction by a pedestrian or animal).

2.3. Police accident reports

The road accident data included all one-car and two-car injury collisions occurring in Great Britain (England, Scotland, Wales) during years 2005-2012. The road accident data were recorded by police officials and their reports were made available for public consumption by the University of Essex Data Archive after processing by the U.K. DfT. Each accident report indicated the factors that the reporting officer believed may have contributed to the collision. These factors relate to the road environment, vehicle defects, and driver-related factors, including injudicious action, error or reaction, impairment or distraction, and behavior or inexperience. We focussed on the three distraction-related categories: driver using mobile phone, distraction in vehicle, and distraction outside vehicle. As in our analysis of officers' views, road accidents were counted more than once when multiple distraction-related factors were recorded for the same accident.

To adjust for driver exposure in our crash risk assessment, we used the U.K. estimated annual trip numbers per driver for each age range and gender. These were collected as part of the annual U.K. National Travel Survey during years 2002-2012 for which, respondents completed a personal travel diary during a 7-day period. We combined the travel estimates per person with estimated driver numbers in each age range and gender. Driver license numbers can yield biased estimates as some inactive drivers hold a valid license. Thus, we estimated active driver numbers as the product of the proportion of active drivers in the U.K. National Travel Survey (~14,959 drivers annually) and estimated U.K. resident numbers. As such, our estimates represented numbers of drivers actively engaged in driving in each age range and gender.

2.4 Crash risk assessment

We estimated driver crash risk based on the road accident reports and officers' views about the typical causes of collisions. Traditional crash risk assessments adjust for driver group (i.e., age, gender) differences in risk exposure (e.g., population numbers, annual travel) by dividing total crash counts of each driver group, *i*, by their risk exposure, such that:

$$\text{Traditional crash risk}_i = \frac{\text{crashes}_i}{\text{exposure}_i} \quad . \qquad (1)$$

where exposure_i is the product of driver numbers and travel per person. However, recent research has revealed that the traditional method of dividing crash counts by risk exposure is over-sensitive to crash counts of driver groups that are small in number or amount of travel (e.g., young and elderly drivers) and is under-sensitive to crash counts of driver groups that are great in number or amount of travel (e.g., middle-aged drivers). [20] Consequently, the traditional approach can lead to biased assessments of crash risk, especially for younger and older drivers who are relatively few in number in the driver population. [20] Here, we use the adjusted crash risk metric, which is designed to more adequately adjust for driver group differences in exposure. [21] Within this approach, the adjusted exposure, ξ_i, of each driver group, *i*, is estimated on the assumption that exposure is high if driver numbers are large and trips are many, low if driver numbers are large and trips are few, and higher if driver numbers are small and trips are many than if driver numbers are small and trips are few.[13,14] It follows that:

$$\xi_i = \frac{\exp(2 \times \bar{z}_i) - \bar{y}_i \times (1 - \bar{z}_i)}{(1 - \bar{y}_i) + \exp(2 \times \bar{z}_i)} \quad . \qquad (2)$$

Total travel per driver, $\bar{y}_i$, and driver numbers, $\bar{z}_i$, are scaled annually by dividing each by the largest value across all driver groups (i.e., age, gender). The adjusted crash risk, γ_i', of each driver group, *i*, incorporates the adjusted index of exposure on the assumption that crash risk should be high if crash counts are large and exposure is small, low if crash counts are small and exposure is high, and should be higher if crash counts are small and exposure is low than if crash counts are large and exposure is high,[13,14] such that:

$$\gamma_i' = \alpha \times A_i \times \frac{1-(\xi_i - \bar{x}_i)\times \exp(-2\times \bar{x}_i)}{1+\exp(-2\times \bar{x}_i)} \qquad (3)$$

with

$$\alpha = \frac{\exp(1)}{1-\exp(1)}, \quad A_i = 1 + \bar{x}_i \times \exp(-\bar{x}_i) - \xi_i \times \exp(\xi_i - 1).$$

The crash counts, $\bar{x}_i$, are scaled values calculated by dividing each by the largest crash count across all driver groups. Adjusted crash risks were calculated annually and were re-scaled by dividing each by the largest adjusted crash risk across all driver groups. The adjusted crash risk is extended to account for all driver ages involved in the same collisions[24]. For two-car crashes, the adjusted crash risk, γ_i', is calculated as the aggregate of each other driver age range involved in the same collision. Adjusted two-car crash risks are aggregated for each driver age after adjusting for the exposure of all driver ages involved in the same collisions.

