

**JUST CAN'T PUT THE BRAKES ON AGGRESSIVE DRIVING:
NARCISSISM,
IMPULSIVITY, AND DRIVER AGGRESSION**

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Abstract

Aggressive driving is a dangerous and seemingly growing phenomenon that has been the subject of much public concern, media attention and academic research. The present study was designed to expand the previous research on the prediction of unsafe driving behaviours. Specifically, this study examined the potential contribution of narcissism, driving anger, impulsivity, sensation seeking, risk-taking, conscientiousness, and neuroticism to various types of unsafe driving practices. Although previous research has found support for the predictive role of many of these factors in aggressive driving, these variables have generally been studied in relative isolation. This study sought to investigate the utility of combining these variables and of assessing their respective roles in the prediction of unsafe driving behaviours. In addition, this study sought to further examine the specific role of narcissism in aggressive driving and more specifically, to examine the potential mediating role impulsivity may have in this association. It was predicted that the link between narcissism and aggressive driving would be mediated by impulsivity. One hundred and eighteen participants completed measures of driving anger, narcissism, impulsivity, sensation seeking, risk taking, unsafe driving behaviours, conscientiousness and neuroticism. Regression analyses were conducted and driving anger emerged as the strongest predictor of all types of unsafe driving behaviours. Narcissism and impulsivity emerged as

predictors but only in one particular type of unsafe driving behaviour. Results support the use of different predictors in understanding the distinctive roles these may play in various types of unsafe driving practices and in further recognizing the diverse and multifaceted profile of the aggressive driver.

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Motor vehicle accidents and roadway fatalities pose a significant social and public health concern. Automobiles have become the primary means of transportation and the increase in, and availability of, cars has led to an unprecedented degree of mobility and opportunity. Sprawling urban developments have led to an increase in the number of automobiles on the road, an increase in traffic congestion, and an increase of time spent in cars. With an increase in cars and commuters and with limited road capacity, it seems that moments of anger and frustration behind the wheel as well as the ensuing potentially hazardous consequences are bound to increase.

According to the National Highway Traffic Safety Administration (NHTSA, 2008), motor vehicle accidents are the leading cause of death in the United States for people between the ages of 3 and 33. In 2008, there were 37,261 roadway fatalities in the United States (NHTSA, 2008) and in Canada, in 2005, there were 2,578 fatal collisions leading to 2,923 deaths (Transport Canada, 2007). Over the last few years, roadway fatalities on Canadian roads have hovered around 3000 deaths per year, accounting for 95% of the transportation fatalities nationwide (Transport Canada, 2007). In the United States, in 2008, an average of 102 people died each day in motor vehicle collisions -- one every 14 minutes (NHTSA, 2008). In addition to the lives lost, and to the number of injuries sustained in motor vehicle collisions, these incidents also pose significant financial costs to society. Based on a number of factors, such as medical costs, employer costs, loss of productivity, property damage, emergency services, insurance administration, court costs, and rehabilitation costs, the overall cost of motor vehicle crashes was calculated as \$230.6 billion for the United States in 2000 (NHTSA, 2003).

Aggressive driving is a growing public health concern both because of the stress and frustration it can cause and because of the dangerous and potentially fatal consequences that may arise from these unsafe behaviours. A 1999 telephone survey conducted by NHTSA found that more than 60% of those interviewed felt that unsafe driving, including speeding, posed a serious threat to their family's well being. Overall, about three out of four participants believed that doing something about unsafe driving was very important. The Steel-Alliance Canada Safety Council, (2000) survey found that 73 percent of Ontario respondents believed that aggressive driving was on the rise (as cited in Tasca 2000).

In 1995, the Automobile Association in Great Britain conducted a study of 526 drivers in an effort to quantify the extent of aggressive driving (Joint, 1997). The results indicated that 88% of the respondents had experienced aggressive behaviours by other drivers in the last 12 months. Specific aggressive driving behaviours experienced included; aggressive tailgating (62%), high beaming (59%), receiving obscene or rude gesturing (48%), deliberately being blocked by another vehicle (21%) and receiving verbal abuse (16%). One percent of drivers said that they had been physically assaulted by another driver. Men (52%) were more likely than women (42%) to have received aggressive or rude gestures and were also more likely to have received verbal abuse (19 % and 10 % respectively). Twelve percent of the respondents indicated that they had not experienced any aggressive driving behaviours. Respondents were also asked about the aggressive behaviours they may have displayed toward other drivers. Forty percent of respondents indicated that they had never behaved aggressively toward other motorists.

Sixty percent admitted to aggressive behaviours such as those listed above. Men were more likely than women to admit to having engaged in any of these behaviours, (64% and 54% respectively). The majority of respondents felt that the behaviour of drivers had changed for the worse in recent years.

Given the significant social and financial costs of motor vehicle accidents, researchers have begun the process of trying to identify the many variables that may contribute to traffic accidents in order to better understand, and to potentially reduce the occurrence of motor vehicle collisions. Overall, there is a consensus among researchers that automobile accidents are the result of a combination of situational and human factors (NHTSA, 2007).

Although motor vehicle accidents have a variety of causes, according to NHTSA (2007), the top causes of crashes in the U.S in 2006 were related to human factors and included things such as: “Failure to keep in proper lane”, “Driving too fast,” “Failure to yield right of way”, and “Operating vehicle in erratic, reckless, careless or negligent manner” (p.100). In a report to Congress, the US General Accounting Office (GAO, 2003) noted, “human factors are seen as the most prevalent, according to data, experts, and studies, in contributing to crashes, followed by roadway environment and vehicle factors” (as cited in Dahlen, Martin, Ragan, & Kuhlman, 2005, p.2). Behaviours such as speeding, inattention, judgment errors, driving while affected by substances and violating traffic laws have all been found to directly contribute to the majority of roadway collisions (NHTSA, 2007). For example, speeding was found to be a major contributor in 31% of fatal crashes in 2006, resulting in a loss of 13, 543 lives (NHTSA, 2007).

Most drivers, at one time or another, experience traffic congestion, construction obstructions, heat and other driving-related stressors. Studies have found that traffic congestion and travel impedance can negatively impact the mood and behaviour and even the health of drivers (Novaco, Stokols, Campbell, & Stokols, 1979; Stokols, Novaco, Stokols, & Campbell, 1978). Research looking at driver stress in conditions of both high and low traffic congestion found that stress levels were higher for motorists on more congested roadways (Hennessy & Wiesenenthal, 1997; Hennessy, Wiesenenthal, & Kohn, 2000). Studies have also found that motorists reported higher levels of driver anger and aggression in high congestion conditions than in low congestion conditions (Hennessy & Wiesenenthal, 1999; Shinar, 1998)

The increase of automobiles on the roadways and the ensuing competition for space have lead to an increase in congestion levels as well as an increase in feelings of frustration, stress and irritation on the roads (Hennessy & Wiesenenthal, 1999) . On the road delays are frustrating for all drivers, but for some, under certain conditions, the feelings of frustration lead to riskier and more aggressive driving behaviours (Hennessy & Wiesenenthal, 1999). Motorists may respond by following too closely, weaving unsafely in and out of lanes, or becoming angry at other drivers who they may view as an impediment to their progress. As a driver who had been mandated to attend “aggressive driving correction school” stated:

People on the road were an impediment to my progress. If I was late, it would reflect badly on me. Maybe the customer wouldn't want the products, and I'd be out of a sale. Getting there was the only thing that was important. If I met you in

person, I might invite you for coffee or something. But on the road, you were in my way (Ferguson, 1998).

As can be seen from the above statement it appears that the norms of common courtesy may become somewhat diluted on the roadways. The code of civility that governs day to day public interactions seem weakened, and at times entirely absent on the roadways. “Wait your turn” appears to be a norm that is subject to significantly more flexibility on the roads than in other public settings. Cutting to the front of the queue at the bank is a behaviour that is unlikely to occur, even from the most impatient of individuals. But while driving, pulling in at the last moment and bypassing the “line” appears to be a relatively standard mode of operation for many drivers. External pressures seem to manage to keep most non-driving conflicts aggression-free (Parkinson 2001). But, this same code of conduct does not seem to apply on the roadways.

Aggressive Driving

NHTSA (2008) has estimated that approximately two-thirds of roadway fatalities can be attributed to behaviours associated with aggressive driving. Ricardo Martinez, administrator of NHTSA reported to Congress that aggressive driving could be equated with alcohol-impaired driving in its contribution to motor vehicle accidents (Martinez, 1997). Overall, there is agreement among researchers that aggressive driving is a significant contributor to automobile accidents. Despite agreement regarding the potential consequences of aggressive driving, one of the complicated and problematic issues surrounding the research in this field has been a general lack of consistency in the ways in which to operationally define this diverse behaviour.

Currently, there is no consensus on the definition of aggressive driving or on the term “road rage”, a term used to describe more extreme acts of driving aggression involving some type of personal assault (Tasca, 2000). The American Automobile Association has defined aggressive driving as the operation of a motor vehicle without regard to others’ safety (Tasca, 2000). Ricardo Martinez of NHTSA defined aggressive driving as the operation of a motor vehicle in a manner which “endangers or is likely to endanger people or property” (as cited in Tasca, 2000, p.4). Speeding, tailgating, making unsafe lane changes, failing to yield the right of way to other road users, running stop signs, honking, making hand and facial gestures are all examples of specific behaviours that would meet the above mentioned definitions of aggressive driving. In a report sponsored by the American Association of State Highway and Transportation Officials and published by the Transportation Research Board, Neuman, Pfefer, Slack, Hardy, Raub, Lucke and Wark (2003) defined aggressive driving as, “operating a motor vehicle in a selfish, pushy, or impatient manner, often unsafely, that directly affects other drivers.” (pg. I-1).

Although the terms aggressive driving and road rage are sometimes used interchangeably there are important distinctions between the two behaviours. Road rage is a criminal offence and occurs when a driving incident escalates into a very serious situation. A motorist may become so angry over another drivers’ behaviour that he/she may retaliate with a violent act ranging from a physical confrontation to an assault with a weapon. Road rage has been defined as an extreme, and very rare, form of aggressive driving behaviour that involves “assaultive behaviour with the intent of bodily harm and

possible homicide” (Ellison-Potter, Bell, & Deffenbacher, 2001). Behaviour associated with road rage are considered criminal offences and fall under the Criminal Code as violent behaviours, while those associated with aggressive driving are considered traffic offences and fall under the Highway Traffic Act (Tasca, 2000). Road rage is a relatively rare phenomenon, though it appears to be on the rise (Mizell, 1997).

One of the central issues that have complicated the ability to reach a consensus on the definition of aggressive driving has been the issue of intent or motivation behind the aggressive behaviour. Some of the research has focused merely on the aggressive behaviour itself and on the potential outcome of the behaviour, while other research has argued that a focus and understanding of the intent behind the behaviour is essential. Galovski and Blanchard (2002) have emphasized the need to distinguish between aggressive driving behaviours committed with intent and those occurring as a result of errors or lapses in judgement. Hennessy (2000) has also highlighted the importance of differentiating between various types of unsafe driving practices. He has identified three types of driving actions and has emphasized the importance of understanding the various underlying motives behind each type. The first two actions, which differ in the severity of outcome, aggressive driving (horn-honking, yelling, etc.) and violent driving (fighting, shooting, etc.) are both undertaken with the intention to harm other motorists either psychologically or physically. The third type outlined by Hennessy (2000) is that of assertive driving (speeding and weaving in and out of traffic) which is motivated by a time urgent or “me first” mentality but is not undertaken with the intent to harm or punish other drivers. Hennessy has argued that this lack of distinction between “assertive” and

“aggressive” driving behaviours has limited the understanding and generalizability of the potential factors that may be linked to aggressive driving behaviours and their outcomes. Deffenbacher (1999) has also been critical of definitions that do not distinguish between aggressive driving which is motivated by harmful intent and risky driving which may not necessarily be committed with malicious intent.

Tasca (2000) has argued that a more precise definition of aggressive driving is needed, and that such a definition should focus on intent and motivation. In his view, definitions of aggressive driving should focus on deliberate and willful driving behaviours that show utter disregard for the safety and well-being of other motorists. He has proposed the following definition: “A driving behaviour is aggressive if it is deliberate, likely to increase the risk of collision and is motivated by impatience, annoyance, hostility, and/or an attempt to save time” (pg. 2). This definition stresses the fact that these behaviours are not necessarily motivated by a desire to harm other motorists, but that they are willful and deliberate actions that are likely to increase the likelihood of a harmful outcome (Hennessy, Wiesenthal, Wickens, Lustman, 2005).

According to Tasca (2000), the specific behaviours constituting aggressive driving should include, but are not limited to: tailgating, weaving in and out of traffic, improper passing, and improper lane changes, passing on the road shoulder, running red lights, and running stop signs. He has also suggested that displays of irritation or hostility, that are not necessarily intended to harm other road users, but that are intended to intimidate, anger or provoke them should also be included in the list of aggressive

behaviours. These include, but are not limited to; flashing headlights, sustained horn-honking, yelling, gesturing and glaring at another driver to show disapproval.

Dula and Ballard (2003) have argued that the lack of a clear definition and the absence of a needed distinction between various unsafe driving practices have detracted from any knowledge or generalizability driving research may have provided. Dula and Geller (2003) have proposed that there are three major classes of dangerous driving and that aggressive driving represents only one facet of dangerous driving. Their three classes include: (1) intentional acts of bodily or psychological aggression toward other drivers, (2) negative emotions such as anger or frustration while driving and (3) risk-taking behaviours which consist of dangerous driving behaviours but which lack actual intent to harm. Although the term aggressive driving is a construct that remains diverse and unclear in much of the literature, a common factor is that all definitions appear to include a behaviour that makes the driving situation more dangerous, for all those concerned, regardless of motivation or the absence or presence of intent to harm.

