Effects of Driver Cell-Phone Use on Driver Aggression

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ABSTRACT. Using 2 field procedures, the authors assessed impacts of cell-phone use on mild forms of driver aggression. Participants were 135 drivers traveling within a city of approximately 17,000 people in an otherwise little-populated region of western North Dakota. The authors videotaped the participants while a confederate driver in a low-status vehicle frustrated them. In Experiment 1, the confederate was traveling well under the posted speed limit. In Experiment 2, the confederate remained motionless at a stoplight that had turned green. When the confederate visibly talked on a hand-held cell phone \( n = 67 \), male drivers exhibited their frustration by honking their horn more quickly and frequently than did drivers in no-cell-phone trials, and female drivers were more angry according to blind judgments of videotaped facial expressions that were compared with those of drivers in no-cell-phone trials \( n = 68 \). The present results suggested that driver cell-phone use contributes to the growing crisis of roadway aggression.

Key words: aggression, cellular telephones, driver behavior, field research, gender differences, road rage

OF ALL DRIVERS, 30% USE CELL PHONES while driving, according to a National Highway Traffic Safety Administration survey that Royal reported in 2003. A recent observational study reported an increase in driver cell-phone use from 2004 to 2005 and estimated that as many as 974,000 vehicles on the road in the United States are being operated by a driver using a hand-held phone at any given daylight moment (Glassbrenner, 2005). The practice of cell-phone use while driving is associated with a four-fold increase in collision risk (Redelmeier & Tibshirani, 1997). The growing number of telephone users who are responsible for dangerous roadway behavior may elicit negative regard from the general driving public. A bumper sticker reading, “HANG UP AND DRIVE!” that has been occasionally seen suggests anger and perhaps—at least—justified nervousness. The present investigation was based on the hypothesis that drivers using cell phones may elicit hostile responses from other drivers, fueling the mounting problem known popularly as “road rage.”
Cell phones have been around since the early 1980s. But the first models were costly and generally quite cumbersome, and only an elite few used them. Cell phones have since become increasingly less expensive and smaller, and now people from various social and economic backgrounds own them. In 2002 worldwide, the number of subscribers to mobile-phone service surpassed the number of subscribers to fixed-line phone service (International Telecommunications Union, 2005). By the end of 2004, two thirds of all U.S. households had cell phones, and households receiving cell-phone service had an average of 1.8 phones per household (Golvin, Charron, Cohen, & McHarg, 2005). Cell-phone use has become ubiquitous. One can see people talking on cell phones while shopping, walking, eating at restaurants, and driving. In surveys for the U.S. Department of Transportation, the Gallup Organization estimated that in 2000, 54% of automobile drivers carried a cellular telephone in their vehicle (Utter, 2001). The organization also indicated that in 2002, 2 years later, this figure had risen to 60% (Royal, 2003).

Drivers’ growing use of cell phones has sparked considerable scientific interest, with most of the researchers addressing the detrimental effects of cell phones on the drivers’ attention. Researchers have observed that engaging in telephone conversations adversely affects a driver’s ability to appropriately react to simulated roadway situations requiring change in speed or direction (McKnight & McKnight, 1993), ability to brake when following another driver who brakes (Alm & Nilsson, 1995), and ability to brake in response to a red light (Strayer & Johnston, 2001)—effects that appear to be greater in older drivers (Shinar, Tractinsky, & Compton, 2005) and that have been observed in open-road studies (Harbluk, Noy, & Eizenman, 2002; Patten, Kircher, Ostlund, & Nilsson, 2004). Obviously, the problem of driver distraction demands attention. The effects of cell-phone use on drivers’ perceptual and motor skills are associated with a nine-fold increase in fatal traffic accidents (Violanti, 1998). It appears that using a cell phone while driving makes one drive worse, consequently making roadways more dangerous. In the present investigation, we believed that driver cell-phone use makes roadways more dangerous also because it angers other drivers.