3. Statistical Analysis

A random effects logistic regression model was used to assess age and gender differences in driver distractions generated by police officers for the road traffic accident scenarios. The random effects approach was used to account for the clustering in our data as participants responded to multiple scenarios. Generalized linear Poisson regression with log-link modelling was used to assess age and gender differences in collisions for which driver distraction was reported as a contributing factor in the accident report. A scaling parameter adjusted for over-dispersion. Total number of collisions was included as an offset term. In our analysis of police officers' views and the accident reports, we included driver age (young, middle-aged, elderly) and gender as factors and year (2005–2012) as a covariate. We conducted our analyses separately for mobile phone use, inside-, and outside-vehicle distractions. After assessing main effects, we tested for all possible interactions involving driver age and gender.

4. Results

4.1. Police officer views on causes of collisions

The police officers were asked to generate factors that they believed were typically involved in the collisions of male and female younger (17-20 years), middle-aged (40-49 years), and older (70+ years) drivers. Figure 1 shows the percentage of scenarios for which officers generated mobile phone use, inside-, and outside-vehicle distraction as typical factors. In general, officers generated each factor slightly more frequently for women than for men, with the exception of mobile phone use among younger drivers and outside-vehicle distraction among elderly drivers. Our regression analysis revealed that officers were significantly more likely to generate examples of inside-vehicle distraction for women (13%) than for men (6%; Odds Ratio [OR]=5.032, p=.003), but not for mobile phone use (25% vs. 21%; OR=1.938, p=.092) or outside-vehicle distraction (5% vs. 3%; OR=4.826, p=.051).

Officers also generated fewer examples of each factor as driver age increased from younger to older age (Figure 1). However, the age trends differed depending on the type of factor. Officers believed that mobile phone use frequently contributed to the collisions of younger and middle-aged drivers, but rarely contributed to the collisions of older drivers. Our regression analysis confirmed that in comparison to younger drivers (35%), officers were significantly less likely to generate mobile phone use as a factor for older drivers (5%; OR=0.005, p<.001), but not for middle-aged drivers (30%; OR=0.500, *p*=.104). Officers also generated mobile phone use less frequently for older drivers compared to middle-aged drivers (OR=0.009, *p*<.001). There were no significant interactions between age and gender of the drivers in the scenarios.

Examples of inside-vehicle distraction reduced from younger (16%) to middle-age (10%) through to older age (3%; Figure 1). Our regression analysis confirmed that officers were less likely to generate examples of inside-vehicle distraction for middle-aged (OR=0.274, *p*=.018) and older (OR=0.016, *p*<.001) drivers compared to younger drivers and were less likely to generate such examples for older compared to middle-aged (OR=0.058, *p*=.002) drivers. There were no significant interactions between age and gender.

Conversely, police officers did not show differences in the number of outside distractions they generated for younger (5%), middle-aged (5%), and older (3%) drivers. Our regression analysis yielded no significant differences for middle-aged (OR = 1.00) and older (OR=0.282, *p*=.191) drivers compared to younger drivers and for older drivers compared to middle-aged drivers (OR=0.282, *p*=.191). There were no significant interactions involving age and gender.

4.2.Police reports on causes of collisions

We compared police officers' views on the typical causes of collisions with real accident reports. Figure 1 shows the percentage of collisions for which mobile phone use, inside-, and outside-vehicle distraction was recorded as a contributing factor in the accident reports. Officers' views on the typical factors contributing to collisions were generally in line with the factors typically reported by police officers for collisions that were similar in nature with regard to driver age and gender.