Driver Typology

Reckless and aggressive driving includes a broad range of dangerous driving behaviours with an equally diverse range of motivational factors. The same on-road behaviour of two separate motorists may be triggered by different emotions and engaged in for different reasons. Dangerously overtaking a slow moving car on the right hand lane may be undertaken as a means to express annoyance toward a slow driver, it may be motivated by impatience and a desire to reach one's destination quickly, or it may simply be motivated by a thrill seeking tendency. The diversity of aggressive drivers represents

a challenge for those concerned with road safety. There are those individuals who are chronically aggressive in every aspect of their life, and who remain so behind the wheel (Hennessy & Wiesenthal, 2005). There are also those who are not usually aggressive, in other situations, but who admit to being aggressive while driving. And there are still others who are generally not aggressive on the roadways, but who will, in specific situations, respond aggressively to other driver's behaviours. And, finally and fortunately, there are also those who will rarely, if ever, act or react aggressively behind the wheel.

Although driver typology has received relatively little attention in driving research there have been some attempts to classify and differentiate various types of aggressive drivers. For instance, Larson (1996) identified five types of aggressive drivers: The Speeder, The Competitor, the Passive-Aggressor, The Narcissist and the Vigilante. The Speeder refers to the type of driver who is primarily and consistently concerned with making good time. When these goals are thwarted or impeded, this driver quickly becomes angry. The Competitor is generally concerned with getting ahead of other drivers. Driving is a competitive activity for these types of individuals and for them, driving includes a constant attempt to "beat" other drivers in various situations (i.e. will try and race driver at a toll booth to get through first). Engaging in these self-constructed competitions increases aggressive driving behaviours and losing in them increases the Competitor's anger and dangerous driving practices. The Passive-Aggressor drives aggressively as a reactionary protest against feeling thwarted or mistreated by other drivers. Passive-Aggressors may block other drivers from passing or

may purposely brake or drive slowly. The Narcissist driver tends to be hostile and judgmental toward other drivers. This type of driver has rigid standards of proper roadway conduct and feels angry when deviations from these norms occur. And finally, the Vigilante driver is the type of driver that is actively concerned with enforcing the rules of the road and confronting or punishing those motorists who have not abided by them.

James and Nahl (2000) proposed that aggressive driving should refer to any type of driving behaviour that occurs under the influence of a negative emotional state. Within this definition, they identified three broad categories of impaired emotions: (a) impatience and inattentiveness, (b) power struggles with other drivers; and (c) recklessness and road rage. James and Nahl (2000) also sought to identify and categorize the various types of aggressive drivers. Their typology was similar to Larsons's and included; the Rushing Maniac, the Automotive Vigilante, the Scofflaw and the Aggressive Competitor. The Rushing Maniac refers to the type of driver who is constantly in a rush and becomes aggressive toward drivers who slow him/her down as conveyed below by this driver appearing to be in a perpetual hurry:

My mind is focused on getting to my destination in a certain amount of time, and I don't seem to care how I do it as long as I don't crash. Even if I don't have to get somewhere by a certain time, I'm always in a hurry (James & Nahl, 2000, p.100).

The automotive vigilante refers to the type of driver who aggressively enforces the rules of the road and punishes drivers who are believed to have committed

transgressions. The vigilante believes that his/her aggressive responses toward rule breakers are a service to society and help to maintain law and order. As a female vigilante driver argues:

I don't think one should move out of the way of tailgaters. That encourages this very unsafe practice. If we continue to bow down to such overly aggressive and dangerous behaviour, then driving will turn into a free-for-all, with the survival of the most aggressive driver (James & Nahl, 2000, p.98).

The Scofflaw refers to the type of driver who feels entitled to break or disregard traffic laws most of which he/she deems as an unnecessary inconvenience - as conveyed by this motorist:

I guess there must be a special reason for that sign and I'll find out one day when I get a ticket for not stopping. I feel that this stop sign just slows me down. I don't stop, but even yielding to it takes some time, too. I get mad at the city for positioning stop signs at places where it's not necessary. When I see a car make a full stop at a stop sign I laugh to myself and say "What a fool" (James & Nahl, 2000, p.105).

And finally there is the aggressive competitor who views driving as a competitive sport. These types of drivers want to be in the lead at all times and tend to feel a sense of defeat if another car passes or outdrives them in any way. These drivers will engage in risky and dangerous driving practices in order to outdrive other motorists. As demonstrated below, taking a simple turn can be transformed into a thrill inducing competitive exercise (perhaps unbeknownst to the perceived competitor);

The light is going to turn red. I'm making my move. The light is now red but I'm completing my turn. I'm in the intersection making my turn at full throttle. Yes, sir! I've completed my turn. The light just turned green. The Sentra is stuck. I feel a sense of joy, elation, accomplishment. Right on! I'm shaking from the adrenaline. What an adventure. I feel good (James & Nahl, 2000, p. 104).

The attempts to classify and identify the various types of drivers and the differences in the motivation and triggers behind dangerous driving behaviours illustrates the difficulties faced in trying to identify a homogeneous portrait of the aggressive driver. As Mizell (1997) concluded after a review of over 10,000 reported aggressive driving incidents, there does not seem to be one profile of the "aggressive driver". Certain individual differences may contribute to certain types of aggressive driving, but not to others. For instance, the Rushing Maniac may consistently engage in risky, aggressive and vengeful driving practices as he/she perceives any obstruction, both human and situational, as impediments to his/her hasty progress while the vigilante driver may not normally engage in risky or unsafe driving practices but may do so only as a response to another motorist's perceived purposeful transgression.

Gender

In the Traffic Safety Facts report, NHTSA (2008) reported that in 2008, in the United States, 36,640 male drivers were killed in fatal crashes compared to 12,477 female drivers killed. Men were almost 3 times as likely to be involved in fatal crashes as women. Males accounted for 71% of all traffic fatalities and 70% of all pedestrian fatalities (NHTSA Traffic Safety Facts 2008). According to NHTSA (2008) speeding is

one of the most prevalent factors contributing to traffic crashes and in 2008 speeding was a contributing factor in 31% of all fatal crashes. Almost 12,000 lives were lost in speeding-related crashes and for drivers involved in fatal crashes, young males have been found to be the most likely to be speeding. Thirty-seven percent of the 16-20-year-old male drivers who were involved in fatal collisions were speeding at the time of the crash (NHTSA 2008).

Some explanations for gender differences in accident rates have focused on driving frequency. On average, men drive more often than women (Hemenway & Solnick 1993) and this increased driving rate may lead to an increased exposure to potentially hazardous situations. However, several studies have controlled for miles driven and clear gender differences in driving behaviours have still emerged. Men have been found to engage in risky and aggressive driving behaviours more often than women (Deffenbacher, Lynch, Filetti, Dahlen, & Oetting, 2003), they have been found to use their seatbelts less frequently (Deffenbacher, Huff, Lynch, Oetting & Sakvatirem 2000) and to drive faster in driving simulators than females (Ellison-Potter, Bell & Deffenbacher, 2001).

In a study on gender related differences in the tendency to commit traffic violations Yagil (1998) found that women had a stronger sense of obligation to obey traffic laws than did men. This study revealed that women were less likely than males to speed even if they were convinced that doing so would be safe. Male drivers were also found to be more likely to underestimate the hazards involved in certain driving activities and to overestimate their driving ability (Yagil, 1998). The tendency of males to

overestimate their driving abilities, coupled with their underestimation of potential driving hazards and their reduced tendency to comply with traffic laws may all come together to create the perfect storm for roadway collisions.

Males have also been found to have different and somewhat more lenient attitudes toward road safety. A Canadian study (Rothe, 1987) found that males were more likely to endorse less safe driving attitudes than females. Males believed it was acceptable to drive while slightly impaired, to exceed the speed limit on city streets and highways, and to drive without a seatbelt. Several studies have found that males are likely to rate themselves as more aggressive while driving than females (Deffenbacher et al., 2000, Deffenbacher, Lynch, Filetti, Dahlen, & Oetting, 2003). In one study (Smith & Heckert, 1998) men reported having received 6 times as many speeding tickets as women (i.e., 25 total speeding tickets for men versus 4 for women). Young men have also demonstrated a tendency to underestimate their own vulnerability while driving and to overestimate their driving ability when asked to compare themselves to their peers more so than young women. In a study conducted by Glendon, Dorn, Davies, Matthews, and Taylor (1996) young men estimated that their peers were 69.7% more likely to be involved in an accident than they were, whereas women reported their peer's likelihood of accident involvement to be 31.3% greater than theirs.

In a telephone survey examining types of risky driving behaviours such as speeding, not fully stopping at a stop sign, red light running, and driving when affected by alcohol, males were more likely than females to engage in each of these behaviours (NHTSA, 1998). Males have also been found to commit more specific aggressive and

violent driving behaviours such as confronting other motorists and have also been found to be more likely to engage in road rage (Hennessy & Wiesenthal, 2002, Shinar & Compton, 2004).

One of the possible explanations for the differences between male and female driving attitudes and driving behaviours may be found in the principles of evolutionary psychology. Evolutionary psychology has argued that male aggression, and more specifically, young male aggression, is an adaptive survival strategy that maximizes access to attractive reproductive females. From this perspective, when males demonstrate their status, strength and power, they can outperform other male competitors and successfully attract available females increasing their chances of successful reproduction (Krahé, 2001; Wilson & Daly, 1985). Evolutionary theory suggests that males are particularly prone to engage in risky behaviours in their efforts to attract females, secure resources and breed successfully (Wiesenthal & Singhal, in press) Wilson and Daly (1985) have termed this effect the “young male syndrome” and they have argued that males are more likely than females to engage in a variety of risky behaviours such as gambling, illicit drug use, theft as well as many types of unsafe and risky driving behaviours. Males’ over representation in roadway fatalities has been widely documented with young males between the ages of 16-29 being disproportionately involved in collisions causing deaths (Wiesenthal & Singhal, in press). After conducting an archival analysis of Canadian road safety data, Wiesenthal and Singhal (in press) found that the number of roadway fatalities had fallen dramatically since the late 1980’s despite an increase in the number of cars on Canadian roads. As the proportion of 15-29 year old

males has decreased, so have the number of roadway injuries and deaths. The decline in fatalities appears to match the decrease in the number of young males in the population. Wiesenthal & Singhal, (in press) have suggested that the changing demographics of the Canadian population can partially explain the reduction in driver injuries, fatalities and drunk-driving incidents.

Although evidence of gender differences in aggressive and risky driving behaviours has been found, the research has produced some mixed results. As highlighted by Hennessy, Wiesenthal, Wickens, & Lustman, (2004) gender differences in aggressive driving behaviours have not been consistently found. Research done by Hennessy and Wiesenthal (1997, 1999) found that males and females were equally likely to report experiencing driver stress and to exhibit mild aggressive behaviours such as horn honking, purposely tailgating other drivers, flashing high-beams, gesturing, or swearing at other drivers. Hauber (1980) conducted a study where drivers were observed as they approached a pedestrian crossing and encountered a confederate crossing without traffic lights. Hauber measured aggressive responses included shouting, gesturing or honking at the pedestrian and failing to stop which forced the pedestrian to speed up. No significant differences between male and female drivers emerged in this study.

There is also evidence that men and women do not differ in the tendency to experience anger while driving (Deffenbacher et al., 2000, 2001). Female college students have reported experiencing driving anger in equal intensity and frequency as male students (Knee, Neighbors & Vietor, 2001; Deffenbacher et al., 2003b). Some research has found that although in general there are no significant gender differences for

driving anger, there are differences in what angers men and women. Research has found that although male and female drivers reported similar levels of mild driver aggression, driver violence was more frequent among male drivers (Hennessy, Wiesenthal, Wickens, & Lustman, 2004). Men have been found to become angrier with slow drivers, while women become angrier at illegal driving and traffic obstructions (Deffenbacher, Oetting, & Lynch, 1994).

The large difference in accident rates and roadway fatalities between men and women and the evidence that gender differences exist in many of the variables related to crashes suggests that gender is a variable that should be taken into consideration in driving research.

Anonymity/Deindividuation

Driving is a unique activity in that it consists of a mix of both public and private behaviours. Although while driving one is in a public arena, surrounded by other motorists and pedestrians, the automobile creates a sense of protection and insulation from the outside world providing drivers with a sense of detachment and anonymity. The car acts as both a physical and psychological shield from other motorists. The anonymity provided by this insulation can weaken restraints and inhibitions that are usually exercised in public interactions (Wiesenthal & Janovjak, 1992). Anonymity occurs when an individual feels that he/she cannot be identified by others and therefore cannot be judged, evaluated, criticized and, perhaps most importantly, punished (Zimbardo, 1970). Research has found that general aggressive tendencies increase with perceptions of anonymity (Rehm, Steinleitner & Lilli, 1987; Yamaguchi, 1980). Zimbardo (1970)

found that when female college students were rendered anonymous, by clothing them in oversized lab coats with large hoods that covered most of their face, they delivered higher intensity shocks and for longer durations to a confederate than did female students who were dressed normally with name tags.

A field study conducted by Ellison, Govern, Petri, and Figler (1995), investigated the effect of anonymity on aggressive driving behaviours. Their research found that drivers in an anonymous conditions (drivers of convertibles with the tops up) honked sooner and for a longer duration, then drivers in an identifiable condition, (drivers of convertibles with the tops down), when they were delayed at an intersection by a driver who failed to advance when the light turned green. Individuals who are polite and considerate in a grocery line may feel free to act otherwise in their vehicles. While behind the wheel, these same individuals may engage in discourteous, pushy and aggressive behaviours that in other public arenas they may be more reluctant to display. While driving there is little probability of repeated interactions with other motorists and such conditions lead to feelings of anonymity, power and control (Hennessy & Wiesenhal, 2001; Hennessy, 1999; Lightdale & Prentice, 1994; Wiesenhal & Janovjak, 1992). Anonymity reduces the risk of detection and punishment and thus increases the likelihood of engaging in aggressive behaviour (Zimbardo, 1970). The ease with which one can drive away, and the limited probability that one will be recognized by other motorists provides optimal conditions for the emergence of discourteous and unsafe driving behaviours.