One can easily imagine a driver mindlessly inching through a parking lot or failing to notice that a stoplight has turned green while deeply immersed in a telephone call.
conversation. Indeed, Alm and Nilsson (1994) observed a significant decrease in simulated driving speed among drivers who were engaged in cell-phone conversations. Following the classic frustration–aggression paradigm (Dollard, Doob, Miller, Mowrer, & Sears, 1939), researchers should expect drivers who are preoccupied by cell-phone conversations to provoke aggressive reactions from those drivers whom they impede. People might discriminate between drivers making a driving error of some sort while distracting themselves by voluntarily engaging in phone conversations and drivers making a driving error while not being visibly distracted.

Dukes, Clayton, Jenkins, Miller, and Rodgers (2001) assessed the effect of cell-phone use on frustration-induced driver aggression by means of written roadway vignettes. In two scenarios, the researchers described a dangerously fast driver and a frustratingly slow driver, manipulating age, gender, and cell-phone use of the offending driver as independent variables. Although participants indicated greater intent to react aggressively to the fast driver than to the slow driver, the offending driver’s age or gender or whether he or she was talking on a cell phone did not influence their aggressive intentions. Researchers can conclude either (a) that cell-phone use by an offending driver has no measurable effect on either anger in or acts of aggression by other drivers or (b) that with only a brief scenario and a questionnaire, research participants’ imagination of a frustrating driving situation is not sufficient to produce aggression in the form of projective self-reports. In the present study, we addressed the issue of cell-phone use and roadway aggression in real-life situations by using procedures that subjected drivers to everyday driving frustrations and permitted empirical measurements of driver behavior, procedures that were uncontaminated by demand characteristics and self-enhancement motives.

Obviously, ethical restrictions hinder field research on aggression (Tedeschi & Quigley, 1996). It is not acceptable to elicit more extreme forms of road rage in actual driving situations. Consider the unacceptable risks that would be associated with systematically frustrating drivers in rush hour traffic in Los Angeles by brandishing a handgun as an independent variable. Hennessy (2000) distinguished mild driver aggression from driver violence, suggesting that mild driver aggression involved an attempt to annoy (horn honking, gestures), whereas violence entailed the intent to harm other drivers physically (drive-by shootings, roadside brawls). Some past researchers have focused on mild forms of driver aggression—including cursing, hand waving, and driving through red lights (Shinar, 1998); length of vocalization and rate of acceleration (McGarva & Steiner, 2000); and passing latency, following distance, number of lane changes, number of cars passed, and top speed (McGarva, 2005). Such researchers have assumed that manipulations of roadway situations to elicit mild driver aggression provide researchers with an opportunity to understand the events and behavior that can escalate into driver violence (Novaco, 1991) and that those manipulations do so without endangering research participants or confederates.

Despite the ethical and procedural difficulties of experimenting in real-life roadway environments, a noteworthy history of field research on driver aggres-
sion has followed the research of Doob and Gross (1968), who measured the latency and duration of horn honks by drivers in response to a confederate vehicle that remained motionless when a traffic light turned green. Frustrator status—which the researchers manipulated by use of either a high-status vehicle or a low-status vehicle—significantly influenced driver aggression in that participants were more inclined to honk at a low-status driver. Other researchers have used this procedure to demonstrate the effects of the frustrating driver’s gender (Bochner, 1971; Deaux, 1971), nationality (Forgas, 1976), anonymity (Ellison, Govern, Petri, & Figler, 1995), and status (Diekmann, Jungbauer-Gans, Krassnig, & Lorenz, 1996); the presence of aggressive cues such as the visibility of a rifle (Turner, Layton, & Simons, 1975) or a beginner–driver’s sticker (Yazawa, 2004) on the frustrating vehicle; and traffic congestion (Shinar, 1998). Using a similar procedure, Kenrick and MacFarlane (1986) observed a positive correlation between ambient temperature and horn honking.

Because of the ubiquity of driver cell-phone use, it is essential that its consequences be more fully understood by transportation researchers and anyone concerned with traffic safety. A potential effect of drivers’ use of cell phones is aggressive responses from other drivers, contributing to the mounting problem of driver aggression. In the present work, we investigated the effects of cell-phone use on frustration-induced driver aggression. Two experiments involved frustrating roadway behavior by a confederate who either did or did not use a handheld cellular telephone. We hypothesized that when encountering a frustrating driver, participants would respond more aggressively if the frustrating driver was visibly talking on a cell phone.