As in our previous analysis of police officers' views, our analysis of the police reports revealed that mobile phone use was rarely associated with collisions involving elderly drivers (0.05%) compared to younger (0.31%; Relative Risk [RR]=0.17, 95% Confidence Interval

[CI]=0.11–0.26) and middle-aged (0.24%; RR=0.20, 95% CI=0.13–0.31) drivers. Mobile phone use was not associated with driver gender (male=0.18%; female=0.21%; RR=1.13, CI=0.96–1.34). However, gender interacted with middle-aged versus younger drivers (RR=0.62, CI=0.45–0.85). Follow-up analyses conducted separately for male and female drivers confirmed that while mobile phone use was equally frequent for younger (0.25%) and middle-aged (0.25%) male drivers, it was reported significantly less often for middle-aged (0.23%) compared to younger (0.37%; RR=0.61, CI=0.49–0.77) female drivers. Reports of mobile phone use increased in number from 2005 through 2012 (RR=1.06; CI=1.02–1.09).

Inside-vehicle distraction was associated with driver age and gender. Elderly drivers (1.88%) had fewer collisions involving inside-vehicle distraction compared to younger (3.56%; RR=0.51, CI=0.45–0.57) and middle-aged (2.22%; RR=0.83, CI=0.75–0.93) drivers. Inside-vehicle distractions were also less frequent for middle-aged drivers compared with their young counterparts (RR=0.61, CI=0.57–0.65). Female drivers were involved in significantly more collisions involving inside-vehicle distraction comparison to male drivers (2.88% vs. 2.23%; RR=1.28, CI=1.19–1.37). The number of collisions involving inside-vehicle distraction increased from year 2005 through 2012 (RR=1.03; CI=1.02–1.05). There were no significant interactions involving age and gender.

Outside-vehicle distraction was not significantly associated with driver gender (male=1.46%; female=1.47; RR=1.04, CI=0.97–1.12) or age (younger=1.51%; middle-aged=1.43%; older=1.44%; middle-aged vs. younger: RR=0.96; CI=0.89–1.04; older vs. younger: RR=1.01; CI=0.91–1.11; older vs. middle-aged: RR=1.05; CI=0.95–1.16). However, driver gender interacted with older versus younger age (RR=0.77, CI=0.62–0.96). Follow-up analyses conducted separately for male and female drivers revealed that outside-vehicle distraction was slightly more frequent among older (1.55%) than among younger (1.42%) male drivers, but not significantly so (RR=1.09, CI=0.96–1.23). Conversely, outside-vehicle distraction was slightly less frequent among older (1.34%) than among younger (1.60%) female drivers, and this difference was significant (RR=0.84, CI=0.70–0.99). Reports of outside-vehicle distraction did not vary significantly across years (RR=0.99; CI=0.98–1.01).

4.3.Crash risk assessment

We estimated driver crash risk based on the police accident reports and police officers' views. Our crash risk estimates adjusted for age and gender differences in risk exposure in terms of driver numbers in the population and amount of annual travel. The crash risk estimates are shown in Figure 2, stacked by the three types of driver distraction. We found previously that police officers' views on the typical causes of road accidents bared a striking resemblance to the typical causes reported by police officers in real accident reports. Observing Figure 2, after adjusting for risk exposure the crash risk estimates confirm that driver risk reduced with age in both the police reports and in officers' views. Hence, the views of police officers about age trends in the frequency of mobile phone use and inside- and outside-vehicle distractions in road accidents were in agreement with the accident reports. The crash risk estimates based on police officers' views and those based on the accident reports differed somewhat in terms of gender differences (Figure 2). Although crash risk estimates were higher overall for men than for women in the police reports, they were higher for women than for men in police officers' views (Figure 2). This observation highlights that officers generated examples of distractions relatively more frequently for female than for male drivers in the scenarios than was evident in the police reports (Figure 1).