Raymond Novaco (1998) suggested that anonymity plays an influential role in roadway aggression:

Generally, people lose self-restraint when not mindful of who they are and of their place in a rule-governed society. A highway, especially at night, provides anonymity and the opportunity to escape. Expectations of punishment are diminished, and aggressive impulses are more readily expressed. The chance to “get away with it” can release aggression that would otherwise have been held in check (Novaco, 1998, p.2).

The privacy and seclusion provided for by automobiles can also impede interpersonal communication that normally occurs between individuals interacting within such close proximity. The lack of verbal communication with other motorists may increase the likelihood of conflict particularly when the consequences of aggressive actions can be relatively easily avoided. Not having to talk to the motorist one has just honked at or made an obscene gesture towards makes the likelihood of engaging in such behaviours more likely. The lack of verbal communication may also contribute to the escalation of initial offenses. If a driver behaves in a frustrating manner, but he/she is cognizant and regretful of it, the ability to convey this regret may be somewhat limited due to the difficulty in communicating verbally with other drivers. The driving environment is not conducive to providing explanations and apologies for negative behaviours. A quick “excuse me” is not easily communicated via automobile and by the time that such communication is possible a retaliatory response may have already occurred.

Vengeance

Vengeance has been defined as the intentional infliction of punishment or harm in return for a perceived offense (Stuckless, Ford & Vitelli, 1995). It has been suggested that vengeance is motivated by the widely held conviction that a perceived offender requires his/her “just” dessert (Wasserstrom, 1978). Stein (1973) defined vengeance as pain, humiliation, or injury inflicted on those who have been a source of injury or annoyance. Revenge is based on a belief that once one has been wronged and an injustice has been committed, it is reasonable, justifiable and at times imperative, to react in a way that will punish the perceived offender. According to Elster (1990), as cited in Wiesenthal et al., (2000), the universal phenomenon of asserting one’s honor came from the deep-rooted urge to show one’s superiority. Individuals holding vengeful attitudes are more likely to engage in aggressive behaviours because they believe that strong actions are justified in defense of their personal rights and freedoms (Daly & Wilson, 1988). Vengeance is more than mere reciprocity; the ensuing reaction can often be more severe than the original act, because the retaliation is an attempt to exert a sense of power over the perceived transgressor (Daly & Wilson, 1988, Stuckless & Goranson, 1992).

Driver aggression is often motivated by the need to punish another driver believed to have behaved inconsiderately or in a potentially dangerous manner. The driving environment is a social setting with very distinct rules and norms that define appropriate and inappropriate behaviours (Rothe, 1994). When these rules are violated, other drivers become angry and want the transgressors punished (Wiesenthal, et al., 2000). Cutting another driver off, failing to signal, driving too slowly, not yielding the right of way, or

tailgating are just a few examples of behaviours that may be seen as norm violations by other drivers. These driving transgressions can lead to feelings of anger and a desire for vengeance by other motorists. Driving vengeance has been defined as the infliction of harm, including physical pain, emotional distress, humiliation and annoyance on another within the driving environment in response to a perceived transgression (Wiesenthal, Hennessy, & Gibson, 2000). Research has found that a major determinant of driver aggression is the perception of having been wronged by another driver (Gulian, Debney, Glendon, Davies & Matthews, 1989).

Research sponsored by the AAA Foundation for Traffic Safety examined over 10,000 police reports and newspaper articles related to road rage incidents to better understand these incidents. The reports revealed that the most common explanations given for why the incidents had turned violent were very personal and somewhat trivial in nature. The reasons given were things such as “Nobody gives me the finger”; “The bastard kept honking and honking his horn at me” (Mizell, 1997). These findings led Crimmins and Callahan (2003) to conclude “anger on the road is less a response to traffic congestion and more a response to the perceived willful actions of others that endanger or offend us, that insult our safety or self-image” (p.383).

Narcissism and Driving

Researchers interested in the causative role of motivation in aggressive driving have focused on identifying personality traits that may contribute to a tendency to engage in riskier and more aggressive driving behaviours. Driving is a complex behaviour and crashes are often the result of a combination of many factors. Different personality types

may aggress for different reasons and in different situations. Narcissism is a personality factor that has been linked to aggression in general and more recently to driver aggression.

For many decades, the traditional view in psychology was that low self-esteem was at the root of aggression. It was believed that lashing out at others stemmed from fundamental inner self-doubts and self-dislike (Toch, 1993). Aggressing against others was seen as a way of gaining esteem, or as a resort used by those with nothing left to lose (Oates & Forrest, 1985). Recently though, there has been evidence to suggest that quite the opposite may be true. Bushman and Baumeister (1998) have found that violence and aggression tend to be the result, not of low self esteem, but instead of very high and positive self-views. They have suggested that individuals, who hold excessively high, and often unrealistic, views of themselves, are more prone to exhibit aggression in order to defend and maintain these grandiose views. This inflated sense of self is considered to be characteristic of the narcissistic individual.

Narcissism is a personality trait characterized by feelings of grandiosity, a conviction that one is special and unique, egocentrism and a desire to receive the admiration of others (Rhodewalt & Morf, 1998). Narcissists are strongly motivated by a need to confirm and maintain their own and other's perception of them as superior beings. But, despite this relentless pursuit of validation of their superiority, they remain somewhat of a paradox. Narcissists are both arrogant and vulnerable. They are preoccupied with their overly favorable self-images and yet are highly sensitive to what they interpret as threats or challenges to their very fragile self-concept. As they are

deeply attached to unrealistic and exaggerated self views much of their actions and energies are dedicated to defending and protecting these beliefs.

Research has found a link between narcissism and aggression, particularly in circumstances where the narcissists' inflated self views have been threatened. Bushman and Baumeister (1998) found that individuals high on narcissism responded more aggressively, as measured by blasts of noise they delivered as punishment, toward an individual who had criticized their written work than did participants low on narcissism. Narcissists have also been found to respond with anger and aggression to bogus negative intelligence feedback (Stucke & Sporer, 2002) as well as to social rejection (Twenge & Campbell, 2003). Overall, these research findings suggest that narcissists have an increased likelihood of retaliating after receiving insults or threatening feedback. Whether motivated by an attempt to restore their fragile ego, or by a vengeful tendency to seek retaliation against a perceived wrong-doer, narcissists have been found to respond more aggressively after receiving insults or threatening feedback.

Narcissists have also been found less likely to forgive the past transgressions of others. Brown (2004) found that trait forgiveness and vengefulness were independent factors and his study revealed that what distinguished unforgiving people who are vengeful from unforgiving people who are not vengeful was degree of narcissism. His research showed that the most vengeful individuals were those who were both low in forgiveness and high in narcissism. Brown (2004) posited that the revenge seeking behaviour of these individuals may be fuelled by either the exaggerated levels of social

confidence exuded by narcissists or by the sense of entitlement that characterizes narcissists.

Revenge seeking tendencies may be particularly relevant within the context of aggressive driving. Research has recently found a link between vengeance and roadway aggression (Hennessy & Wiesenenthal, 2001; Wiesenenthal, Hennessy, & Gibson, 2000). Driver aggression is often retaliatory in nature and motivated by a need to punish another driver believed to have behaved inconsiderately or in a potentially dangerous manner. Wiesenenthal, Hennessy, & Gibson (2000) have defined driving vengeance as the desire to get even with another driver in response to a perceived injustice or infraction. For some drivers this vengeful wish is fulfilled through driver aggression and at times violence (Hennessy & Wiesenenthal, 2001; Hennessy & Wiesenenthal, 2002). Individuals, high on vengefulness, may be less likely than individuals low on vengefulness, to ignore or overlook the frustrating actions of other motorists. Vengeful individuals have a tendency to feel warranted in harming perceived perpetrators as they believe that these individuals are deserving of punishment or correction for their inappropriate or potentially harmful conduct (Baumeister, 1997; Daly & Wilson, 1988; Hennessy & Wiesenenthal 2004). The narcissist, with an elevated need for vengeance, may seek to punish or lash out at what he/she may consider to be the inconsiderate or aggressive driving behaviour of another motorist. A desire to get even may increase the likelihood of engaging in retaliatory roadway aggression toward perceived offenders.

Knee, Neighbors & Vietor (2001) examined the role of self-determination in aggressive driving behaviours. Self-determination theory posits that there are individual

differences in emotional regulation in interpersonal contexts. People differ in the extent to which they regulate their behaviour based on a tendency toward an autonomous or a controlled orientation (Deci & Ryan, 1985). Individuals whose orientation is autonomous tend to be less susceptible to external pressures while individuals with a controlled orientation tend to be more vulnerable to external pressures, tend to be more defensive and more sensitive toward perceived attacks on their self-esteem. Knee et al. (2001) found that individuals who were high in controlled orientation responded with greater driving anger and aggression in provocative incidents. The authors suggested that the ego-defensiveness, characteristic of controlled individuals, makes them more likely to assume a defensive interpersonal stance when confronted with frustrating and seemingly challenging driving situations.

Recent research has found a link between aggressive driving and certain aspects of narcissism. Schreer (2002) examined the relationship between belligerent driving behaviour and narcissism and noted that specific aspects of narcissism predicted aggressive driving behaviour and that these specific dimensions were gender related. Males high on the Entitlement component of narcissism (e.g., “I insist upon getting the respect that is due to me”) reported higher aggressive driving behaviours, while women high on the Exhibitionism component of narcissism (e.g., “I like to be the center of attention”) reported higher levels of aggressive driving. A more recent study (Lustman, Wiesenthal & Flett, 2010) also found a positive association between narcissism and aggressive driving such that narcissists were more likely to respond aggressively to the frustrating behaviours of other motorists. In this study, participants were presented with

scenarios of frustrating driving situations and were asked how angry these situations would make them and how they would likely respond in such circumstances. At the same level of anger as other participants, narcissists were found to respond more aggressively to the frustrating behaviour of other motorists.

Anger and Aggressive Driving

Anger is another factor that has received considerable attention from researchers for its role in aggressive driving behaviours and accident involvement. Anger is often a response to perceived injustice. According to Ferguson and Rule (1983), anger, blaming, and retaliation occur when individuals believe that the norms of proper conduct have been violated. Driving is an interactive behaviour involving both explicit and implicit rules of conduct and violations of the rules of engagement may lead to feelings of anger and aggression behind the wheel. A slow moving or inconsiderate driver whose actions impede the progress of other drivers may evoke anger in other motorists leading to aggressive retaliatory responses.

Anger is a construct measured both as a stable personality trait as well as a transient and context specific state. Spielberger (1999) characterized trait anger as a broad tendency that certain individuals have, leading them to experience intense anger across situations. Individuals high in trait anger have a low threshold for anger and experience anger more easily and more intensely over a wide range of circumstances. Whereas trait anger refers to a stable personality trait influencing how an individual feels and behaves across time and situations, state anger refers to a person's feelings at a particular moment. Deffenbacher et al. (1994) have suggested that some individuals are

more likely to become angry when engaged in the specific behaviour of operating a motor vehicle and they have referred to this context specific anger as trait driving anger.

According to Deffenbacher et al. (1994), individuals high in trait driving anger have a general propensity to become angered frequently and intensely while driving. The driving environment is a hotbed for feelings of frustration and individuals who are high in trait anger will have ample opportunities to experience feelings of irritation and aggravation while behind the wheel. Slow moving drivers, inconsiderate drivers, long traffic jams, roadway construction are but a few examples of anger provoking events that can lead to feelings of frustration and anger.

Individuals high in trait driving anger have been found to be more likely to engage in aggressive driving behaviours, have had more traffic violations and have had more motor vehicle accidents (Deffenbacher et al. 1994; Deffenbacher, Huff, Lynch, Oetting & Salvatore, 2000; Deffenbacher, Lynch, Filetti, Dahlen, & Oetting 2003a; Deffenbacher, Deffenbacher, Lynch, & Richards, 2003b; Lajunen & Parker, 2001). High anger drivers, in comparison to low anger drivers, have been found to be approximately 3.5-4.0 times more likely to engage in aggressive behaviours while driving and 1.5-2.0 times more likely to engage in risky non-aggressive driving behaviours such as not wearing a seatbelt or exceeding the speed limit (Deffenbacher, et al., 2003a). They have also reported higher levels of anger in frequently occurring driving situations and have an increased tendency to speed (Deffenbacher, et al., 2003b). High anger drivers have also reported a greater likelihood of engaging in risky driving behaviours in normal driving conditions, have reported more close calls and have received more driving citations even

though they did not differ from low anger drivers with regard to number of miles driven or driving frequency (Deffenbacher, et al., 2003a).

Overall, the research suggests that some drivers are more likely to become angry when encountering frustrations on the roadways and accordingly these individuals are more likely to engage unsafe driving behaviours. The behaviour of these individuals increases the occurrence of roadway aggression both in their tendency to initiate it and to escalate it by potentially eliciting similar driving behaviours from others.