**EXPERIMENT 1**

**Method**

**Participants**

In Experiment 1, participants were 81 drivers (43 women, 31 men, and 7 people whose gender was unclear to us) traveling along various two-lane roads within the city limits of a small town in western North Dakota. Their selection was based on chance in that they happened to be behind a slower vehicle that a confederate was driving around town during early afternoon hours on weekdays during the period from September through November. Participants did not give their informed consent to participate in the experiment, and we did not debrief them. We could not observe the expressions of 19 drivers and the gender of 7 because of glare on their windshields, but we otherwise included them in the analyses.

**Materials**

In Experiment 1, Matthew Ramsey, a 21-year-old man, drove a low-status, sun-faded yellow, 1970 Dodge Omni hatchback. The vehicle had in-state license
plates but an out-of-town dealer tag on the tailgate, which indicated the possibility that the driver was a resident of North Dakota but from out of town. We mounted a digital video camera (Sony DCR-TRV20) with a polarizing filter (Sony VF-37CPK S) onto a horizontal speaker panel behind the rear seat so that it faced out the rear window toward on-coming traffic and was concealed by several articles of clothing so as to give the appearance of a pile of unwashed laundry.

Procedure

In Experiment 1, the confederate drove a circuit by traveling east on a two-lane road with a posted speed limit of 25 mph (40.23 km/hr), turning left onto a 25 mph (40.23 km/hr) two-lane road, then turning left onto a 35 mph (56.33 km/hr) two-lane road, then turning left again onto a 35 mph (56.33 km/hr) two-lane road, and finally turning back onto the original east-bound road, yielding a total travel distance of approximately 2.9 miles (4.7 km). On sections of road between intersections when a vehicle approached from approximately 0.25 mile (0.40 km) behind, the confederate reduced speed to 10 mph (16.09 km/hr) less than the posted speed limit. As predetermined by a coin toss, the confederate either engaged himself in a mock cell-phone conversation complete with hand gestures and head movement or drove looking straight ahead with two hands on the steering wheel and without a visible cell phone.

The confederate noted the gender and approximate age of the participant, the number of passengers in the vehicle, the vehicle type (car, sports car, SUV, pick-up, truck), and the average approximate following distance (in car lengths). Andrew R. McGarva and Suzannah A. Shear, who were blind to the experimental conditions later independently reviewed the video recordings and scored the participants’ emotional reactions to frustration on a 7-point Likert-type scale ranging from 1 (no reaction) to 7 (very angry). Because of a Cronbach’s alpha interrater reliability of .79, we used judgments for Andrew R. McGarva for all subsequent analyses. We did not record the number of horn honks and their latencies because of a distinct lack of horn honking in each condition.

Results

In Experiment 1, driver aggression—measured here by (a) the number of car lengths that participants maintained between their vehicles and the confederate vehicle and (b) our ratings of participants’ emotional reactions to frustration—did not appear to vary as a function of the participant’s age, the number of passengers, or the vehicle type. We performed a 2 × 2 (Gender × Cell-Phone Condition) multivariate analysis of variance (MANOVA) on the number of car lengths and our ratings of emotional reaction. The interaction was significant, Wilks’s Λ = .884, F(2, 53) = 3.48, p = .038, multivariate η² = .116. Follow-up univariate analyses of variance (see Table 1) indicated that this interaction of
gender by cell-phone condition was attributable to emotional reaction, with women being more visibly angered by a frustrating cell-phone driver than were men and with men being less visibly angered in the cell-phone condition than in the no-cell-phone condition (see Figure 1). Neither the main effect for gender, Wilks’s $\Lambda = .985$, $F(2, 53) = 0.67$, $p = .666$, multivariate $\eta^2 = .015$, nor the main effect for cell-phone use, Wilks’s $\Lambda = .967$, $F(2, 53) = 0.91$, $p = .410$, multivariate $\eta^2 = .033$, was significant.