Importantly, the crash risk estimates revealed a striking disagreement between police officers' views and the accident reports in terms of the contribution of each type of distraction to driver risk. In the police reports, in-vehicle distraction accounted for the greatest proportion of driver risk (58%), followed by outside-vehicle distraction (33%), and mobile phone use (10%; Figure 2).

Conversely, in police officers' views, mobile phone use accounted for the greatest proportion of driver risk (58%), followed by in-vehicle distraction (29%), and outside-vehicle distraction (12%; Figure 2). Hence, mobile phone use accounted for a minority of driver risk in the accident reports and a majority of driver risk in police officers' views.

5. Discussion

We asked police officers about the typical causes of road accidents involving drivers of various ages and gender and compared their views with real road accident reports. Our findings show that police officers' views differed substantially from accident records in the relative frequency which mobile phone use was reported as cause of collisions. Mobile phone use was cited in a small minority of crashes in the police records, but was viewed by officers in our survey as a highly frequent cause of collisions. A similar discrepancy between police officers' views and accident reports was, to a much lesser extent, also observed in respect to inside-vehicle distraction. In contrast, no such difference was found with regard to outside-vehicle distraction.

Thus, our results suggest that distractive activities inside the vehicle, and especially mobile phone use, are being underreported by officers attending the crash scene. This confirms concerns raised by the U.K. Department for Transport [2] that officers may be less likely to assign driver distraction as a contributing factor due to verification problems. Mobile phone use, in particular, was suggested as an under-reported contributing factor to crashes; officers often do not have immediate access to drivers' phone records and must rely on drivers' self-reports. These crash-involved drivers may be unable or unwilling to admit to using a mobile phone at the time of the crash.[2]

In line with this interpretation, the current findings may reflect differential willingness of drivers to admit to being distracted at the time of the crash with respect to different distracting activities.[5] That is, crash-involved drivers might be more likely to reveal that their attention was diverted by conversations with passengers than by conversations in their mobile phone; and might be more likely to reveal their attention was diverted by a roadside billboard than by interaction with passengers. This is consistent with the findings of a survey among crash-involved drivers, in which conversation with passengers was the most prevalent type of distracting activity *present* at the time of the crash; yet, when drivers were asked about distracting activity that had *contributed* to their crash, outside-vehicle distraction was cited most frequently. [22] Police officers may, therefore, be less likely to report factors related to inside-vehicle distraction and mobile phone use, due to difficulties or concerns around substantiating their claims.

Our results also revealed that officers' views about driver age differences in the involvement of distraction-related factors broadly agreed with our analysis of the accident reports. Similarly, the discrepancies in gender differences were relatively small. These results suggest that the degree of underreporting of driver distraction does not differ overall across driver groups.

In both police officers' views and accident reports, the frequency of collisions resulting from mobile phone use was reduced with driver age. Additionally, elderly drivers were less likely than younger and middle-aged drivers to be involved in collisions attributed to inside-vehicle distraction. Finally, police officers' views and the accident reports both indicated that collisions involving inside-vehicle distractions were more frequent among female drivers than among male drivers. These age and gender patterns in the involvement of driver distraction in crashes broadly agree with the literature. The frequency with which police officers generated distraction-related factors for the road accident scenarios also resonates with the self-reported and observed prevalence of driver-related distraction.[4-5] Alternatively, our findings may also point to an interesting possibility that police officers possess biased driver stereotypes that may influence their judgments about the causes of road accidents. [23] Future studies may wish to test this possibility more directly.

Our results from the crash data show an increase over the years in the proportion of accidents attributed to mobile phone use or other inside-vehicle distractions; at the same time, the proportion of accidents involving outside-vehicle distractions remained stable over time. These results complement earlier work [1,4,9] and support concerns that rapid growth in the availability of mobile phones and in-vehicle technologies might be associated with increased crash risk. In fact, given the reporting bias demonstrated in the current paper, it is likely that this time trend in the relative importance of phone use in crashes is an underestimation.

