

Personal and Social Determinants of Aggressive and Dangerous Driving

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Abstract

Aggressive and dangerous driving compromises personal and public safety. The purpose of the present study was to identify common forms of aggressive and dangerous driving and to determine contributing factors. Participants included 298 university students who completed an online survey measuring aggressive and dangerous driving and a range of possible causes. Results showed that verbal aggression was most common followed by using one's vehicle to express anger. Aggressive driving was associated with permissive attitudes towards driving aggression, vehicle preferences, and a disposition towards anger. Texting and eating while driving were the most common types of dangerous driving. The strongest predictors of dangerous driving were commuting distance, permissive attitudes towards distracted driving, vehicle preferences, and vehicle type. Implications and suggestions for future research are discussed.

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Introduction

Aggressive and dangerous driving has always been a major problem on North American roads. Results from Shinar's (1998) survey conducted in the Washington D.C. area showed that drivers reported feeling more threatened by aggressive drivers (40%) than drunk drivers (33%). In Canada, health care costs due to traffic-related accidents amount to at least 10 billion dollars a year (Canadian Automobile Association, 2013). While some automobile accidents are due to vehicle failure and other uncontrollable factors, other accidents are the result of drivers who engage in aggressive and/or dangerous forms of driving.

What is Aggressive Driving?

Aggressive driving consists of aggression with the intent to physically, psychologically, or emotionally harm those within a driving environment (Hennessey & Wiesenthal, 2002). The National Highway Traffic Safety Administration (NHTSA) lists the following driving infractions as most common: Exceeding the posted speed limit, following too closely, erratic or unsafe lane changes, improper signaling, failure to obey traffic signs and red light running (Miles & Johnson, 2003). Aggressive driving is also described as the end result of frustrating experiences (e.g., getting cut-off by another driver) and takes one of two forms: Instrumental or hostile aggression. Instrumental aggression refers to behaviour drivers engage in to overcome or get past an obstacle (Shinar, 1998). For example, yelling at a driver of a vehicle that is blocking traffic to get that motorist to move out of the way or changing lanes and speeding up in order to get around a slower moving vehicle. Hostile aggression, in contrast, refers to behaviour drivers engage in to vent out their anger as a means to feel better rather than solve a problem (Shinar, 1998). Behaviours considered hostile include making obscene gestures, yelling, flashing lights, honking excessively and tailgating other motorists.

Who is Likely to Engage in Aggressive Driving Behaviour and Why?

Sex and Age

One variable commonly associated with aggressive driving is sex. Males, on average, exhibit more aggressive tendencies while driving compared to females (Smart, Stoduto, Mann & Adlaf, 2004; Tasca, 2000). In a report by a UK transportation agency it was noted that a pedestrian struck by a car was 1.5 times more likely to be killed if the driver of the vehicle was male (Krahe & Fenske, 2002). Furthermore, in an analysis of Canadian newspaper articles on road rage incidents, Smart and Mann (2002) found that males were perpetrators in 96% of the reported cases. A study on the effects of passengers on driving behaviour found that men engaged in even more aggressive forms of driving when in the presence of a male passenger compared to when driving alone (Jackson & Gray, 1976).

Younger drivers are also more likely to exhibit aggressive driving behaviours (Beirness & Simpson, 1988; Jonah, 1986; Hauber, 1980; Parker, Lajunen, & Stradling, 1998; Wickens, Mann, Stoduto, Lalomiteanu, & Smart, 2011). For example, young drivers (between the ages of 17 and 35) engage in more retaliatory behaviour (e.g., chasing a car after being cut off, trying to run another motorist off the road, etc.) compared to older drivers who tend to engage in brief verbal altercations following traffic incidents (Parry, 1968).

Personality Traits

Individuals with a “Type-A personality” are more likely to exhibit aggressive driving behaviour (e.g., honking, flashing lights, etc.) when provoked (Friedman & Rosenman, 1974; West, Elander, & French, 1993). Previous research also shows that drivers high on measures of narcissism are also more likely to exhibit acts of aggressive driving compared to non-narcissistic individuals (Britt & Garrity, 2006; Edwards, Warren, Tubré & Hoffner-Prillaman, 2013;

Hennessy & Wiesenthal, 2002; Lustman, Wiesenthal, & Flett, 2010; Schreer, 2002). Similarly, those with a high propensity toward anger (i.e., also called general trait anger) are especially likely to engage in aggressive driving (Deffenbacher, Lynch, Oetting, & Swaim, 2002; Deffenbacher, Oetting, & Lynch, 1994; Deffenbacher, Demm, & Brandon, 1986; Underwood, Chapman, Wright, & Crundall, 1999).