Other Personality Traits and Aggressive Driving

Research on the Five Factor Model has found a link between some of the Big Five personality traits and aggressive driving. In particular, conscientiousness, defined as a tendency to be disciplined, reliable and responsible (McCrae & Costa, 1987) has been found to be inversely related to risky driving behaviours, as well as number of moving violation tickets (Arthur & Doverspike, 2001). Arthur and Graziano (1996) found that conscientiousness was the only one of the Big Five factors that predicted crash involvement. Research has also suggested a link between neuroticism and aggressive driving tendencies. Neuroticism is characterized by a tendency to easily experience unpleasant emotions such as anger or anxiety (McCrae & Costa, 1987). The relationship between driving anger and aggressive driving suggests that neuroticism may also play a role in aggressive driving. The tendency to anger easily, characteristic of neurotic individuals, may extend to the tendency to anger easily while behind the wheel. While driving, and while attempting to reach one's destination, moments of frustration and aggravation are bound to occur. For neurotic individuals these obstacles are likely to

elicit unpleasant feelings such as anger and irritation and these may lead to a heightened tendency to engage in aggressive and vengeful driving behaviours. A positive relationship has also been found with neuroticism and vehicular accidents, aggression while driving, driving fatalities, and dislike of driving (Matthews, Dorn, & Glendon, 1991).

Risk-taking Propensity and Sensation Seeking

A propensity toward risk-taking is another factor that may be important in the driving domain. Although risky driving has received considerable attention within aggressive driving research, the focus has generally been on risk-taking within the context of driving – risky driving. There has been relatively little focus on a general propensity toward risk-taking and how this may influence aggressive and risky driving behaviours. Although sensation seeking has been examined in aggressive and risky driving research, sensation seeking scales tend to measure a propensity to engage in risk-taking behaviour that is thrill seeking in nature (Meertens & Lion 2008). Sensation seeking refers to the extent to which an individual desires novel and intense stimuli. Zuckerman (1994) has described sensation seeking as a “trait defined by the seeking of varied, novel, complex, and intense sensations and experiences and the willingness to take physical, social, legal and financial risks for the sake of such experiences” (p.27). Individuals high on sensation seeking have been found to be more likely to engage in risky behaviours such as; cigarette smoking, high-risk sexual behaviours, drug and alcohol consumption and physically risky sports (Zuckerman, 1990). Within the driving domain, sensation seeking has been associated with drunk driving, exceeding the speed

limit, not wearing a seatbelt, racing other drivers and passing in no passing zones (Arnett, 1990; Arnett, Offer, & Fine, 1997; Clement & Jonah, 1984; Furnham & Saip, 1993). Jonah (1997) reviewed over 40 studies on risky driving and found a positive association between sensation seeking and collision involvement.

A recent study by Cazenave (2007), found that narcissistic adolescents were more likely to engage in the practice of parkour, or free running. Parkour is an extreme sport, in which the participant's goal is to move through space as quickly and efficiently as possible -- as though one was being chased --while overcoming any obstacles that may present themselves. Individuals participating in free running engage in risky behaviours such as scaling walls or jumping from rooftop to rooftop. Cazenave's (2007) study, conducted in suburbs of Paris, found that adolescents who practiced free running were higher in narcissism and sensation seeking.

A study by Dahlen, Martin, Ragan, and Kuhlman (2005) examined the role of sensation seeking, impulsiveness, driving anger and boredom proneness in unsafe driving practices. Their research found that sensation seeking predicted lapses in concentration, minor losses of vehicular control, aggressive driving, risky driving, physically and verbally aggressive driving anger expression and the use of the vehicle to express anger. Their study also found that sensation seeking was unrelated to driving anger, and that it was only moderately related to impulsiveness and boredom proneness.

Although risk-taking and sensation seeking are conceptually similar, they are not necessarily identical. Sensation seeking refers to a tendency to enjoy novel and varied experiences (Zuckerman, 1990) and risk-taking is a positive attitude toward taking

recognized risks (Rohrmann, 2004). Individuals who take risks may not necessarily be motivated by sensation seeking tendencies and sensation seekers may not necessarily engage in activities that they consider risky. Trying new and exotic foods may be motivated by a sensation seeking tendency, but it is unlikely to be considered risky behaviour. Drivers who engage in risky and aggressive driving behaviours may not necessarily be doing so because of their thrill seeking nature, but perhaps because of their general willingness to take risks in all domains. Studies have found a positive association between risky driving and other risk-taking behaviours, such as drug and alcohol use and drunk driving (Beirness & Simpson, 1988, Klepp & Perry, 1990; Wilson & Jonah, 1988). Risky driving behaviours have also been found to covary with each other. For example, low seat belt use has been associated with both drunk driving (Wilson & Jonah, 1998) and tailgating (Evans & Wasielewski, 1983).

Although an assumed association between a general propensity toward risk-taking and risky driving behaviours seems conceptually sound, there has been a lack of empirical research focusing on this relationship within the driving domain. It may be the case that individuals who drive in a risky fashion are more likely to engage in general risk-taking, and are thus more likely to engage in risky behaviours in other domains and contexts, but it may also be the case that risky drivers do not evaluate their driving behaviours as risky. Risky driving may be influenced by an increased willingness to engage in risky behaviours, but it may also be influenced by an assessment of the behaviour as relatively safe.

Risk-taking is also a factor that may be important in the relationship between narcissism and aggressive driving. In order to defend and maintain their overly favorable self-perceptions, narcissists have been found to engage in self-deceptive enhancement leading to an increased likelihood of engaging in risky behaviours. They are boastful and seem to chronically overstate and overestimate their skills and abilities, even when faced with evidence to the contrary. A study by Lakey, Rose, Campbell, and Goodie (2008) found that narcissists gambled more frequently than their non-narcissist counterparts and that their misplaced overconfidence led them to a heightened propensity to accept bets and take risks. Research has found that narcissists overestimate their ability to answer general knowledge questions and this overconfidence leads them to make large bets based on their perceived knowledge, but in the end, relative to non-narcissists, they underperform (Campbell, Goodie, & Foster, 2004). Narcissists have also been found to inflate their future grades (Farwell & Wohlwend-Lloyd, 1998) and to predict that they would do better than others on a given task prior to completion.

This distorted overestimation of their abilities may also lead narcissists to engage in risky and aggressive driving behaviours. Their characteristic overconfidence may extend to the driving domain, where they may feel that they are superior and capable drivers who can safely engage in risky driving behaviours.

Impulsivity

Impulsivity is another factor that has been associated with high-risk and aggressive behaviours. Individual differences in impulse control have been found to predict a variety of addictive and risky behaviours. Poor impulse control has been linked

to alcohol use (Grano, Virtanen, Vahtera, Elovainio, & Kivimaki, 2004) and problem gambling (Clarke, 2006). Impulsiveness has also been associated with risky and unsafe driving behaviours such as: drunk driving, reduced seatbelt use, reduced ability to notice traffic signs and accident rates (Hansen, 1988 ; Loo, 1979). In a recent study by Wickens, Toplak, and Wiesensthal (2008), a positive relationship was found between impulsivity and driving mistakes and violations. Adams (1970) reported that a pattern of impulsive responding on a hazard judgment task was associated with motor vehicle accidents. A study by Hartos, Eitel, and Simons-Morton (2002) found a positive association between reduced self-control (lack of forethought and acting upon hunches) and risky driving behaviours. On the other hand, a study by Lajunen and Parker (2001), did not find a significant relationship between impulsivity and either reactions to driving provocations or driving anger.

Impulsiveness may be an important factor in reactionary or retaliatory aggression that characterizes many aggressive driving incidents. Indeed, an intervention devised in Albany at the State University of New York targets impulsivity as the key element in reducing the likelihood of road rage incidents for at-risk drivers (see Galovski & Blanchard, 2002; 2004). The reason that impulsivity may lead to risk-taking and aggressive behaviours is that individuals may simply lack the necessary self-control to refrain from engaging in such behaviours. Reduced levels of self-control may increase the likelihood of acting aggressively when encountering frustrating driving situations and it may also lead to the escalation of incidents that may have originally been, and potentially remained, rather benign or innocuous. An inability to control one's impulses,

as well as a reduced consideration of the consequences of one's actions, may lead impulsive individuals to react aggressively to frustrations on the roadways increasing the likelihood of dangerous outcomes.

Although impulsivity and risk-taking are conceptually similar, and both can lead to a wide variety of problem behaviours, there are important distinctions both in preference and motivation between the two concepts. Impulsiveness refers to one's control over one's thoughts and behaviours (Barratt, 1972), while risk-taking refers to a willingness and preference for risk-taking. Impulsive individuals may engage in risk-taking behaviours not because they necessarily have a positive attitude toward risk-taking, but simply because they lack the self-control required to refrain from engaging in such behaviours. Impulsivity can be assessed with a variety of measures. It was assessed in the current research with a measure of impulsivity derived from Eysenck's personality measures. While this measure has not been examined extensively in terms of its possible link with overly aggressive driving behaviour, elevated scores on Eysenck's impulsivity scale have been associated significantly ($r = .28$) with a measure designed to assess the propensity for angry driving (see DePasquale, Geller, Clarke, & Littleton, 2001).

Narcissism and Impulsivity

Recent research has examined the relationship between narcissism and impulsivity and the role that impulsiveness may have in partially explaining some of the characteristically self-defeating behaviours exhibited by narcissists. Vazire and Funder (2006) conducted a meta-analysis and found a strong relationship between impulsivity and narcissism. Their review revealed that narcissists consistently rated themselves as

impulsive and were also consistently seen as impatient, unable to delay gratification, and lacking in self-control by others who rated them. Vazire and Funder (2006) suggested that narcissists engage in self-defeating behaviours such as boasting, self-aggrandizement, and aggressive reactions because they are dispositionally impulsive. In their view, narcissists often fail to reach their goals, not because they are making poor strategic decisions in order to attain their goals, but because they lack the self-control necessary to refrain from engaging in behaviours that ultimately impede goal attainment. Vazire and Funder (2006) suggested that narcissists react aggressively to perceived insults or criticism because they are overcome by an impulse that they fail to control. There is no logic or goal attainment strategy to their aggressive response; they are merely acting out on their immediate need to lash out at the source of their frustration.

Narcissistic individuals may be more likely to be aggressive drivers simply because they lack the ability to inhibit the frustration or anger they may feel on roadways. Individuals low on narcissism may feel irritated or frustrated by certain driving situations, but may be able to refrain from acting out on these feelings and thus reduce the risk of further escalations. Narcissistic individuals may lack the self-control necessary to refrain from acting out on their immediate feelings of anger and irritation and their knee-jerk reaction to driving frustrations may lead them to aggress more readily on the roadways. It may be the case that the relationship between narcissism and aggressive driving is mediated by impulsivity.

Present Study

The present study was designed to expand the previous research on the prediction of unsafe driving behaviours by combining various personality factors and assessing their respective relationship to unsafe driving practices. Trait driving anger, impulsiveness, narcissism and sensation seeking are all variables that have been found independently to relate to aggressive driving. Although risky driving has been examined in aggressive driving research, somewhat surprisingly, the potential role of risk-taking in general has remained largely unexplored.

The present study sought to extend previous research by investigating the utility of combining these variables and examining the relationship they may have to unsafe driving practices. It has been suggested that a combination of predictors may account for more variance in unsafe driving than one single variable, but to date only a few studies have attempted to examine the utility of combining potential risk-factors (Dahlen & White, 2006). Aggressive driving is a diverse and complicated behaviour and it is likely that multivariate models are needed to strengthen the prediction of vehicular accident and accident related driving behaviours.

The second aim of the current research was to further examine the role of narcissistic traits on various unsafe driving behaviours. The research on the relationship between narcissism and aggressive driving has produced mixed results. Thus, the present study sought to further examine this relationship and to evaluate the potential role of narcissistic traits in the prediction of aggressive, risky and vengeful driving behaviours.

The third way in which the present study proposed to extend previous research was to examine the role of individual differences on various unsafe driving behaviours. Risky, vengeful, dangerous and aggressive driving may be behaviours that are engaged in by various types of individuals and for various and diverse reasons. The underlying motivation for aggressive driving behaviours may be hostility for some, impatience or frustration for others and an attempt at vengeance or retribution for others. An incident that triggers one driver to drive aggressively may not trigger another. Narcissists may be more aggressive behind the wheel because they are impulsive and lack the self-control to stop themselves from engaging in dangerous driving behaviours. Or, it may be the case that narcissists are more vengeful and thus feel that motorists who misbehave, should be justly punished for their incompetence or inconsideration. The mixed results in the role of narcissism in aggressive driving may be influenced by the specific type of aggressive driving under examination. Although research has found that aggressive driving is a real problem (Lajunen & Parker, 2001; Mizell, 1997), the construct itself remains unclear in much of the literature. What is common about the various types of driver aggression is that they all make the driving situation more dangerous for all motorists. Dangerous driving includes aggressive actions done with the intention to harm, but it also includes risky driving behaviours which are often done without intent to harm.

The types of unsafe driving practices that will be examined in this study include; vengeful, dangerous, aggressive, and risky driving behaviours. Vengeful driving refers to the responses made toward other motorists when faced with common frustrating driving situations such as being honked or cursed at, or having one's parking spot taken. These

incidents focus on driving encounters where a motorist may feel irritated or unjustly treated by other drivers. The focus of this type of aggression is on reactive aggression toward other motorists frustrating behaviours. Risky driving refers to behaviours that are unsafe such as weaving in and out of traffic, driving on the shoulder or driving while intoxicated. Although risky behaviours are potentially dangerous, unlike aggressive driving behaviours, they are not undertaken with the intent to do harm or antagonize other motorists. Risky drivers are most likely engaging in unsafe driving practices, because they believe that they are capable of navigating successfully through these risks or because they have not given sufficient consideration to the potentially devastating consequences (Willemssen, Dula, Declercq, & Verhaeghe, 2008). Aggressive driving refers to behaviours that are intentional acts of physical, verbal or gestured aggression such as flashing headlights, making rude gestures or purposely tailgating. Dangerous driving includes both risky and aggressive driving practices as well as a tendency to experience negative emotions while driving such as anger, impatience or frustration. Negative emotions contribute to dangerous driving as they may directly or indirectly increase the likelihood of becoming involved in a crash. The current study sought to investigate whether certain predictors are better able to predict specific types of unsafe driving behaviours.