It is important to point out that, unlike mobile phone use, we were unable to distinguish the use of technology from other sources of in-vehicle distraction. This is because while 'mobile phone use' is reported as a separate contributory category; other various sources of distraction within the vehicle are grouped under the same category. Identifying which forms of distracting behaviours are most likely to contribute to a crash is essential for effective prioritization of road safety programs. This could be achieved by making accident reports more detailed with regard to different distraction categories, such as in-vehicle technology use.

In conclusions, the major contribution of this paper has been to introduce a novel approach for establishing the extent to which distraction-related factors are being underreported in police crash records. We have provided the first empirical evidence that inside-vehicle distractions, and mobile phone use in particular, are indeed underreported causes of crashes. Our findings highlight a potential shortcoming in reporting procedures that has serious repercussions for road safety assessment. Specifically, mobile phone use appears to be a major problem for driving safety, despite its relatively low rate in crash data. Researchers and policy makers should consider this in making conclusions based on national accidents records. The current results raise an urgent need to further improve current accident reporting procedures. One useful approach might be to use phone records more routinely to determine whether a driver was using their phone before the crash.

Improved reliability of crash data would allow guidance on road safety, and effectively reduce the number of casualties arising from distraction-related road accidents.

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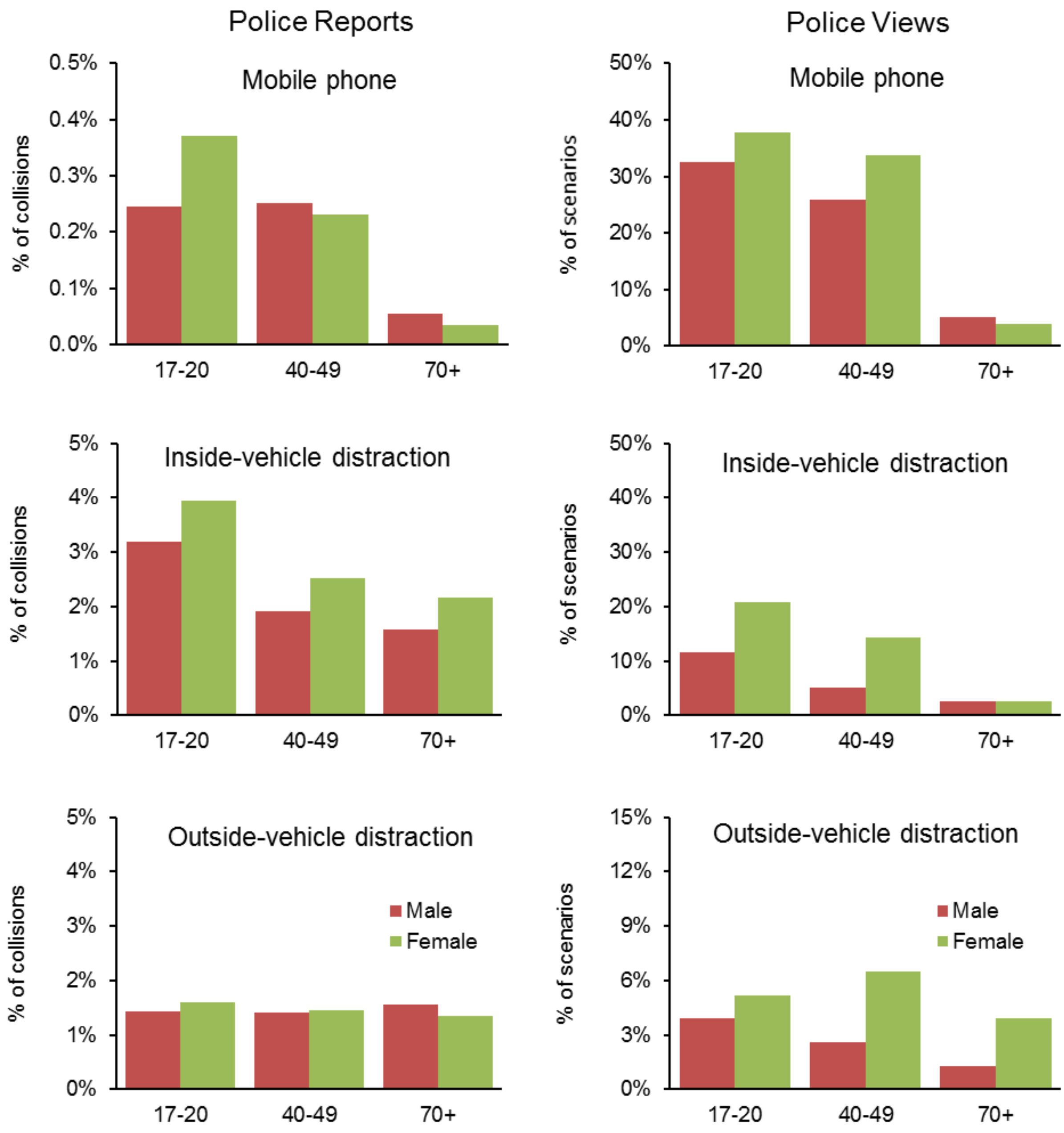