Drivers with high general trait anger engage in more frequent acts of aggressive driving because there are more situations that provoke these drivers (Deffenbacher, et al., 2002). For instance, someone with high general trait anger is much more likely to behave aggressively (e.g., by blowing a horn or speeding up) when he or she is cut off in traffic, not permitted to merge, or when another driver goes out of turn at an uncontrolled intersection relative to someone with a lower propensity to anger. However, an individual with high general trait anger may exhibit few signs of aggressive driving (despite being easily angered) if he or she has developed adaptive coping strategies such as counting rather than retaliating with a horn blast, thinking of appropriate distractions, focusing on safe driving and/or applying relaxation techniques (Deffenbacher, et al., 2002).

Situational and Social Factors

Like most behaviour, driving is not only influenced by one's personal characteristics but also by situational and social factors. Previous research indicates that the social status a vehicle represents can determine the level of aggression displayed by other drivers (Bochner, 1971; Diekmann, Jungbauer-Gans, Krassnig, & Lorenz, 1996; Doob & Gross, 1968; McGarva & Steiner, 2000). In a study on the effects of social status on aggression a new luxury car (signifying high status) and an older car (signifying lower status) were driven to an intersection (Doob & Gross, 1968). When the light turned green, neither of the cars moved, thus blocking

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traffic. The time it took, in seconds, for the drivers of the blocked cars to sound their horn was then recorded along with the length of the horn. Those stuck behind the high-status car waited longer to sound their horn compared to those stuck behind the low-status car (Doob & Gross, 1968).

Vehicle characteristics and preferences have also been linked to aggressive driving. Research has shown that drivers of high-performance vehicles exhibit a higher prevalence of aggressive driving (Krahe & Fenske, 2002; Smart, Stoduto, Mann, & Adlaf, 2004), and that drivers who preferred sportiness over safety in a vehicle engaged more frequently in risky driving practices (Krahe & Fenske, 2002).

What is Dangerous Driving?

Dangerous driving refers to unsafe driving acts that are not intentionally meant to put others in harm's way such as speeding, illegal lane changing, and driving too closely (i.e. tailgating) (Bone & Mowen, 2006). One of the most prevalent forms of dangerous driving is distracted driving, which involves instances where a driver's attention veers away from the task of driving such that the driver is no longer providing full attention to the road. Behaviours that contribute to distracted driving include: eating food, drinking beverages, engaging in personal grooming, using a cell phone to send a text message or call someone, entering coordinates into a GPS system, and watching DVDs on an in-car entertainment system while driving (Robertson, 2011). Distracted driving is responsible for an estimated 25% of all automobile accidents (Bone & Mowen, 2006).

Cell phone use while driving has become a prime concern in road safety. Previous research has shown that drivers who talk on their cellphones while operating a motor vehicle are more likely to be killed or seriously injured in an accident (Brueckner, 2010; Clarke, 2010;

Fowles, Loeb, & Robertson, 2011; Redelmeier & Tibshirani, 1997). Novice drivers who talk on their cell phones while driving are especially likely to wander into the lane of other neighbouring motorists and do less visual scanning, thereby increasing their chances of getting into an accident with another motorist (Robertson, 2011). Due to the seriousness of this problem, all ten provinces in Canada now have legislation prohibiting the use of hand-held devices while driving with fines and penalties reaching as high as \$400 and 4 demerit points (Robertson, 2011). Despite these efforts, cell phone use while driving continues to be an everyday occurrence for many motorists.

Predictors of Cell Phone Use While Driving

Age and Sex

As age increases, the likelihood of using a cell phone while driving decreases (Hallet, Lambert, & Regan, 2012; Lansdown, 2012). In Brusque and Alauzet's (2008) study, drivers between the ages of 18 and 24 reported using their cell phones while driving 17 times more often than drivers over 59 years of age. Cell phones have become such an integral part of young people's lives that many cannot imagine living without them (Walsh, White, Cox & Young, 2011). Thus, because young people place a high value in regards to cell phone use and they have a constant need to stay connected with their peers, they are also more likely to use their devices while driving (Atchley, Atwood, & Boulton, 2011).

The results for sex and distracted driving are less clear cut. Walsh, White, Cox and Young (2011) found no differences in the frequency of cell-phone usage by sex. However, there were sex differences in regards to why motorists use their cell phones while driving. Males used their cell phones primarily for work-related reasons (e.g., to arrange meetings, to conduct business, etc.), whereas females used their cell phones in order to converse with friends and

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family members. Other studies reported higher usage among female drivers (e.g., Bone & Mowen, 2006; Hong, Chiu, & Huang, 2012). Still others have shown that males engage more frequently in distracted driving (Nurullah, Thomas, & Vakilian, 2013). Thus, sex may not prove to be as a strong predictor for dangerous driving as it is for aggressive driving.

Personality Traits

One personality characteristic associated with the frequent use of a cell phone while driving is extroversion. Because extroverted people prefer engaging in constant communication with others, they are also more likely to spend time calling and sending text messages while driving to maintain these relationships, compared to more introverted individuals (Butt & Phillips, 2008; Ehrenberg, Juckes, White, & Walsh, 2008). Interpersonal anxiety has also been found to have an effect on cell phone use while driving (Bianchi & Phillips, 2005; Hong, Chiu, & Huang, 2012; Whiteside & Lynam, 2001). Those who have anxiety in regards to developing interpersonal relationships tend to use their cell phones as an alternative to face-to-face interactions to communicate with others (Hong, Chiu, & Huang, 2012). Drivers with high interpersonal anxiety are accustomed to using their cell phones with a high frequency and this occurs even while they are driving.