### EXPERIMENT 2

In Experiment 1, it was difficult to consistently capture enough of drivers’ facial expressions on video to make confident judgments about their emotional reactions to the slower confederate vehicle. In some cases, we did not aim the camera properly at a tailgating driver. At other times, participant drivers passed the confederate vehicle so quickly that the videotape obtained was not adequate in length. In Experiment 2, we used Doob and Gross’s (1968) traffic-light procedure, expecting that drivers who were still would be easier to videotape.

### Method

#### Participants

In Experiment 2, in the same small town in western North Dakota in which we conducted Experiment 1, a confederate driver stopped at traffic lights on a two-lane road. A camera directed out the rear window videotaped the 55 drivers (25 women and 30 men) of vehicles who happened to be positioned behind the confederate vehicle in midday. We did not include 1 male driver in the present study because he seemed excessively distracted or disturbed and appeared to notice nei-

<table>
<thead>
<tr>
<th>Source</th>
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<th>$F(1, 54)$</th>
<th>$\eta$</th>
<th>$p$</th>
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<td>Gender</td>
<td>Distance</td>
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<td>Emotion</td>
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<td>Cell phone</td>
<td>Distance</td>
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<td>.183</td>
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<td></td>
<td>Emotion</td>
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<td>.03</td>
<td>.845</td>
</tr>
<tr>
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<td>Distance</td>
<td>0.30</td>
<td>.08</td>
<td>.583</td>
</tr>
<tr>
<td>Cell phone</td>
<td>Emotion</td>
<td>6.87</td>
<td>.34</td>
<td>.011</td>
</tr>
</tbody>
</table>

*Recorded in number of car lengths to the nearest quarter of a length. b)Judgments were made on 7-point scale ranging from 1 (no reaction) to 7 (very angry).*
ther the confederate vehicle nor the stoplight. We did not include the expression of one other driver in the analyses because windshield glare obscured it.

**Materials**

In Experiment 2, we used the same confederate driver and the same low-status vehicle that we used in Experiment 1, except that the vehicle was spray-painted with dark gray primer to minimize the likelihood that the car would be recognized from earlier conditions and considered a chronically slow vehicle. An additional distinction from Experiment 1 was that a 25-year-old female confederate sat in the passenger seat and aimed the video camera through the back window from over her shoulder. To help her aim the camera, we directed video output to a 5 in. television monitor that sat between her feet.
Procedure

In Experiment 2, the confederate driver slowed and stopped at a red stoplight. During this time, we videotaped for later analysis the reactions of any following driver who stopped behind the confederate vehicle. As in Experiment 1, the confederate driver either visibly engaged himself in a mock-animated conversation while holding a handheld cell phone to his ear or looked straight ahead with no cell phone. Again, we predetermined the experimental condition by a coin toss.

When the light turned green, the confederate driver said “green,” and the confederate passenger began timing 15 s on a stopwatch and said, “go,” following the interval. The confederate accelerated the confederate vehicle and drove it through the intersection as soon as one of the following occurred: (a) the confederate passenger said, “go,” or (b) the participant driver honked three times, at which point the confederate driver acknowledged his mistake by raising his hand in a wave while accelerating. During the interval of stillness, we recorded the participant driver’s vehicle type, gender, approximate age, and number of passengers. We later measured the number of honks and the honk latency (time from word “green” to the first honk) by reviewing the tape. Using blind procedures, we scored the video recordings for the participant’s expressed emotion on a 7-point Likert-type scale ranging from 1 (no reaction) to 7 (very angry); and measured assertive driving behavior (a rating of how the target vehicle was operated) on a 7-point Likert-type scale ranging from 1 (no reaction), to 2 (inching up slightly), to 3 (inching up several times or moving up very closely), to 4 (moving up and sharply braking once or twice, perhaps looking to pass), to 5 (charging up, revving the engine, or moving to pass), to 6 (all of the aforementioned and moving dangerously to pass), to 7 (aggressive collision with the frustrating vehicle).