Hypotheses

The following hypotheses are proposed:

1. *The combination of narcissism, impulsivity, driving anger, sensation seeking, and risk-taking will predict vengeful driving behaviours.*

2. *The combination of narcissism, impulsivity, driving anger, sensation seeking, and risk-taking will predict risky driving behaviours.*
3. *The combination of narcissism, impulsivity, driving anger, sensation seeking and risk-taking will predict dangerous driving behaviours.*
4. *The combination of narcissism, impulsivity, driving anger, sensation seeking, and risk-taking will predict aggressive driving behaviours.*
5. *Narcissists will have higher levels of driving anger than their non narcissist counterparts.*
6. *Impulsivity will mediate the link between narcissism and vengeful driving*

Measures

1. *The Narcissistic Personality Inventory (Raskin & Terry, 1988)*

The most widely used measure of narcissism is the Narcissistic Personality Inventory (NPI; Raskin & Terry, 1988). This scale was developed to measure individual differences in narcissism in non-clinical populations (see Appendix B). It contains 40 items and respondents choose between two alternatives such as “Sometimes I tell good stories” and “Everybody like to hear my stories”. The scale provides a full-scale score and seven subscale scores. The subscales are; Authority (e.g. “I like to have authority over other people”, Self-sufficiency (e.g. “I am more capable than other people”), Exploitativeness (“I can make anybody believe anything that I want them to”), Superiority (e.g., “I am an extraordinary person”), Exhibitionism (e.g., “I really like to be the center of attention”), Entitlement (e.g., “I insist upon getting the respect that is due to me”) and Vanity (e.g., “I like to look at my body”). The Exhibitionism, Entitlement, and

Exploitativeness subscales have been associated with hostility, aggression and defensive self-esteem (Emmons, 1987). The scale evidenced acceptable internal consistency (Guttman lambda 3=.83) and adequate construct validity (Raskin & Terry, 1988).

2. The Dula Dangerous Driving Index (DDDI)

The DDDI (Dula & Ballard, 2003) is a 28-item self-report scale, developed to measure the likelihood of engaging in dangerous driving behaviours. The scale provides an overall measure of Dangerous Driving and also includes three conceptually distinct subscales. The subscales are; Aggressive Driving (“I would tailgate a driver who annoys me”), Negative Emotions While Driving (“I lose my temper when driving”) and Risky driving (“I will race a slow moving train to a railroad crossing”). The DDDI has been shown to have good internal reliability with total scale and subscale alpha coefficients ranging from 0.83 to 0.92 (Dula & Ballard, 2003). Items are rated on a 5-point scale ranging from ‘never’ to ‘always’.

3. The Driving Vengeance Questionnaire(DVQ)

The DVQ (Wiesenthal, Hennessy, & Gibson, 2000) was developed to measure a general tendency toward vengeful driving reactions. There are 15 items, representative of common driving scenarios where individuals may feel irritated or feel unjustly treated by another driver. Participants are required to choose one of four options ranging from extremely aggressive responses to non-aggressive responses. The DVQ has been found to represent a reliable measure of vengeful driving attitudes ($\alpha = .83$; Hennessy & Wiesenthal, 2001) and to predict the likelihood of mild driver aggression and violence (Wiesenthal et al., 2000).

4. Driving Anger Scale (DAS)

The DAS (Deffenbacher, Oetting, & Lynch, 1994) is a 14-item scale which is intended to measure the ease with which a driver is able to be provoked into anger. Participants are presented with various driving scenarios (e.g. “A slow vehicle on a mountain road will not pull over and let people by”, “Someone honks at you about your driving”, and asked to indicate on a five-point Likert scale (1 = not at all to 5 = very much) the level of anger each scenario would elicit. Scores can range from 14 to 70 with higher scores indicating a greater tendency to experience trait driving anger. Internal reliability of the scale has been reported to range from .80 to .92 (Deffenbacher et al., 2000).

5. Impulsivity Scale

Impulsiveness was measured using the Eysenck-Impulsivity Scale (Eysenck, Pearson, Easting, & Allsopp, 1985). Impulsivity as measured by this instrument is related to decision making without an awareness of risks and consequences. The scale is a 19-item self-report measure which uses a question format such as: “Do you often buy things on impulse?”, “Do you usually work quickly, without bothering to check?” Items are answered on a 6-point scale ranging from ‘never’ to ‘always’. The instrument is known to have good reliability. Eysenck and associates (1985) reported internal consistency coefficients of .83 to .84.

6. The Big Five Inventory

The BFI (Benet-Martinez and John, 1998) is a 44-item measure that yields separate scores on each of the “Big Five” personality traits (Conscientiousness,

Agreeableness, Emotional Stability, Extroversion and Openness). Items are answered on a 5-point Likert scale with answers ranging from 1 (Disagree Strongly) to 5 (Agree Strongly). Of particular interest in the present study were the Conscientiousness factor designed to measure reliability, dependability, self-discipline and responsibility and the Neuroticism factor designed to measure low emotional stability.

7. The Risk Propensity Scale

The Risk Propensity Scale (Meertens & Lion, 2008) was employed to assess a general tendency to take risks. Participants rated their agreement with 7 statements expressing their attitudes toward risk aversion (Safety first) or risk-propensity (I take risks regularly). Items are rated on a 9-point Likert scale ranging from 1 (totally disagree) to 9 (totally agree). Higher scores on the measure indicate higher risk-seeking tendencies. The scale has been found to have good internal reliability with a Cronbach's α of .77 (Meertens & Lion, 2008).

8. Sensation Seeking Scale Zuckerman-Kuhlman Personality Questionnaire (ZKPQ)

The Zuckerman-Kuhlman Personality Questionnaire (Zuckerman, Kuhlman, Joireman, Teta, & Kraft, 1993) consists of 99 items measuring five basic dimensions of personality, and participants are asked to answer True or False on each statement. The five personality dimensions measured by this instrument are as follows: 1) Neuroticism-Anxiety, 2) Activity, 3) Sociability, 4) Impulsive Sensation Seeking, and 5) Aggression-Hostility. Two subscales containing 19 items comprise the Impulsive Sensation-Seeking dimension. The first subscale, Impulsivity (containing 8 items), involves the tendency to

act quickly without much thinking. The second subscale, Sensation Seeking (containing 11 items), describes the seeking of novel and exciting experiences such as “I would like the kind of life where one is on the move and traveling a lot, with lots of change and excitement”. In the current study the 11-item Sensation Seeking subscale was used to measure sensation seeking.

Procedure

Students were recruited through the York University Undergraduate Research Participant Pool (URPP) at York University in Toronto, Canada. The participants in the URPP were undergraduate students enrolled in Introduction to Psychology courses and could earn up to 3% toward their final grade for voluntarily participating in research studies. A brief description of the study was posted on the URPP website and participants signed up for participation and responded to the questionnaires on-line. All participants were required to have a valid driver's license. First, participants were asked to read and sign a consent form before taking part in the study. The project received ethical approval with the consent form assuring participants that their participation was voluntary and that they could withdraw from the study at any time without penalty. They were also told that their information would remain confidential. All URPP participants received 1% toward their final grade in Introduction to Psychology for participating in this study. The online questionnaire administered to the students included a demographic questionnaire (asking their age, number of years driving, number of car accidents and a self-rating of driving ability), the Narcissistic Personality Inventory (NPI), the Driving Vengeance Questionnaire (DVQ), the Dula Dangerous Driving Index (DDI), the Risk

Propensity Scale, the Driving Anger Scale, the Impulsivity Scale and the Big Five Inventory (BFI). For counter balancing purposes, the questionnaires were presented to the participants in a randomized order.

Results

Participants

The sample consisted of 117 (96 women, 21 men) undergraduates enrolled in psychology courses at York University in Toronto, Canada. A demographic questionnaire was used to gather information on age, gender, and years of driving experience (see Table 1). Participants were also asked to self-rate their driving abilities in comparison to other drivers. Participant ages ranged from 18 to 51 years of age ($M = 22.46$, $SD = 5.87$). All of the participants had valid driver licenses. The number of years driven ranged from 6 months to 33 years age ($M = 4.5$, $SD = 5.41$).

Scale Reliabilities

Internal consistencies were calculated for each measure via coefficient alpha in order to ensure that scales were assessing unitary constructs. Reliability coefficients for each of the measures used in the current study can be found in Table 2. Alphas for all measures exceeded .70, with a range from $\alpha = .72$ to $\alpha = .93$ which meets standards (.70 or above) recommended for research (Nunnally, 1978).

Data Screening

All statistical analyses were conducted using SPSS version 17.0 for Windows. Prior to conducting any statistical analyses, the data set was examined for accuracy of data entry, missing values, normality, and outliers. The accuracy of data entry was

examined using “frequencies” in SPSS 17.0, verifying that all values were within the expected range.

Variables were analyzed for non-normality by inspecting values for kurtosis and skewness (see Table 3). Histograms and Q-Q plots were also examined. Data with a skew above an absolute value of 3.0 and kurtosis above an absolute value of 8.0 are considered problematic (Kline, 1998). The skewness and kurtosis were all well within a tolerable range for assuming a normal distribution. Furthermore, the histograms and Q-Q plots showed no univariate outliers or extreme scores. Thus, the assumption of normality was satisfied.

Scatterplots were generated for every predictor with every other predictor as well as the criterion. A plot of each of the variables (narcissism, driving anger, impulsivity, sensation seeking, risk-taking, conscientiousness, and neuroticism) with the dependent measures (vengeful, aggressive, risky and dangerous driving) indicated a linear relationship. No bivariate outliers were identified. Before the first set of analyses was conducted, the assumptions underlying the multiple regression technique were examined. The studentized residuals were examined and were found to be normally distributed. In examining Cook’s distance (Fox, 1991), to identify data points with unusual leverage, two potentially influential multivariate outliers were found. Once these were identified, the previously developed model was tested again without the two observations and no differences in the interpretation of the final statistics were found. Therefore, the two multivariate outliers were kept in the analysis.

Multicollinearity diagnostics were conducted to examine the independence of the predictors. The Variance Inflation Factor (VIF) were all within the acceptable range, none were greater than 4, indicating the independence of the predictors.

Correlations

Bivariate correlation analyses were conducted in order to examine the interrelationships among all variables. Several statistically significant correlations emerged (see Table 4). A significant relationship was found between driving vengeance and all other variables except for risk propensity. The DVQ was positively correlated with narcissism ($r = .21, p < .05$), driver anger ($r = .43, p < .01$), impulsivity ($r = .29, p < .01$), sensation seeking ($r = .23, p < .05$), and neuroticism ($r = .26, p < .01$) as well as with aggressive driving ($r = .67, p < .01$), risky driving ($r = .51, p < .01$) and dangerous driving ($r = .51, p < .01$). The DVQ was also negatively related to conscientiousness ($r = -.29, p < .01$). Dangerous driving was correlated with driver anger, ($r = .54, p < .01$), impulsivity ($r = .35, p < .01$), sensation seeking ($r = .26, p < .01$) and risk propensity, ($r = .21, p < .05$). Risky driving was correlated with driving anger, ($r = .37, p < .01$), impulsivity, ($r = .26, p < .01$), risk propensity, ($r = -.34, p < .01$), sensation seeking, ($r = .26, p < .01$) and conscientiousness, ($r = -.26, p < .01$). Aggressive driving was related to driving anger, ($r = .41, p < .01$), impulsivity, ($r = .28, p < .01$), risk propensity, ($r = -.26, p < .01$), sensation seeking, ($r = .25, p < .01$) and conscientiousness, ($r = -.23, p < .05$). Driving anger was also positively related to impulsivity ($r = .28, p < .01$), and neuroticism ($r = .28, p < .01$), but no significant relationship emerged between driving anger and risk propensity or sensation seeking. Similarly, driving anger was not

associated significantly with narcissism. Impulsivity was also positively related to sensation seeking , ($r = .57, p < .001$) and narcissism ($r = .19, p < .05$). Interestingly, no significant association was found between narcissism and many of the other variables. No significant relationship emerged between narcissism and driving anger, risk-taking, or risky, aggressive and dangerous driving. Narcissism was positively related to impulsivity ($r = .19, p < .05$), sensation seeking , ($r = .27, p < .01$) and neuroticism ($r = .22, p < .05$)

Gender Differences

To assess for gender effect, independent samples t-tests were conducted comparing men ($n = 21$) and women ($n = 96$) on the primary variables of interest. These included the outcome variables (vengeful, aggressive, risky and dangerous driving behaviours) as well as narcissism, driving anger, impulsivity, sensation seeking, risk-taking and the participants' self-ratings of their driving abilities. The results of these analyses are listed in Table 5. The assumptions for using the T statistic were satisfied, as all the dependent measures were normally distributed and the Levene Tests confirmed no violations of the assumption for homogeneity of variance. Significant differences emerged on self-ratings of driving ability, vengeful, aggressive and risky driving such that men had significantly higher means on all of these variables. No significant gender differences were found for narcissism, driving anger, impulsivity, sensation seeking, dangerous driving or risk-taking.

When asked their opinion about their own driving skills (rate your driving abilities in comparison to other drivers from 0-99; 0 = *I'm at the very bottom* and 99 = *I'm at the very top*) the average score for all participants, both male and female, was 68%

($SD = 23.33$) However the t-test revealed a significant gender difference on these self-ratings with males estimating their ability at 80% ($M = 80, SD = 12.67$) and females estimating their ability at 65% ($M = 65, SD = 24.27$), $t(116) = -.27, p = .008$.