Attitudes and Social Norms

Personal attitudes towards cell phone use while driving are also an important predictor of distracted driving behaviour. Recent research has shown that those who feel that using a cell phone to text or call someone while driving is acceptable are more likely to engage in this behaviour (Riquelme, Al-Sammak, & Rios, 2010; Rozario, Lewis, & White, 2010; White, Walsh, Hyde, & Watson, 2012). However, other studies have found that those who consider distracted driving behaviours to be risky still engage in those behaviours while driving (Atchley,

Atwood, & Boulton, 2011; Hallet, Lambert, & Regan, 2012). Attitudes drivers have about their perceived driving skills have also been linked to cell phone use while driving as drivers who rate themselves as skilled have been shown to engage more frequently in cell phone use behind the wheel (Bayer & Campbell, 2012).

Purpose of this Study

The main objective of the proposed study is to determine the prevalence of aggressive and dangerous driving behaviours in a sample of young drivers. In addition, the present study examines attitudes towards aggressive and dangerous driving behaviours to see whether certain practices are considered more acceptable than others. This study also seeks to determine whether social, personal, and psychological factors associated with aggressive driving behaviour (e.g., age, sex, anger disposition, attitudes) also correspond to dangerous (non-aggressive) driving practices such as talking on a cell phone or sending text messages.

Method

Participants

The present study included 102 male and 196 female participants ($M = 20.77$ years of age, $SD = 3.6$) from a Canadian university who were enrolled in Psychology courses during the 2012 fall semester. Participants were recruited from the university's Psychology Subject Pool in accordance with the Psychology Department's procedures¹. Participants earned 1 research credit worth 2% toward their grade in Psychology. Since this study is specifically about driving behaviour, participants were required to be drivers of motor vehicles at least on occasion.

Measures

Background information was obtained using 10 questions designed for this study. Five items measured general driver attributes (i.e., age, sex, years licensed, whether or not the driver

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completed a driving training program, and whether the person typically drives alone or with passengers in the vehicle). The remaining 5 items asked participants to identify various attributes of the vehicle they drove most often (i.e., type of vehicle, how the vehicle was obtained, transmission type, whether the vehicle is modified in some way, and whether the vehicle is equipped for hands-free phone calls).

Personal vehicle preferences were measured using 7 questions in which participants were required to imagine that they were shopping for a new vehicle and to rate the importance of certain vehicle aspects (i.e., purchase price, speed, performance, safety, comfort, fuel efficiency) using a five-point scale with responses ranging from “not important” to “extremely important.” Participants were also asked to indicate the one overall feature they considered to be their single most important vehicle preference by selecting one of the following options: make/model, speed/performance, comfort/luxury, fuel efficiency, and safety features.

Daily commuting behaviour was assessed using 13 items. Participants were asked to indicate how many kilometres they drove on a typical weekday and weekend. Available responses ranged from zero to more than 50 kilometres per day. Participants were also asked to report where most of their driving took place during weekdays and weekends (e.g., within the city, on a highway, or in a rural area), and to indicate at what time most of their driving on a typical weekday and weekend took place. For example, “On a typical weekday, I drive during the evening (i.e., 6:00 - 8:00 PM).” Responses were rated on a five-point scale ranging from “never” to “always.”

Attitudes towards aggressive and dangerous driving were measured using 10 items which assessed how participants felt about particular driving practices. Participants were presented with statements of common driving scenarios and asked to rate to what extent they agreed or

disagreed with the statement. Example statements included: “It is okay to drive 15-20 Kph over the speed limit when traffic is light” and “Talking on a cell-phone while driving isn’t as distracting as most people claim it to be.” Each statement utilized a five-point scale with responses ranging from “strongly disagree” to “strongly agree” with a neutral option.

The long version of the Driver Anger Scale (Deffenbacher, Oetting, & Lynch, 1994) was used as a means of measuring participants’ tendencies towards anger and aggression. Thirty-three hypothetical driving situations in which a participant might be angered or provoked were presented. Examples included: “Someone is driving too slowly in the passing lane holding up traffic” and “You encounter road construction and detours.” For each situation, participants were instructed to report the extent to which it would anger them using a five-point scale with responses ranging from “not at all” to “very much.”