Figure 1. Percentage of police reported collisions involving mobile phone use, inside-, and outside-vehicle distraction as a reported contributing factor (left) and the percentage of scenarios for which police officers generated mobile phone use, inside-, and outside-vehicle distraction as a typical cause (right).

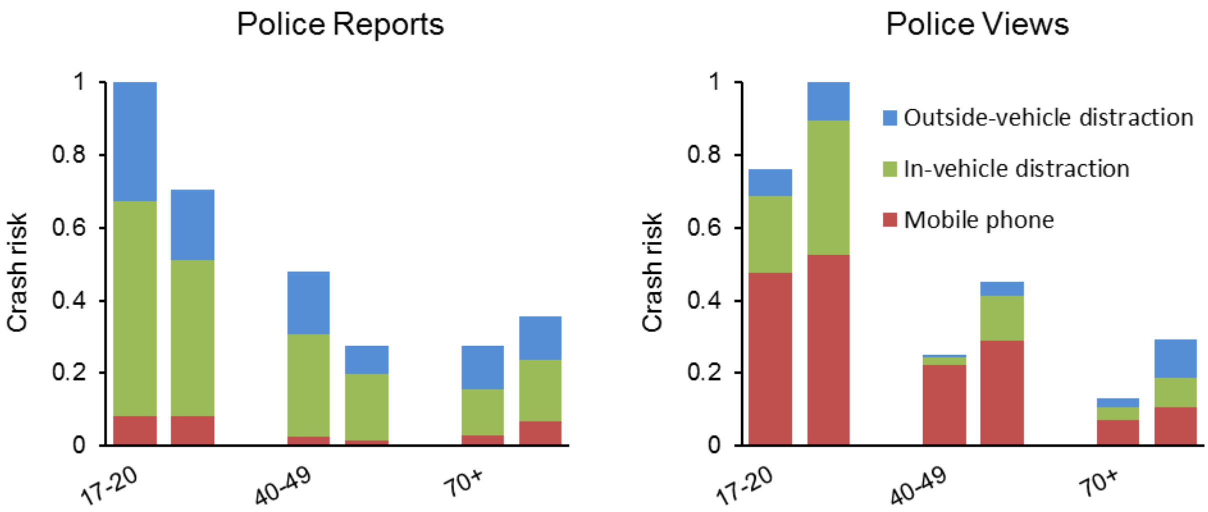

Figure 2. Estimated driver crash risk by age and gender based on police reports of road accidents (left) and factors generated by police officers for road accident scenarios (right), stacked by mobile phone use, and inside-, and outside-vehicle distraction.