There was a significant difference in the scores on risky driving between men ($M = 23.00, SD = 8.38$) and women ($M = 19.02, SD = 6.41$) $t(116) = 2.43, p = .017$. Men were more vengeful ($M = 31.14, SD = 7.93$) and aggressive ($M = 17.81, SD = 5.70$) in their driving behaviours than women ($M = 26.66, SD = 6.09$), and ($M = 13.11, SD = 5.04$) respectively, $t(116) = -2.89, p = .005$, $t(116) = -3.78, p = .000$.

Regression Analysis

In order to test the hypotheses, four separate multiple regressions were conducted on each of the various types of unsafe driving practices; dangerous, aggressive, vengeful, and risky driving served as the criterion variables. Driving anger, narcissism, impulsivity, risk-taking, sensation seeking, conscientiousness and neuroticism were entered as predictor variables. Results revealed that different types of unsafe driving behaviours were predicted by various combinations of predictor variables.

Hypothesis 1: The combination of narcissism, impulsivity, driving anger, risk-taking, conscientiousness and neuroticism will predict vengeful driving behaviours.

A multiple regression analysis was conducted to test this hypothesis. The results for this analysis can be found in Table 6. The predictors were entered in the following order; Gender, narcissism, impulsivity, driving anger, risk-taking propensity, sensation seeking, conscientiousness and neuroticism. Results offered partial support for Hypothesis 1. The findings suggested that vengeful driving was predicted though some

combination of predictors. The overall model accounted for 38% ($R^2 = .38$) of the variance. Driving anger ($\beta = .29, p = .001$) narcissism ($\beta = .20, p = .017$), gender ($\beta = .19, p = .022$), and conscientiousness ($\beta = -.19, p = .021$) all emerged as significant predictors. Anger emerged as the strongest predictor of driver vengeance accounting for 7% of the variance, followed by narcissism, gender and conscientiousness each at 3%. Neuroticism, risk-taking, sensation seeking, and impulsivity did not come out as significant predictors on top of and above all the other predictors.

Hypothesis 2: The combination of narcissism, impulsivity, driving anger, sensation seeking, risk-taking neuroticism and conscientiousness will predict risky driving behaviours.

A multiple regression was conducted. Gender, narcissism, impulsivity, driving anger, risk-taking propensity, sensation seeking, conscientiousness and neuroticism were entered as the as predictor variables and the risky driving subscale of the The Dula Dangerous Driving Index (DDDI) served as the outcome variable. Results offered partial support for Hypothesis 2 (see Table 7). Gender ($\beta = .19, p = .023$), driving anger ($\beta = .28, p = .002$), and risk-taking ($\beta = .19, p = .029$), all emerged as significant predictors for risky driving. The overall model accounted for 35% ($R^2 = .35$) of the variance. Driving anger accounted for 6 %, risk-taking accounted for 3% of the variance and gender accounted for 3 % of the variance. Narcissism, conscientiousness, neuroticism, sensation seeking and impulsivity did not emerge as significant predictors of risky driving.

Hypothesis 3: The combination of narcissism, impulsivity, driving anger and risk-taking will predict dangerous driving behaviours.

A multiple regression analysis was conducted to test this hypothesis (see Table 8). Gender, narcissism, impulsivity, driving anger, risk-taking propensity, sensation seeking, conscientiousness and neuroticism were entered as the as predictor variables and the Dula Dangerous Driving Index (DDDI) served as the dependent variable. Driving anger ($\beta = .44, p = .000$) was the only variable that emerged as a significant predictor of dangerous driving behaviours. The combination of predictors accounted for 39% of the variance ($R^2 = .39$). Driving anger accounted for 15% of the variance.

Hypothesis 4: The combination of narcissism, impulsivity, driving anger and risk-taking will predict aggressive driving behaviours.

Gender, narcissism, impulsivity, driving anger, risk-taking propensity, sensation seeking, conscientiousness and neuroticism were entered as the as predictor variables and the aggressive driving subscale of the Dula Dangerous Driving Index (DDDI) served as the dependent variable. Collectively, the predictors in this model accounted for 37% of the variance ($R^2 = .37$). Gender ($\beta = .30, p = .000$), driving anger ($\beta = .28, p = .001$) and risk propensity ($\beta = .19, p = .025$), emerged as significant predictors (see Table 9). Gender accounted for 8% of the variance, driving anger accounted for 6% and risk propensity for 3%.

Hypothesis 5: Narcissists will have higher levels of driving anger than their non narcissist counterparts.

Gender, narcissism, impulsivity, risk-taking propensity and sensation seeking, were entered as the as predictor variables and driving anger served as the dependent variable. Hypothesis 5 was not supported by the findings (see Table 10). Narcissism did

not emerge as a significant predictor of driving anger in either the multiple regression or in the correlation analyses. Interestingly, impulsivity was the only variable that emerged as a significant predictor of driving anger ($\beta = .34, p = .003$).

Hypothesis 6: Impulsivity will mediate the link between narcissism and vengeful driving

As the final step, the potential mediating role of impulsivity on the relationship between vengeful driving and narcissism was examined.

Mediation exists when a predictor indirectly affects a dependent variable through a mediating variable (Preacher & Hayes, 2008). The preconditions for a test of mediation are that each of the predictor, potential mediator and outcome variables are significantly related. The first step in mediation requires that the independent variable (narcissism) be significantly associated with the dependent variable (aggressive driving). The second step requires that the independent variable (narcissism) be significantly associated with the mediator (impulsivity). The third step is to establish a significant relationship between the mediator (impulsivity) and the dependent variable (vengeful driving). If significant relationships emerge from these independent analyses then the mediator (impulsivity) and the independent variable (narcissism) are regressed simultaneously on the dependent variable (aggressive driving). If mediation is occurring, the relationship between the mediator and the dependent variable should remain significant, but the relationship between the independent and dependent variable should decrease.

Multiple regressions were conducted with narcissism, impulsivity and all outcome variables; vengeful, aggressive, dangerous and risky driving behaviours in order to meet

the preconditions for mediation analysis. The regressions revealed a significant relationship between narcissism and vengeful driving behaviours. Interestingly, no significant relationship was found between narcissism and aggressive, dangerous or risky driving behaviours. As a result, the mediating role of impulsivity was only examined within the context of the relationship between narcissism and vengeful driving.

It was hypothesized that individuals with elevated narcissistic traits would engage in more vengeful driving behaviours than individuals low on narcissistic traits. In accordance with this hypothesis, a significant relationship between narcissism and vengeful driving emerged ($\beta = .22, p = .017$). Once this relationship was established, the relationship between vengeful driving and the proposed mediator, impulsivity, was examined and this too was found to be significant ($\beta = .32, p = .000$). Finally, the relationship between impulsivity and narcissism was examined and a significant relationship was also found with ($\beta = .19, p = .036$). Results supported the prediction that narcissism and impulsivity were independently related to vengeful driving.

In order to examine the potential mediating effects of impulsivity on the relationship between narcissism and aggressive driving, both these variables were simultaneously regressed onto vengeful driving to determine to what degree the relationship between narcissism and aggressive driving had been degraded. Controlling for impulsivity caused the association between narcissism and vengeful driving to fall significantly. In this analysis, impulsivity was significant ($\beta = .29, p = .001$), but as expected, narcissism was no longer significant ($\beta = .16, p = .069$).

Once the preconditions of the mediating role of impulsivity on the relationship between narcissism and vengeful driving had been met, a mediation analysis was conducted. In the current study, the bootstrapping technique (Preacher & Hayes, 2004) was used to test the mediational model of impulsivity as a mediator of the relationship between narcissism and vengeful driving. Although the Baron and Kenny (1986) causal steps approach is the most commonly used approach for testing mediation, this approach has been found to lack statistical power (McCartney, Bub, & Burchinal, 2006; Preacher & Hayes, 2004). A comparison study of 14 methods to test the statistical significance of mediation effects found the bootstrapping method to be one of the superior methods due its simplicity, high statistical power, and low probability of making Type 1 errors (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). The bootstrapping method allows for multiple mediators to be examined within the same model and has greater power to detect significant effects while controlling for the effects of covariates (Preacher & Hayes, 2004). Unlike the Baron and Kenny (1986) approach to mediation, the bootstrapping method does not rely on the assumption that the total and indirect effects are normally distributed (MacKinnon, Lockwood, & Williams, 2004; Preacher & Hayes, 2004). The bootstrapping approach improves statistical power due to the fact that the significance of the effect of the predictor on the mediator and the effect of the mediator on the outcome are tested through a single joint effect instead of testing the significance of these two effects separately, which is the case with the Baron and Kenny (1986) test of mediation.

Bootstrapping involves the computer generation of a large number (e.g. thousands) of samples from independent random sampling of the available sample. Confidence intervals are then generated from this pseudo-created sampling distribution. The bootstrapping technique produces point estimates and bias-corrected and accelerated (BCA) confidence intervals for each of the proposed indirect effects as well as a point estimate of the remaining direct effect. Confidence intervals for the indirect effects of the independent variable on the dependent variable through the proposed mediator are produced and intervals that do not include zero suggest significant mediation.

Results based on 1000 bootstrapped samples indicated that while the total effect of narcissism on vengeful driving was significant ($TE = .22$, $SE = .09$, $p = .017$), the direct effect was not ($DE = .16$, $SE = .09$, $p = .07$). These results supported the hypothesis that impulsivity mediated the relationship between narcissism and vengeful driving (IE lower 95% CI = 0.10, upper 95% CI = 0.15). Because zero is not in the 95% confidence interval, the indirect effect is significantly different from zero at $p < .05$.

In sum, the findings from this study revealed that different variables predicted different types of unsafe driving practices. Driving anger was the only variable that emerged as a significant predictor of all types of unsafe driving behaviours (vengeful, aggressive, risky, and dangerous). Vengeful driving was predicted by gender, narcissism, driving anger and conscientiousness. Both risky and aggressive driving were predicted by gender, driving anger and risk-taking. Driving anger emerged as the only significant predictor of dangerous driving.

Discussion

The present research was conducted to assess the utility of combining driving anger, narcissism, impulsivity, sensation seeking, and risk-taking in order to increase the accuracy with which aggressive and unsafe driving behaviours could be predicted. The findings of this study replicated previous work suggesting that personality is related to aggressive driving behaviours and it also provided additional support for the utility of including multiple factors in the prediction in unsafe driving behaviours. It also provided support for the diversity of the aggressive driver suggesting that there is no universal profile of the unsafe driver.

Consistent with previous research (Dahlen, Martin, Ragan, Kuhlman, 2005; Deffenbacher et al., 2000; Deffenbacher et al., 2003), this study found additional support for the role of driving anger in predicting dangerous, aggressive and unsafe driving behaviours. In the current study, driving anger emerged as the strongest predictor of all types of unsafe driving behaviours. Driving anger was the only variable that significantly predicted all 4 outcomes – vengeful, risky, aggressive and dangerous driving behaviours. In isolation, driving anger accounted for 29% of the variance in dangerous driving, 18% of the variance in vengeful driving, 17% in aggressive driving and 14% in risky driving.

It seems that some individuals are more likely to become angry consistently across a variety of driving situations. Accordingly, these individuals engage in dangerous, aggressive, risky and vengeful driving behaviours more often than others, which, in turn, may also lead them to further inflame and endanger other motorists. These individuals may put others at risk both directly and indirectly by the responses

their behaviour may elicit. Thus, it appears that the present results suggest that individual differences in the tendency to experience anger while driving is an important and consistent predictor of all types of unsafe and accident related behaviours.

Although in the present study driving anger explained the most variance in all types of unsafe driving behaviours, gender, risk-taking, narcissism and conscientiousness all explained additional variance in certain aggressive driving behaviours. Gender was a significant predictor of vengeful, aggressive and risky driving behaviours, but did not emerge as a significant predictor of dangerous driving. Narcissism only predicted vengeful driving behaviours. General risk-taking predicted risky and aggressive driving behaviours, but interestingly it did not emerge as a significant predictor of vengeful or dangerous driving tendencies. The differences in these findings suggest that aggressive driving is not one consistent or homogeneous construct. It appears that some personality variables may increase the likelihood of engaging in certain types of roadway aggression, whereas others variables may contribute to an increased likelihood of engaging in other types of roadway aggression. Narcissism, for example, was found to contribute to retaliatory roadway aggression, but it did not seem to play a role in risky or general aggressive driving. The results provide evidence that different people will aggress on the roadways for different reasons and that these underlying motivations and diverse triggers are important and influential factors toward a more comprehensive understanding of aggressive driving behaviours.

The findings from the current study provide support for Deffenbacher, Petrilli, Lych, Oetting, and Swaim's (2003) position that the way in which an individual codes

and interprets driving related events influences their behavioural and emotional response. These authors suggested that two motorists encountering the exact same roadway situation may interpret it in very different ways leading to potentially very different responses. For example, if a driver cuts off another driver, one driver may become angry and interpret this as an insult, or as a personal attack that requires a retaliatory response. This interpretation of events may lead this motorist to try and catch up to the perceived offender and to try to punish or reprimand him/her in some way. He/she may try to cut the perceived transgressor off, or may follow the other motorist too closely or make obscene gestures toward him/her. These retaliatory behaviours may inflame or escalate the situation leading to even more roadway aggression. While another motorist may encounter exactly the same event, being cut off, but he/she may think that the offending driver is simply a bad driver and respond by trying to stay away from this motorist, avoid further interaction and focus on driving safely. Thus, two drivers who have experienced the same situation may interpret it differently leading to different emotional and behavioural responses.