Aggressive Driving

Aggressive driving behaviour tendency was measured using a shortened version of the Driver Anger Expression Inventory (Deffenbacher, Lynch, Oetting, & Swaim, 2002). Six items measured *verbally aggressive behaviours* (e.g., calling the other driver names aloud, yelling questions such as “Where did you get your license?”). *Physical aggression* was measured using 9 items pertaining to situations wherein drivers engage in physically aggressive displays (e.g., giving the other driver the finger). Nine items were used to assess *vehicle-based aggression* (e.g., driving faster). Lastly, 6 items were used to assess *adaptive* expressions of aggression while driving (e.g., thinking about things that distract from thinking about the other driver). For each item, participants were asked to indicate how often they exhibited the stated behaviour using a four-point scale that ranged from “almost never” to “almost always.”

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Dangerous Driving

A modified version of a driving survey developed by Dahlen (2002) was used to measure the prevalence of dangerous driving behaviours. Participants were presented with 20 items that represented unsafe driving acts devoid of aggression (e.g., ate lunch/a snack while driving, sent/read a text while driving) and instructed to indicate how many times in the last three months they had engaged in the described act. Six frequency-based responses ranged from “none” to “more than 5 times.” In addition, participants used the same scale to report how many times they had a moving (non-parking) violation, a major vehicle accident, and/or a minor vehicle accident in the last year.

Procedures

The online survey was accessed through a secured web site maintained by Sona data management software. Potential participants were provided with a consent form which included a description of the study, details about what was expected of participants, information on how anonymity and confidentiality would be maintained, and a box to click for informed consent. Upon agreement, participants were connected to a separate website containing the survey instrument and debriefing statement.

The survey instrument was a questionnaire consisting of 126 items grouped into seven sections presented in the following order: General Background Information (10 questions), Personal Vehicle Preferences (7 questions), Daily Commuting Behaviour (13 questions), Attitudes Towards Aggressive and Dangerous Driving (10 questions), Tendency Towards Anger Personality Measure (33 questions), Aggressive Driving Behaviour Measure (30 questions), and the Dangerous Driving Behaviour Measure (23 questions).

After completing the questionnaire, a debriefing statement provided additional details. Participants were given definitions of aggressive and dangerous driving behaviour and were informed that the main purpose of the present study was to measure the prevalence of these driving behaviours. The debriefing statement also explained that previous studies indicate that aggressive driving is more common among young males who get easily provoked and who own high-performance or modified vehicles and that the present study examined these variables to see if the findings could be replicated. This information was initially withheld to avoid a potential social-desirability response bias. In addition, participants were informed that the study assessed a number of social influences including commute time, presence of passengers and attitudes towards aggressive and dangerous driving to see if they also correlate with aggressive forms of driving. Participants were also told that this study attempts to determine whether the personal, psychological, and/or social factors typically associated with aggressive driving behaviours are also associated with non-aggressive forms of driving (e.g., distracted driving). Finally, contact information was included for agencies that provide driver training (e.g., AMA and The Driving School Directory) and anger management resources as well as a link to an anger management network.

Results and Discussion

Response Rate

Of the 344 students who clicked on the link to the present study at the Psychology Subject Pool Site, 27 chose not to participate resulting in a response rate of 92%. Most respondents completed all of the questions on the survey. There were up to 21 missing responses to any given item resulting in a completion rate of approximately 93%.

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Aggressive Driving

Thirty questions from the Driver Anger Expression Inventory (Deffenbacher, Lynch, Oetting, & Swaim, 2002) formed the aggressive driving index. Recall that respondents were presented with a variety of driving scenarios and then asked to indicate how often they behave in the manner described using closed-ended response options that ranged from “almost never” to “almost always.” Response options were numerically coded so that “almost never” = 1 and “almost always” = 5. Taken together, the questions formed an overall aggressive driving index ranging from 30 (low aggression) to 120 (high aggression). Aggression index scores in this sample ranged from 32 to 87 with a mean of 51.7 (SD = 9.06).

Prevalent Forms of Aggressive Driving

Verbal aggression was highly prevalent among respondents. For example, 15% of respondents claimed they almost always call names under their breath while driving, 12% said they glare at other drivers almost always, and 11% reported making negative comments almost always. Taken together, 81% indicated they called names and glared at least sometimes, while 85% claimed they make negative comments (see Table 1). Using a vehicle to express anger was also common as 65% claimed they drive a lot faster at least sometimes, 86% stated they drive a little faster at least sometimes, and 44% indicated they speed up to frustrate the other driver at least sometimes. However, few reported engaging in these forms of vehicular aggression almost always (i.e., 1, 2, and 3% respectively).

A sizeable number admitted to using adaptive or productive strategies for coping with anger while driving. In fact, 93% of subjects reported paying even more attention to being a safe driver when angered at least sometimes. In addition, 90% of subjects reported thinking things through before responding when faced with frustrating driving situations. These strategies may

help to account for the low frequency of extreme forms of anger expression. This is particularly true when looking at physical aggression. Few respondents reported engaging in highly aggressive behaviours including physically getting out of a car to tell off a driver (2%), forcing another driver to the side of the road (3%), and rolling down a window to express one's anger (8%). While adaptive coping strategies may account for these low frequencies, another reason why respondents may not engage in these extreme forms of driver aggression is because of the perceived consequences. Using physical aggression to intimidate others brings the risks of retaliation and possible injury or even death. Furthermore, criminal charges can result from engaging in physical aggression against others and thus may act as a deterrent.