Results

In Experiment 2, to assess whether male drivers and female drivers in the cell-phone condition and the no-cell-phone condition differed in their responses to a frustrating driver and whether there was an interaction between gender and cell-phone condition, we used a MANOVA on the number of honks, the participant driver’s emotion, and the participant driver’s behavior. The interaction was marginally significant, Wilks’s $\Lambda = .846$, $F(3, 46) = 2.79$, $p = .051$, multivariate $\eta^2 = .154$. Follow-up ANOVAs (see Table 2 and Table 3) indicated that this interaction of gender by cell-phone condition was attributable to the number of honks, with men being more affected by the cell-phone condition in the expected direction. The main effect for gender was not significant, Wilks’s $\Lambda = .976$, $F(3, 46) = 0.38$, $p = .675$, multivariate $\eta^2 = .024$. Neither was the main effect for cell-phone condition, Wilks’s $\Lambda = .913$, $F(3, 46) = 1.46$, $p = .239$, multivariate $\eta^2 = .087$. Because latency data were missing from 13 experimental events, we did not include the variable in the MANOVA but instead analyzed it separately. We transformed latency data using
arcsine \( x \), \( x^2 \), and log \( x \), with log \( x \) producing the largest effect sizes. ANOVAs indicated a significant interaction of gender by cell-phone condition, \( F(1, 37) = 6.19, p = .018, \eta^2 = .116 \), with men being quicker to honk their horns in the cell-phone condition than were drivers in the no-cell-phone condition (see Table 3). The main effect of cell-phone condition was also significant, \( F(1, 37) = 4.89, p = .033, \eta^2 = .057 \). But the main effect of gender was not significant, \( F(1, 37) = 2.15, p = .151, \eta^2 = .044 \).

### TABLE 2. Means (and Standard Deviations) of Driver Emotion, Driver Behavior, Number of Honks, and Honk Latency as Functions of Gender and Cell-Phone Use

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cell phone</th>
<th>No cell phone</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Men (( n = 16^a ))</td>
<td>Women (( n = 10^a ))</td>
</tr>
<tr>
<td>Driver emotion</td>
<td>2.31 (1.54)</td>
<td>2.30 (0.82)</td>
</tr>
<tr>
<td>Driver behavior</td>
<td>2.50 (1.27)</td>
<td>2.00 (0.67)</td>
</tr>
<tr>
<td>Number of honks</td>
<td>2.63 (1.54)</td>
<td>1.30 (1.06)</td>
</tr>
<tr>
<td>Honk latency</td>
<td>4.74 (2.10)</td>
<td>8.32 (3.81)</td>
</tr>
</tbody>
</table>

\( ^a \)For honk latency, these sample sizes were reduced to \( n = 15, 9, 5, \) and 12, respectively.

### TABLE 3. Effects of Gender and Cell-Phone Condition on Driver Emotion, Driver Behavior, Number of Honks, and Honk Latency

<table>
<thead>
<tr>
<th>Source</th>
<th>Dependent variable</th>
<th>df</th>
<th>( F )</th>
<th>( \eta )</th>
<th>( p )</th>
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<tbody>
<tr>
<td>Gender</td>
<td>Emotion(^a)</td>
<td>1, 48</td>
<td>0.48</td>
<td>.10</td>
<td>.491</td>
</tr>
<tr>
<td></td>
<td>Driver behavior(^b)</td>
<td>1, 48</td>
<td>1.05</td>
<td>.15</td>
<td>.311</td>
</tr>
<tr>
<td></td>
<td>Number of honks</td>
<td>1, 48</td>
<td>0.33</td>
<td>.08</td>
<td>.568</td>
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<tr>
<td></td>
<td>Latency</td>
<td>1, 37</td>
<td>1.72</td>
<td>.19</td>
<td>.151</td>
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<tr>
<td>Cell phone</td>
<td>Emotion</td>
<td>1, 48</td>
<td>2.69</td>
<td>.23</td>
<td>.108</td>
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<tr>
<td></td>
<td>Driver behavior</td>
<td>1, 48</td>
<td>1.05</td>
<td>.15</td>
<td>.311</td>
</tr>
<tr>
<td></td>
<td>Number of honks</td>
<td>1, 48</td>
<td>2.38</td>
<td>.22</td>
<td>.130</td>
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<tr>
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<td>Latency</td>
<td>1, 37</td>
<td>4.89</td>
<td>.24</td>
<td>.033</td>
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<tr>
<td>Gender ( \times ) Cell phone</td>
<td>Emotion</td>
<td>1, 48</td>
<td>0.43</td>
<td>.10</td>
<td>.515</td>
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<td>Driver behavior</td>
<td>1, 48</td>
<td>0.32</td>
<td>.08</td>
<td>.572</td>
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<tr>
<td></td>
<td>Number of honks</td>
<td>1, 48</td>
<td>7.66</td>
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<td>Latency</td>
<td>1, 37</td>
<td>6.19</td>
<td>.34</td>
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</table>