Sensation Seeking and Impulsivity

Inconsistent with previous research, (Arnett, 1994, 1996; Arnett et al., 1997; Jonah, 1997) and contrary to the hypothesis, it was found that sensation seeking did not emerge as a significant predictor for any type of unsafe driving practices in the current study. A possible reason for the differences observed in the present study may be explained by the inclusion of other predictors in the regression analyses. Although sensation seeking was significantly correlated with all measures of unsafe driving

practices, when other predictors were entered into the regressions, it no longer emerged as a significant predictor. In the final regression models sensation seeking did not seem to account for any unique variance above and beyond other predictors. This may be partially explained by the role of general risk-taking. A propensity toward risk-taking emerged as a significant predictor of risky and aggressive driving behaviours. It appears that a general willingness to take risks is explaining variance in unsafe driving practices that is untapped by measures of sensation seeking and impulsivity. The results from the current study suggest that risky and aggressive drivers may recognize the risk associated with their driving behaviours, but are nonetheless, for a variety of reasons, still willing to take those risks. While sensation seeking and impulsivity have proven to be significant predictors of aggressive driving in previous studies and in the current study, these variables were correlated with many of the unsafe driving variables, in the multiple regression, they did not account for a significant portion of unique variance beyond that accounted for by the other predictors. The limited role of impulsivity in the present research may also be partially attributable to the instrument used to measure this construct. A limitation of this study was that only one measure of impulsivity was used and this instrument is related to decision making without an awareness of risks and consequences. It is possible that other impulsivity measures may prove to be more strongly linked to dangerous driving behaviours. Further study may be warranted in order to examine these discrepancies more closely.

Risk-taking

In the current study, a general tendency to take risks was found to contribute to certain types of unsafe driving practices. Risk-taking emerged as a significant predictor of aggressive and risky driving behaviours, but not of vengeful or dangerous driving behaviours. Although driving anger was the strongest predictor of all types of unsafe driving behaviours, a propensity toward risk-taking seems to explain a proportion of variance in unsafe driving practices that driving anger does not explain. No significant relationship was found in the correlation analysis between driving anger and risk-taking.

Driving can be considered a risky endeavor at all times, but a drivers' ability to balance risk with safety is a critical aspect of safe driving. While driving a motorist is constantly deciding what risk is worth taking or prudent to avoid. It seems that a general tendency toward risk-taking increases the likelihood of engaging in unsafe driving behaviours. Sometimes drivers may engage in risky or aggressive driving because they have not evaluated these behaviours as risky. They may drive unsafely inadvertently or because of an underestimation of the risks associated with the particular behaviour. The relationship between a general propensity and willingness to take risks and risky and aggressive driving behaviours found in this study, suggests that drivers engaging in these types of behaviours may recognize that there are risks involved in these driving practices, but for a variety of reasons are still choosing to engage in them. The balance between the potential risks involved in the behaviour (collisions, traffic violations) seems to be outweighed by the perceived benefits of the behaviour (getting somewhere quickly, outriving other motorists, fun). Unsafe driving practices such as speeding, following

too closely, passing illegally, driving on the shoulder, or driving while mildly intoxicated may be recognized as potentially risky, but for some drivers the benefits seem worth the risks. It may also be the case that individuals engaging in these types of driving behaviours do recognize that objectively the behaviour may be risky, but perhaps due to their inflated beliefs in their driving competence, or their illusion of invulnerability, they believe it to be less risky for them personally.

These findings also seem to suggest that retaliatory aggression, or vengeful driving behaviours are not motivated or triggered by the same factors that may contribute to other types of roadway aggression. A positive attitude toward risk-taking seems to increase the likelihood of engaging in aggressive and risky driving behaviours, but it does not appear to influence retaliatory roadway aggression. Individuals who are more likely to respond aggressively to perceived transgressors do not have an increased willingness to take risks in general. This cautious attitude toward risk-taking may deter them from engaging in risky and aggressive driving behaviours such as not wearing a seatbelt or driving quickly, because in these circumstances they may believe that the risks of a negative outcome do not outweigh the potential benefits. It may be the case that when it comes to vengeful driving behaviours, they do not perceive the interpersonal escalations that honking, or obscene gesturing may lead to, as being particularly risky or as having potentially dangerous outcomes.

Neuroticism and Conscientiousness

Regarding the roles of neuroticism and conscientiousness in unsafe driving behaviours, the present findings produced some mixed results. Consistent with previous

research, (Arthur & Doverspike, 2001, Arthur & Graziano, 1996), conscientiousness was found to be inversely related to unsafe driving practices, but only with that of vengeful driving. No significant relationship was found between conscientiousness and risky, aggressive or dangerous driving tendencies. Although conscientiousness was found to be correlated with risky and aggressive driving, in the final models it did not account for a significant portion of unique variance beyond that accounted for by other predictors. The expectation that neuroticism would be a useful predictor of unsafe driving was not supported by the current study. Neuroticism did not emerge as a significant predictor for any type of aggressive driving. Although it was correlated with vengeful driving, and with driving anger, it did not emerge as a significant predictor above and beyond other variables in the regression analyses.

Narcissism

Interestingly, narcissism predicted vengeful driving behaviours, but not dangerous, aggressive or risky driving behaviours. It was expected that narcissistic traits would add to the prediction of all types of unsafe driving practices, but the results from the study did not support this prediction. It appears that narcissistic traits may be valuable in predicting only specific subsets of aggressive driving – ones that are retaliatory in nature.

One potential explanation for this finding may have to do with the hypersensitive and defensive ego that is characteristic of narcissist individuals. Narcissists are individuals with conflicting senses of self. They have aspects of grandiosity and vulnerability. They seem preoccupied with demonstrating or defending their feelings of

superiority while simultaneously battling underlying feelings of inadequacy. Studies have found that narcissists are prone to derogate or lash out at others who have provided them with ego-threatening feedback in the form of social rejection or criticism (Bushman & Baumeister, 1998; Bushman, Bonacci, van Dijk, & Baumeister, 2003; Twenge & Campbell, 2003). Narcissists seem to be preoccupied with defending their rights, their abilities and their ego leading to an increased tendency to punish those who they believe have threatened or challenged them. Prior research has found that narcissists are quick to take offense and to externalize blame (Campbell, Reeder, Sedikides, & Elliot, 2000; McCullough, Emmons, Kilpatrick, & Mooney, 2003). The DVQ (Driver Vengeance Questionnaire) taps into responses made toward the frustrating and provocative driving behaviours of other motorists. Examples of such behaviours would be a motorist failing to yield the right of way at a stop sign when it is not their turn to proceed, or a driver honking or cursing, or a driver bypassing a queue of vehicles and then attempting to merge in front of other motorists at the last minute. For narcissists, these provocative behaviours may trigger their competitive and confrontational tendencies. These types of incidents may challenge or threaten their inflated self-views and acting out aggressively toward the perceived offenders may help to restore their fragile and defensive esteem. For the narcissist, being honked or cursed at may be perceived as personal affronts to their self-esteem. Individuals low on narcissism may not feel that these incidents are challenges or threats to their pride or abilities and may thus be more likely to drive on without further attempts at retribution.

The risky driving questionnaire taps into a tendency to engage in risky driving behaviours often motivated by a need to arrive to one's destination quickly. It includes questions such as: "I will drive in the shoulder lane or median to get around a traffic jam". The measure also taps into a tendency to engage in risky behaviours such as driving while mildly intoxicated, or driving without a seatbelt. In the current study, narcissists did not show an increased tendency to engage in these types of risky driving behaviours. It appears that narcissists are aggressive when they experience what they perceive to be a provocative encounter with other motorists and thus their aggression seems limited to one that is retaliatory in nature. They do not seem to be more willing to take risks behind the wheel or drive dangerously for purposes other than vengeance.

These findings highlight the importance of the role of intent or motivation behind aggressive driving behaviours. Narcissists do not seem to have an increased tendency to engage in risky or aggressive driving behaviours more so than their non-narcissists counterparts, unless they feel that other motorists have acted inconsiderately or provocatively. For narcissists a significant portion of their social interactions are dedicated to either demonstrating or maintaining their sense of superiority. They are hypervigilant to potential insults or challenges to their highly valued self-esteem. Narcissists have been found to be overly sensitive to criticisms, and to respond more aggressively than others to negative feedback or perceived insults (Raskin & Terry, 1988). They are also more likely to report that they have encountered interpersonal transgressions in their everyday lives (McCullough, Emmons, Kilpatrick, & Mooney, 2003). When other motorists drive in an inconsiderate or potentially provocative manner,

narcissists may be more likely to notice it, focus on it and perceive it as a transgression that requires addressing. Non-narcissistic individuals may be more likely to let these events go and perhaps fail to even interpret them as significant transgressions. The tendency for narcissists to experience more interpersonal transgressions on a daily basis suggests that they are perhaps hypervigilant and hypersensitive to these occurrences and are therefore more likely to address and therefore potentially inflame situations that their nonnarcissist counterparts may consider relatively benign and not worth pursuing.

Narcissistic individuals may be more likely to engage in retaliatory aggression in order to “right” a perceived wrong – but they do not seem to take more risks or drive more aggressively when provocation, or more specifically perceived provocation, is not present. It may be that narcissists drive with a vigilante attitude doing their part to enforce the rules of the road – even if that means acting aggressively or vengefully toward perceived transgressors. Narcissists may feel that people who drive in an inconsiderate manner should be reprimanded accordingly.

Another possible explanation for the relationship between narcissism and vengeful driving may lie in the heightened tendency of narcissists to infer hostile intent. Rhodewalt and Morf (1995) found that narcissists held more hostile views of others, experienced anger more frequently and interpreted their daily lives with a suspicious outlook (Rhodewalt & Morf, 1995). Narcissists seem preoccupied with maintaining their overly positive self-views and this constant vigilance may lower their threshold for taking offense at interpersonal events (McCullough et al., 2003). They approach and interpret the world with a heightened sensitivity regarding the intentions and actions of others.

From this perspective, the frustrating behaviour of other motorists may be viewed as a competitive confrontation toward which narcissists feel compelled to respond. They may not only feel challenged by the actions of the offending motorist but they may also believe that the intent of the motorist was to in fact challenge them or cause them some sort of stress. The perception of the causes of an event is an important determinant in the ensuing response. The hostile attribution bias refers to a tendency to perceive the actions of others as stemming from hostile intent (Baron & Richardson, 1994). Research has found a link between this tendency and the likelihood to engage in reactive aggression (Dodge, Murphy, & Berchsbaum, 1984; Dodge, Price, Bachorowski, & Newman, 1990). When narcissists encounter a motorist who drives in a frustrating manner, their heightened tendency to assume that the action was intended to challenge them may lead to more aggressive retaliatory responses. Non-narcissists may be less likely to assume that hostile intent was present, and hence less likely to engage in reactive and retaliatory aggression. The actions of the other motorist may be frustrating to most drivers, but without the presence of assumed intentionality, the need for retaliation is likely reduced. The hostile attribution bias has only been related to reactive, and not proactive aggression (Dodge et al., 1990). This distinction may help partially explain the current findings where narcissists are more likely to engage in vengeful driving behaviours, which are reactive in nature, but not more likely to engage in any other type of aggressive driving behaviours.

Another factor that may be relevant in this context is the role of forgiveness. A study by Exline, Baumeister, Bushman, Campbell, and Finkel, (2004) found that

narcissists tended to be more unforgiving than non-narcissists. In particular they found that narcissistic entitlement was a distinct predictor of unforgiveness. The authors of the study suggested that entitled individuals are more easily offended than others and are preoccupied with defending their rights and collecting on perceived interpersonal debts. This hypersensitivity and insistence on repayment that appears to be characteristic of narcissistic individuals leads to an unwillingness to forgive perceived transgressors. Their tendency to place a high value on self-respect, self-assertion and “face saving” leads them to see forgiveness as a costly and unappealing option (Exline, Baumeister, Bushman, Campbell, & Finkel, 2004). When another motorist behaves inconsiderately, the narcissist may feel compelled to retaliate because letting such an action go unpunished may be viewed by the narcissist as a sign of weakness. Narcissists may be reluctant to excuse or forgive transgressors because doing so may be too costly for their pride and their need for the restoration of justice.

Although narcissists appear to be more likely to aggress against perceived offenders, the motive behind this reactive aggression still remains somewhat unclear. The aggressive response may be a strategy to protect or restore a weak and threatened ego, but in some circumstances, it may be a response that is motivated by a sense of vigilantism. Narcissists may have rigid and fundamental beliefs about justice and fairness. It may be the case that they feel that it is their duty to maintain the rules of the road and when these rules of engagement are violated, narcissists may view retaliation as a necessary public service. They may want to punish transgressors because they believe that this maintains justice and fairness. It may be the case that narcissists have a stronger

need for justice than they do for forgiveness – and that they see the two as mutually exclusive. Narcissists may perceive forgiveness as a miscarriage or absence of justice and may thus feel compelled to punish or hold the transgressor accountable in order to restore moral order. Responding aggressively to the reckless driving of other motorists may be a way for the narcissist to express moral disapproval of the inconsiderate or dangerous behaviour. In their minds, retaliating may be the only acceptable option because not retaliating may be considered a sign of moral apathy. As the following excerpt demonstrates some drivers feel that rude and inconsiderate drivers must be taught a lesson for the good of the public and society at large:

Just before the on-ramp entrance I let one of the cars go in front of me. I thought I had saved this person a great deal of trouble and that he would be thankful that I let him go ahead of me. But instead of getting the wave, I got nothing. I didn't even see a quick gesture of thanks. Immediately, I became infuriated. I don't understand why some people are so rude. What would society be like if everyone were like this rude person? Maybe I should have just made him wait his turn. How hard is it to wave anyway? Any civilized person would do it. But this person is hardly civilized. I wanted to teach that person a lesson. I decided not to leave it to other forces to teach him a lesson. I had to be the punisher (James & Nahl, 2000, p.78).