Sex and Aggressive Driving

A comparison of means showed no significant difference in aggressive driving between male ($M = 51.9$, $SD = 9.3$) and female drivers ($M = 51.6$, $SD = 9.0$), $t = .297$, (1, 245), n.s. This either means that younger males and females are equally aggressive or that males and females display milder forms of driver aggression similarly.

Driving Attitudes and Aggressive Driving

Attitudes toward aggressive driving practices were moderately to weakly correlated with aggressive driving. Specifically, aggressive driving was related to the perception that it was okay to drive 15-20 Kph over the speed limit ($r = .336$, $p < .01$), to the notion that slow drivers should be ticketed ($r = .280$, $p < .01$), that it is better to run through a light turning red than stop ($r = .228$, $p < .01$), that it is okay to speed if late for work ($r = .356$, $p < .01$), that drivers who make mistakes should be honked at ($r = .349$, $p < .01$), and that most drivers speed ($r = .273$, $p < .01$). Attitudes towards distracted driving practices were only weakly associated with aggressive driving (see Table 3).

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Anger Disposition and Aggressive Driving

Having a high propensity for anger was moderately correlated with overall aggressive driving, $r = .360$, $p < .01$ (see Table 4). This finding coincides with results from Deffenbacher, Lynch, Oetting, and Swaim (2002) and Krahe (2005) study which found that high general trait anger positively correlates with aggressive driving behaviour. However, there was only a weak correlation between anger disposition and engaging in physical acts of aggression ($r = .194$, $p < .01$) suggesting that adaptive strategies may be effective in reducing the propensity for expressing anger.

Driver Characteristics and Situational Factors

There was a weak relationship between aggressive driving and daily driving distance, $r = .145$, $p < .05$. Similarly, the number of years licensed was also only weakly correlated with aggressive driving ($r = .114$, $p < .05$) which may suggest that driver aggression is less dependent on driving experience and more dependent on personality type and personal attitudes.

There was a significant difference in aggression between respondents who report a preference for speed/performance ($M = 55.7$, $SD = 9.6$) over safety ($M = 45.8$, $SD = 7.8$), $t = 4.4$ (1, 67), $p < .001$. By contrast, drivers who indicated that a vehicle's safety features was the most important aspect they considered if shopping for a new car had the lowest overall aggressive driving index score (see Table 5). This finding closely matches Krahe and Fenske's (2002) study on predictors of aggressive driving behaviour which showed that men who base their purchasing decisions on speed and sportiness of a car had significantly higher aggressive driving scores than men who gave priority to safety features. However, sport cars, which often have high horsepower rating, were not associated with high aggression index scores in this study. A means comparison showed no significant difference in the aggression by type of vehicle most

often driven (see Table 6) supporting the notion that driver aggression is more dependent on personal traits (e.g., personality and attitudes) than external factors.

Dangerous Driving

The dangerous driving index consisted of 23 questions that assessed non-aggressive but unsafe driving behaviours using a modified version of Dahlen's (2002) Driving Survey that included 4 items on distracted driving. Respondents were presented with a variety of different driving scenarios and then asked to report how often they have engaged in this behaviour in the last 3 months or past year (e.g., driven without using a seatbelt, changed lanes unsafely) (see Table 2). Response options ranged from "none" to "more than 5 times" and respondents could receive an overall index score between 22 (not dangerous) to 132 (very dangerous). Participants reported a mean of 57 (SD = 15.7) with scores ranging from 28 to 100.

Distracted Driving

The distracted driving sub-index was composed of four questions that focused on cell phone use and eating while driving. For example, participants were asked how many times in the last 3 months have they sent or read a text message while driving (options ranged from none to more than 5 times). Potential distracted driving index scores ranged from 4 to 24 with higher values representing being more of a distracted driver. Participants reported a mean of 14.9 (SD = 6.31) with scores in the ranges of 4 to 24.

Prevalent Forms of Dangerous Driving

The most common forms of dangerous driving were all related to distracting driving. Sending a text message while stopped at a stoplight was the most prevalent distracted driving practice with 57% of subjects reporting having done so more than 5 times in the last three months. Other frequent acts of distracted driving included sending a text message while driving

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(i.e., 40% did so more than 5 times in the last three months) and eating while driving (i.e., 33% did so more than 5 times in the last three months) (see Table 2).

A majority of subjects (i.e., 54%) also reported driving 10-20 Mph over the speed limit more than 5 times in the past three months, while 47% reported switching lanes in order to exceed the speed limit more than 5 times in the same time frame. As the severity of dangerous driving practices increased, however, the frequency of engagement in dangerous driving decreased. For example, the majority of respondents (i.e., 89%) claim they have never used a shoulder lane to pass and have never ran a red light (i.e., 73%).