\(^a\)Judgments were made on 7-point scale ranging from 1 (no reaction) to 7 (very angry). \(^b\)Judgments were made on 7-point scale ranging from 1 (no reaction) to 7 (aggressive collision).
DISCUSSION

Experiment 1

In Experiment 1, where participant drivers were subjected to a much slower confederate driver, we found that women were more visibly angered by the frustration than men. Subjective ratings of emotional expression indicated an interaction of gender by cell phone and the possibility that women may be more inclined to display a negative reaction when frustrated by a driver operating a cell phone, a reaction that may not be intended to be communicated to the other driver. There was no significant difference in the following distance that we observed between cell-phone conditions.

Experiment 2

In Experiment 2, we again observed an interaction of gender by cell phone. We rated female participants as more visibly angered when delayed at a stop light by a driver talking on a cell phone relative to male drivers. Compared to women drivers, men were quicker to sound their horn and sounded their horn more frequently when frustrated by a cell-phone user than a non-cell-phone user. Unlike the women’s facial expressions of anger, the horn honk response was undeniably overt and intended to be communicated to the frustrating driver. It may be that although both men and women are especially angered by frustrating cell-phone drivers, only men tend to react in a way that makes their anger known to the frustrating driver.

General

Researchers of driver cell-phone use have focused mainly on the role of driver distraction, with the majority of the scientific work supporting the notion that people perform various driving tasks worse when talking on the phone. The literature agrees with popular opinion: Even the majority of cell-phone users admit that using a handheld cell phone while driving is dangerous (American Automobile Association Foundation for Safety, 2003). It is reasonable to assume that an avoidable danger that is as recent to the roadways and as widespread as is driver cell-phone use would induce some public resentment toward the activity that causes that danger and that is often easily recognized by other drivers. From this circumstance, one should not infer that hands-free phones are the answer. Renge (2000) assessed the comprehension of subtle roadway communications by novice and expert drivers. Drivers probably can make many fine distinctions about other drivers, such as the distinction between singing and engaging in a conversation through a concealed telephone.

The present findings indicate the possibility that driver cell-phone use elicits anger and aggression in other drivers and as such may contribute to hazardous driving conditions above and beyond the effects of cell-phone conversations on the phone-using driver’s attention. In Experiment 1, female drivers who were
frustrated by a slow-moving driver who was engaged in a cell-phone conversation were more likely to display an angry facial expression than those stuck behind a slow-moving driver who was not visibly engaged in any self-distracting behavior, an effect not observed among male drivers. We again observed an interaction of gender and cell-phone use in Experiment 2, where men were more aggressive than women in terms of honking their horn more quickly and more frequently in cell-phone conditions than in no-cell-phone conditions. From these findings, it appears that although drivers’ responses to roadway frustrations vary by gender, driver aggression can be greater when the frustration is attributable to the other drivers’ cell-phone use.