Sex and Dangerous Driving

A comparison of means showed no significant difference in dangerous driving between male ($M = 58.8$, $SD = 16.9$) and female drivers ($M = 56.2$, $SD = 15.1$), $t = 1.26$, (1, 256), n.s. Again, this could be because respondents tended to engage in mild forms of dangerous driving (e.g., reading a text while stopped at a stoplight) rather than the more serious forms (e.g., forcedly merging into a lane). Or, it could be indicative of young female drivers today engaging in similar amounts and types of dangerous driving practices as their male counterparts.

Driving Attitudes and Dangerous Driving

Driving attitudes showed weak to moderate correlations with dangerous driving behaviours (see Table 3). Driving attitudes that best predicted dangerous driving included the view that it is okay to drive 15-20 Kph over the speed limit, the view that it is okay to speed if late for work, and the belief that talking on a cell phone is not distracting. Notably, drivers who feel that it is okay to speed were likely to engage in both aggressive and dangerous driving. This finding suggests that efforts to reduce the incidence of dangerous and aggressive driving should entail means for reducing speeding.

Driving Attitudes and Distracted Driving

Attitudes that were associated with distracted driving included the notion that talking on a cell phone is not distracting ($r = .352, p = < .01$), the view that it okay to read text messages while stopped ($r = .345, p = < .01$), and the view that most drivers with cell phones text while driving ($r = .337, p = < .01$). This finding coincides with previous research that has found personal attitudes to be a predictor of intention to use a cell phone while driving (Walsh, White, Cox, & Young, 2011; Walsh, White, Hyde, & Watson, 2008). Thus, in order to decrease the prevalence cell phone use while driving, more attention should be placed on changing driver's attitudes and demonstrating the dangers of distracted driving in terms of outcomes (Walsh, White, Cox, & Young, 2011).

Anger Disposition with Dangerous and Distracted Driving

Propensity for anger and dangerous or distracting driving was only weakly related (i.e., $r = < .1$, see Table 4). Similarly, for both dangerous and distracted driving, the correlations with anger disposition were less than .1 (see Table 4). This finding was expected, as dangerous driving behaviour refers to behaviour that is not motivated by anger.

Driver Characteristics and Situational Factors

Daily driving distance was also only weakly correlated with dangerous driving ($r = .23, p = < .01$), but commuting distance was moderately associated with distracted driving ($r = .31, p = < .01$). Furthermore, years licensed was only weakly correlated with dangerous driving ($r = .21, p = < .01$) and distracted driving ($.25, p = < .01$). Means comparisons showed no significant differences in dangerous driving by type of vehicle most often driven.

There was a moderate significant difference in dangerous driving by personal vehicle preferences. Drivers with a preference for comfort and luxury had the highest overall dangerous

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index score ($M = 61.2$, $SD = 17.0$), while drivers with a preference for vehicle safety features had the lowest ($M = 48.7$, $SD = 13.4$), $t = 3.92$. (1, 89), $p = <.001$ (see Table 5). This finding may suggest that preference for a vehicle with more driver-oriented features (e.g., media information systems, heated seats, wireless phone connectivity, etc.) contributes to dangerous driving.

Drivers of large vehicles showed more distracted tendencies compared to drivers of sports cars. Specifically, those driving trucks had a higher distracted score than those in sports cars (see Table 6). One reason for why drivers of sport cars engage less frequently in distracted driving compared to drivers of larger vehicles may be due to the fact that operating these cars requires more attention. A sizeable number of vehicles that have manual transmissions are sport cars. Because these vehicles require drivers to actively disengage and engage a clutch and shift gears while driving, they necessitate more sustained attention and hand engagement (i.e., one hand is on the steering wheel and one is on the gear shift). Trucks and SUV's, on the other hand, mostly come in automatic variants and require less driver input compared to their manual sport car counterparts and thus drivers may have more time and potentially one “free-hand” that can be used to perform other activities including cell phone use and other distracting behaviours.

Conclusion

The present study was designed to investigate the prevalence of aggressive and dangerous driving (including distracted driving) among university students. In addition, this study identified factors associated with these behaviours including driver characteristics (e.g., years licensed, type of vehicle driven, vehicle preferences), situational factors (e.g., daily commuting distance), driving attitudes, and the tendency to become angered.

The strongest relationship found was between driver aggression and certain driving attitudes. In particular, the views that it was okay to speed and that drivers who make mistakes should be “punished” were associated with more frequent acts of aggressive driving (e.g. using the vehicle to express anger). Having a high propensity for anger was also indicative of aggressive driving. Other driver characteristics and situational factors were also only weakly related to aggressive driving (e.g., commuting distance, years licensed and type of vehicle driven). There were, however, significant differences found in overall aggression based on vehicle preferences with drivers who had a preference for speed and performance reporting the highest levels of driver aggression, and drivers with a preference for vehicle safety showing the lowest overall aggression scores.

Dangerous forms of driving were also found to be prevalent among the respondents of this study. The most common form of dangerous driving was distracted driving. A sizeable percentage of respondents admitted to texting while driving and eating while driving. Another common form of dangerous driving was speeding.

Driving attitudes and vehicle preferences were both associated with dangerous driving. In particular, the view that it is okay to exceed the limit and the view that it is okay to read a text message when stopped at a red light were both associated with dangerous and distracted driving. Furthermore, there were significant differences found in dangerous driving tendencies based on vehicle preferences. Overall, drivers who rated comfort and luxury as the most important feature in a vehicle showed had the highest dangerous and distracted driving scores while those who rated safety features as important had the lowest.

A number of the findings of the current study are consistent with prior studies. The finding that anger disposition was significantly correlated with aggressive driving behaviours

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closely coincides with Deffenbacher, Lynch, Oetting, and Swaim's (2002) finding that drivers with a high propensity towards anger engage in more frequent acts of aggressive driving. Similarly, Krahe's (2005) study that showed dispositional aggressiveness was a significant predictor of women's driving aggression. Furthermore, the fact that respondents who rated speed and performance as their most favoured option if shopping for a new car had the highest aggression score, while those who viewed safety as the most important feature had the lowest score matches Krahe and Fenske's (2002) study which found that those who base their purchasing decisions on the speed and sportiness aspects of a vehicle had significantly higher aggressive driving scores than those who favored safety features. In regards to dangerous driving, the current finding that driving attitudes about cell phone use correlated with distracted driving, supports Riquelme, Al-Sammak, and Rios (2010) finding that those who feel that using a cell phone while driving is acceptable, are more likely to engage in this behaviour.

A few suggestions can be made for how to reduce the incidence of dangerous and aggressive driving. One area that should be given greater consideration is efforts to address speeding (e.g., increased fines and increased demerit points for multiple offences) since those who feel that it is okay to speed are more likely to engage in both aggressive and dangerous driving practices. Likewise, more emphasis should be placed on highlighting the dangers of distracted driving (i.e., cell phone use) and enforcing the current legislation in order to emphasize the point that it is NOT okay to text and use a cell phone while driving.

Limitations

One limitation of the present study deals with the issue of social desirability. A number of questions included in the aggressive and dangerous driving index asked respondents about their engagements in illegal driving activities (e.g., speeding, road rage, cell phone use, etc.). Because

engaging in these activities paints a picture of being a “bad driver”, respondents may have underreported their involvement in illegal driving activities. Another issue with this study concerns the sample characteristics. In the current study, 34% of respondents were male while 66% were female ($M = 20.77$ years of age, $SD = 3.6$). According to Transport Canada (2004), of drivers between the ages of 20 to 24, 52% are male and 48% are female. As result of this difference in sex distribution, results found may not represent the general behaviour and attitudes of young drivers as a whole. Future studies should thus seek out samples of young drivers from the community to examine if the results found in this study hold true for the general population. Furthermore, future studies should combine self-report measures (i.e., questionnaires) with observational or experimental research methods (e.g., driving simulators) to see if attitudes drivers have about aggressive and dangerous driving translate to actual observable behaviour.

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TABLES

Table 1***Aggressive Driving Behaviours University Students Engage in When Provoked***

Category	Behaviour	Almost always	Often	Sometimes	Almost never
Verbal aggression	Call names under breath	15%	31%	35%	19%
	Glare at other driver	12%	28%	41%	19%
	Make negative comments	11%	33%	41%	15%
	Call names aloud	9%	17%	28%	46%
	Yell "where did you get your license"	4%	9%	24%	63%
	Swear at other driver	6%	14%	35%	45%
Vehicular aggression	Drive a lot faster	1%	13%	51%	35%
	Drive a little faster	2%	31%	53%	14%
	Speed to frustrate driver	3%	8%	33%	56%
	Tailgate	0%	5%	26%	69%
	Purposely block driver	2%	5%	23%	70%
	Do onto other driver	2%	0%	22%	76%
	Cut in front	1%	4%	22%	73%
	Leave on high beams	0%	1%	9%	90%
	Follow driver for a long time	0%	2%	17%	80%
Physical aggression	Shake fist	1%	3%	11%	85%
	Give "the finger"	1%	2%	20%	76%
	Roll down the window	0%	1%	7%	91%
	Stick out tongue	0%	1%	5%	93%
	Scare the other driver	0%	1%	4%	95%
	Force other driver to side of the road	0%	0%	3%	97%
	Go crazy	0%	1%	11%	87%
	Get out and tell off driver	0%	0%	2%	97%
	Bump driver's bumper	0%	0%	1%	99%
Adaptive behaviour	Pay even closer attention to being a safer driver	18%	38%	37%	7%
	Think of distractions	2%	15%	48%	35%
	Think through before responding	11%	33%	46%	10%
	Think of positive solutions	9%	30%	46%	16%
	Tell myself it's not worth getting mad	12%	27%	44%	17%
	Decide not to stoop to their level	21%	33%	35%	11%

Table 2
Dangerous Driving Behaviours Among University Students in the Last Three Months