Gender differences in driver aggression remain uncertain. Of the six indications of driver aggression, horn honking was the only one in which men were significantly more aggressive than women in Experiment 2. Previous researchers found gender to be a good predictor of driver violence (Hennessy & Wiesenthal, 2002), aggressive lane changes (Shinar & Compton, 2004), horn honking (Doob & Gross, 1968), and attitudes toward obeying traffic laws (Yagil, 2001). Other researchers have been unable to demonstrate any reliable distinction between aggression in male and female drivers (McGarva, 2005; McGarva & Steiner, 2000). The field needs further research to more thoroughly investigate gender differences in the expression of driver aggression.

The present findings contradict Dukes et al.’s (2001) finding that paper-and-pencil measures of driver aggression in response to a scenario describing an offending driver were not influenced by whether the driver was visibly communicating on a cell phone. It is true that in the present research, we worked in a less populated region (western North Dakota vs. Colorado Springs, CO) and that attitudes toward driving with cell phones might be more pronounced farther away from urban centers. But it is more likely that the conflicting results can be accounted for by differences in experimental procedure. For instance, Doob and Gross (1968) reported two opposing effects of the frustrating driver’s status on horn-honk latency depending on whether data were obtained from field observations or from a questionnaire that described the field situation. In the field, people were quicker to honk at low-status drivers. On questionnaires, people indicated they would honk quicker at high-status drivers. Although recent research has indicated minimal socially desirable response biases in the completion of driver behavior questionnaires (Lajunen & Summala, 2003), the external validity of self-report measures of driver aggression remains dubious. The direction of future research will reveal whether the costs of field research on driver aggression are worth the external validity gained when social scientists require participants to actually engage in the behavior of interest rather than rely on self-report. Perhaps the use of simulated driving environments, or microworlds (DiFonzo, Hantula, & Bordia, 1998), will serve as an adequate compromise.

The generalizability of the present results to other situations is unknown. Novaco (1991) discussed variation in the meaning of a horn honk when comparing its use
in places such as London, where a honk “seems to reflect both the signaling and anger aggression functions” to its use in places such as La Jolla, CA, where “horn-honking is deviant and looked at askance” (p. 278). The state of North Dakota has a population of approximately 600,000 people. At the time of the present study, the town of Dickinson, ND, was home to just over 17,000 residents in a county with just 17,962 registered vehicles. Consequently, drivers involved in the present study experienced less congestion and were more likely to encounter other drivers with whom they were acquainted. In light of research on the effects of anonymity on aggression (Ellison et al., 1995), the small size of this community might inhibit driver reactions to one another. It would be interesting to assess aggressive reactions to driver cell-phone use in more populated areas.

The costs of field procedures such as those in the present research include the inability of potential participants to give their informed consent to participate in the experiment. We neither told drivers that they were involved in an experiment nor debriefed them about it. On the other hand, drivers unknowingly involved in this and similar research placed themselves on public roadways to engage in normal daily behavior with no real expectation of privacy. Researchers do not identify these participants individually and do expose them to typical roadway situations. Researchers may therefore argue that informed consent is unnecessary in such experiments. In any case, for the present series of studies, we intend to publish a thorough debriefing statement in the local newspaper after completing our fieldwork on driver aggression in Dickinson.

In the present study, we intended to incite nothing more than mild driver aggression, nothing even remotely approximating the violent road rage occasionally described in sensational accounts by the various media. In the present study, we presumed that if a frustrated driver displayed any behavior that could be considered dangerous, we could defuse the situation by merely discontinuing the frustration by either pulling over or accelerating. Such extreme cases did not arise.

Casually, we have observed that simply raising a hand, as if to assume blame or apologize, can be quite useful in attempts to reduce roadway tensions. It is likely that drivers use and understand a set of nonverbal cues that serve as requests for forgiveness for roadway misbehavior, as when a driver nearly pulls out in front of an oncoming driver and raises both hands as if to say, “It was my fault and I’m very sorry.” Schmitt, Gollwitzer, Forster, and Montada (2004) observed that a victim’s emotional responses to an offense varied as a function of whether he or she perceived the harm-doer as admitting damage and offering compensation in a verbal apology. To help reduce driver aggression, future researchers should investigate the means by which drivers offer nonverbal apologies and the role of forgiveness during roadway interaction.

REFERENCES


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