Category	Behaviour	More than 5 times	4 times	3 times	2 times	1 time	Never
Dangerous driving	Drove 10-20 Mph over speed limit	54%	6%	11%	10%	8%	11%
	Switched lanes to speed over limit	47%	5%	12%	13%	8%	14%
	Made an illegal turn	16%	6%	8%	14%	15%	41%
	Drove 20 Mph over speed limit	15%	5%	7%	12%	14%	47%
	Not wearing seatbelt	11%	1%	3%	7%	7%	71%
	Entered intersection turning red	8%	6%	14%	17%	15%	40%
	Changed lanes unsafely	4%	3%	7%	20%	22%	44%
	Drifted into another lane	5%	2%	5%	13%	19%	56%
	Forcedly merged into lane	4%	3%	4%	12%	17%	60%
	Tailgated	3%	1%	4%	10%	16%	66%
	Got a moving violation	1%	1%	4%	8%	20%	66%
	Ran a red light	3%	1%	4%	5%	13%	73%
	Drove after drinking alcohol	3%	1%	3%	6%	9%	78%
	Gone out of turn	1%	1%	1%	5%	10%	81%
	Almost hit a pedestrian	0%	0%	1%	3%	13%	83%
	Involved in a minor accident	0%	0%	0%	3%	17%	80%
Used shoulder lane to pass	3%	1%	1%	1%	5%	89%	
Involved in a major accident	0%	0%	0%	0%	5%	95%	
Distracted driving	Sent/read text while stopped	57%	4%	10%	10%	5%	14%
	Sent read/text while driving	40%	6%	8%	15%	6%	25%
	Eating while driving	33%	6%	13%	15%	13%	20%
	Dialed number while driving	19%	7%	10%	14%	11%	40%
Adaptive driving	Pulled over to answer call	5%	2%	8%	8%	9%	68%

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Table 3

Driving Attitudes Associated with Aggressive, Dangerous, and Distracted Driving

Attitude	Aggressive driving	Dangerous driving	Distracted driving
It's okay to speed	.336**	.496**	.326**
Drivers who travel slow in the fast lane should be ticketed	.280**	.047	.037
Talking on a cell-phone isn't distracting	.225**	.339**	.352**
It's okay to run through a light turning red	.228**	.218**	.138**
Not okay to eat while driving	-.202**	-.228**	-.307**
If late for work, okay to speed	.356**	.375**	.246**
It's okay to read text message when stopped	.251**	.325**	.345**
Drivers who make mistakes should get honked at	.349**	.140*	.092
Most drivers text while driving	.164**	.280**	.337**
Most drivers speed occasionally	.273**	.319**	.284**

* $p < .05$; ** $p < .01$

Table 4

Anger Disposition and Situational Factors in Relation to Aggressive, Dangerous and Distracted Driving

Variables	Aggressive driving	Dangerous driving	Distracted driving
Anger disposition	.360**	.098	.095
Daily driving distance	.145**	.227**	.308**
Number of years licensed	.114*	.209**	.249**

* $p < .05$; ** $p < .01$

Table 5
Vehicle Preferences Mean Comparison

Driving behaviour	Vehicle preferences				
	Make/model	Speed/performance	Comfort	Fuel efficiency	Safety
Aggressive Driving	54.3 (SD = 8.8)	55.7 (SD = 9.6)	53.8 (SD = 9.2)	51.3 (SD = 8.00)	45.8 (SD = 7.8)
Dangerous Driving	59.8 (SD = 15.6)	59.2 (SD = 14.8)	61.2 (SD = 17.0)	57.8 (SD = 15.1)	48.7 (SD = 13.4)
Distracted Driving	15.4 (SD = 6.0)	15.2 (SD = 6.7)	16.0 (SD = 6.8)	15.2 (SD = 6.1)	13.1 (SD = 6.2)

Table 6
Type of Vehicle Driven Mean Comparison

Driving behaviour	Type of Vehicle Driven							
	Truck	SUV	Minivan	Sedan	Sports car	Compact	Subcompact	Motorcycle
Aggressive Driving	49.3 (SD = 5.6)	51.8 (SD = 8.6)	49.9 (SD = 9.1)	52.7 (SD = 8.7)	51.7 (SD = 11.1)	51.7 (SD = 8.9)	47.8 (SD = 10.6)	49.7 (SD = 9.5)
Dangerous Driving	59.0 (SD = 14.3)	59.9 (SD = 16.3)	56.3 (SD = 17.2)	56.3 (SD = 15.5)	54.1 (SD = 17.0)	57.6 (SD = 14.8)	57.1 (SD = 13.0)	46.7 (SD = 18.2)
Distracted Driving	17.0 (SD = 5.2)	16.2 (SD = 6.2)	13.3 (SD = 6.6)	15.0 (SD = 6.4)	12.7 (SD = 6.2)	14.7 (SD = 5.9)	15.5 (SD = 7.3)	12.7 (SD = 7.8)