It may be the case that narcissists retaliate because they believe that it is the right and necessary action to take. It seems that they are bothered by transgressors and believe that they should be justly punished but it remains unclear as to whether the punishment

serves to restore the narcissist's wounded ego, or if it serves to restore their sense of justice and law and order.

Narcissism and Impulsivity

The current study revealed a significant relationship between narcissism and vengeful driving behaviours. Interestingly, no significant relationship was found between narcissism and aggressive, dangerous or risky driving behaviours. As a result, the mediating role of impulsivity was only examined within the context of the relationship between narcissism and vengeful driving.

The prediction that impulsivity mediated the relationship between narcissism and vengeful driving was supported by the findings from this study. In isolation narcissism was a significant predictor of vengeful driving behaviours. But when impulsivity was added to the regression the influence of narcissism on vengeful driving was greatly reduced. The findings of this study provide evidence in support of Vazire and Funder's position that relatively narcissistic individuals are poor self-regulators with an increased probability of engaging in some types of aggressive or risky behaviours. Although the link between narcissism and poor impulse control is not clear, there is evidence that narcissistic individuals drink heavily (Luhtanen & Crocker, 2005), tend to be sexually promiscuous (Foster, Shrira, & Campbell, 2006), and make irrational bets and gambling decisions (Campbell, Goodie, & Foster, 2004). As mentioned previously, narcissists have been found to respond aggressively to insults and criticisms. Why this may be the case remains unclear, but Vazire and Funder (2006) have suggested that narcissists tend to lash out because they are overcome by impulses that they are unwilling or unable to

control. The findings from this study provide support for the position that the aggression manifested by narcissists is linked to their impulsive temperament. Vengeful driving is a specific subtype of aggressive driving that focuses on responses to the frustrating behaviours of other motorists. Reactive aggression, such as vengeful driving, has been characterized as impulsive and automatic in nature (Zillman, 1994). For the narcissist being cut off or honked at by another driver may be interpreted as an insult deserving of retribution. The vengeful seeking tendencies of narcissists may lead them to want to retaliate against wrong-doers and their impulsive disposition may reduce the likelihood that they will restrain themselves from seeking what they believe to be just retribution. Their need for immediate gratification, which in this case appears to be retribution, appears to lead to an aggressive retaliatory response toward the perceived offender. Narcissists have been found to be motivated to engage in behaviours that they deem rewarding, and that may provide benefits in the realm of self-enhancement or increased status or dominance. In the case of retribution for a perceived driving offence it seems that narcissists are more apt to pursue their goal of dominance, validation or vengeance in an immediate and forceful manner than their non-narcissists counterparts. Their impulsive disposition may limit their ability to put the brakes on their need to provide perceived transgressors with the retribution that is deemed to be deserved.

Foster, Shenese, and Goff (2009) have suggested that narcissists may take more risks than others because they are strongly governed by the benefits of rewards and this eagerness toward gratification leads them to engage in problematic behaviours such as gambling or drinking. According to Foster et al., (2009) narcissists take risks because

they are overly sensitive toward potential gains or rewards. The reward of giving a motorist who has engaged in a driving transgression seems to be a worthwhile pursuit for the narcissist. But engaging in risky driving practices in order to reach one's destination faster does not seem to be a reward worth pursuing.

This study supported previous research that found narcissists to have realistic outlooks in assessing risks. Narcissists did not demonstrate a tendency to engage in risky driving nor did they demonstrate a heightened willingness to take risks. But, interestingly, the findings from this study did not find that narcissists held unrealistic outlooks when assessing their own driving abilities. No significant relationship between narcissism and perceived driving ability emerged. Individuals with elevated narcissistic traits did not inflate their ratings of their own driving abilities more so than individuals low on narcissistic traits. Narcissists may engage in riskier behaviours because they overestimate their abilities in other areas such as gambling or problem solving, but their perception of their driving skills did not appear more inflated than that of non-narcissists and this may help to explain why they are not more likely to engage in risky driving behaviours.

In the current study, the relationship between narcissism and risk-taking or risky driving did not emerge as significant. Although individuals with narcissistic traits were found to be more impulsive they did not appear to be greater risk takers. The lack of association between narcissism and risk-taking may be partially explained by the self-enhancement patterns of narcissists. It has been well-established that narcissists have a heightened tendency to self-enhance (Campbell, Rudich, & Sedikides, 2002; Rhodewalt

& Morf, 1998). They have overly positive self-perception and they tend to overestimate their skills and abilities. But this chronic self-aggrandizement has been found to follow a particular pattern. Narcissists do not self-enhance in all areas of life. This propensity toward the better-than-average effect that is characteristic of narcissists has been associated with specific traits. Narcissists tend to see themselves as superior on traits such as intelligence and attractiveness and they have been found to overestimate their status and importance as well as their contribution to group tasks (Campbell et al., 2002; Gabriel, Critelli, & Ee, 1994; John & Robins, 1994). But, interestingly, the findings from the current study revealed that narcissists' perceptions of their driving abilities was not enhanced any more so than those of non-narcissists. It is perhaps the case that driving ability may not be an area in which narcissists self-perceptions are overly positive, or at least, not any more so than their non-narcissist counterparts. This lack of self-enhancement in the driving domain may help explain the lack of association between risky driving and narcissism. In areas such as gambling or prediction of scores on tasks, narcissists may be more likely to expect a positive and superior outcome and thus engage in riskier behaviours because they overestimate their skills in these arenas and therefore see their success or inflated predictions as likely. But in the case of driving, they may be more reluctant to take risks, because they are not convinced that they have the skills needed to engage in risky driving practices. It may be the case that being a superior driver does not contribute to a sense of intellectual or social superiority that narcissists seem to crave and actively pursue. Males in general seem to associate superior driving

abilities with their sense of male identity but narcissists do not appear to need to include this ability in their repertoire of superior skills.

Another explanation for the lack of association between narcissism and risky driving may lie in the motivation behind the risk-taking activity. Lakey, Rose, Campbell and Goodie (2008) conducted a study investigating the relationship between narcissism and gambling. Their research revealed a link between narcissism and gambling in general, as well as gambling related problems. Their study also found that the link between gambling pathology and narcissism was partially mediated by narcissists' overconfidence and their willingness to take risks. The authors of this study suggested that narcissists tend to be governed by the immediate prospect of reward and this heightened sensitivity toward reward makes them more likely to ignore or dismiss potential risks. But it may be the case that the rewards offered by risky driving lack the appeal that make taking the risk potentially worthwhile. The benefits of risky driving may not be appealing to narcissists or perhaps not appealing enough that they minimize or dismiss the risks involved. Getting to their destination faster may not be a worthwhile enough reward for the narcissist. This combination of lack of self aggrandizing within the driving domain coupled with the potential lack of appeal of the reward involved in risky driving may lead narcissists to refrain from engaging in unsafe driving practices beyond retaliatory aggression toward other motorists.

The findings from this study seem to support the position that narcissists are cognizant of the risks involved in risky behaviours but because they are overly eager to receive the potential rewards associated with the risky behaviour the risk is worthwhile to

them. In other words, they are aware of the potential risks associated with risky behaviour but if the reward is tantalizing enough the risk becomes worthwhile. Risky driving, aggressive driving, or general risk-taking does not seem to be an attractive enough reward for the narcissists. However, giving a perceived transgressor his/her “just dessert” seems to be an outcome worth pursuing.

Anger and narcissism

Consistent with previous research (Lustman et al., 2010), no significant relationship was found between driving anger and narcissism. Individuals high on narcissism did not seem to anger more easily while driving than did individuals low on narcissism. Research on the relationship between anger and narcissism has provided some mixed results. An initial study by McCann and Biaggio (1989) found that individuals with elevated narcissistic traits exhibited greater arousal of anger and were more likely to express their anger verbally than those with low narcissistic traits. However, in this same study, when a different anger expression scale was used, no differences emerged between high and low narcissists and anger. Much of the research on the relationship between anger and aggression and narcissism has focused on anger felt by individuals after they have experienced rejection or criticism by others. Twenge and Campbell (2003) found that narcissists reported more anger than non-narcissists after experiencing social rejection when told that no members of a group they had just met had picked them to work with on a group project. A study by Rhodewalt and Morf (1998) conducted a study where participants who believed that they were being given a series of IQ tests were given feedback of either success or failure while taking the test. Results

indicated that those with high NPI scores reacted with the most anger when given failure feedback after having initially been given success feedback. Research by Bushman and Baumeister (1998) found that narcissists were most likely to respond aggressively, when given the opportunity to deliver blasts of noise to an individual who had criticized their written work. The findings from these studies indicate that narcissists are more prone to anger and aggression when their esteem has been threatened by negative feedback that questions their social or intellectual abilities. But inconveniences and frustrations encountered while driving do not seem to trigger the narcissist's anger or aggression, unless they interpret them as provocative.

The results indicated that there was not a significant association between driving anger and narcissism in the current research. This could, in part, be due to the narcissism measure that was used. A recent development is the creation of a measure of pathological narcissism (Pincus et al., 2009). This scale was created out of concerns that the NPI does not tap more extreme and destructive forms of narcissism. Thus, further research on the correlates of aggressive driving with this newer instrument is indicated. The lack of association between driving anger and narcissism may also be partially explained by the fact that when the aggravating behaviours of other motorists do not pose any threats to the narcissists' fragile egos they do not appear to get angrier than individuals with low narcissistic traits. A person driving slowly in the fast lane or being stuck in a traffic jam does not appear to challenge the narcissist's self-worth. Having someone else engage in frustrating driving behaviours may be an inconvenience that impedes one's progress, but for narcissists it appears that as long as their ego or esteem is

not on the line their tendency to get angry behind the wheel is not any different than their non-narcissist counterparts. Interestingly, even when narcissists respond more aggressively, as when seeking retribution for the frustrating driving behaviours of other motorists, they do not seem to experience more anger than non-narcissists. For narcissists, it appears that the same level of anger translates more easily into aggressive responses, particularly in instances of retribution, than it does for their non-narcissist counterparts. For narcissists, anger appears to be a call to action – or perhaps a knee jerk response that their impulsive disposition prevents them from controlling.

Gender

In this study, significant gender differences emerged on vengeful, aggressive and risky driving behaviours as well as on self-ratings of driving competence. No significant gender differences were found for narcissism, driving anger, impulsivity, or risk-taking.

The results revealed that men were more likely to engage in various types of aggressive driving behaviours than were women. These findings are consistent with much of the research on aggressive driving (Deffenbacher, et al., 2003; Deffenbacher et al., 2000; Hemmway & Solnick, 1993). The gender differences in roadway fatalities also seem to be consistent with the finding that males engage in more aggressive and unsafe driving practices than females.

Consistent with previous research (Deffenbacher et al., 2000, Deffenbacher et al., 2003a), no gender differences in driving anger emerged in the current study. Although the incidents that anger males and females on the roadways may differ, the overall levels of anger in response to roadway frustrations appear to be equal. These results seem to

suggest that certain unsafe driving practices such as risky driving may not necessarily be a function of increased driving anger. Females may be feeling as angry as males when encountering roadway frustrations, but it appears that this anger does not translate as readily into aggressive or risky driving behaviours for females as it does for males.

An interesting finding from this study was that drivers judged their own skills as superior to those of the average driver and this sense of perceived superiority was significantly stronger for males than for females. The mean for self-rating driving ability was 64% for females and 80% for males. Women showed significantly less self-enhancement biases in regards to perceived driving abilities than did males. This differential pattern of self-enhancement may help to partially explain differences in male and female driving behaviours.

One of the problematic implications of the belief that one is a more skilled driver than the average driver is that this inflated sense of competence may lead to an overconfidence that increases the likelihood of engaging in risky driving behaviours. Dangerous drivers may not necessarily be those with low driving skills, but those with an exaggerated belief in their competence leading to an increased willingness to take risks. The tendency to see oneself as a superior driver is likely to contribute to a feeling of relative invulnerability to the potential hazards associated with risky and reckless driving behaviours. Studies have revealed that drivers who think that they are more capable than other drivers tend to think that they are at less risk of crash than others (DeJoy, 1989; Harré, Foster, & O'Neill, 2005; Harré & Sibley, 2007).

Males have been found to have more motor vehicle collisions, to use seatbelts less frequently, and to speed and commit violations more so than females (Jonah, 1990). The tendency to overestimate one's driving abilities may increase the likelihood of engaging in these types of driving practices because the overconfidence leads to an often erroneous belief that one can avoid or outdrive the potential negative consequences associated with these behaviours. Refraining from speeding, or from following too closely seems like an unnecessary burden if one believes that one's superior driving abilities will allow one to engage in these behaviours and escape unscathed. Individuals who believe that their driving skills are superior to the average driver may believe that things such as speeding restrictions are directed at drivers who are not as skillful as they are. They may believe that risky driving behaviours are risky – but only for those who are less skilled than they are.

This inflated sense of driving ability may reflect an attitude about masculinity where being a skilled, or more precisely, a particularly skilled, driver is an important part of the male identity. Researchers have studied the role of macho personality on aggressive driving and have found that men endorsing a “macho personality” were more likely to drive aggressively than other men (Krahe & Fenske, 2002). Ozkan and Lajunen (2005) found that the number of driving offences as well as aggressive violations increased as a function of masculinity. This inflated sense of driving competence may also help explain the gender differences in accident rates and aggressive driving in general. If an individual considers him/herself to be an excellent driver he/she is also likely to believe that he/she is less vulnerable to accidents than others and will have less

incentive to engage in self-protective behaviours (Horswill, Waylen, Tofield, 2004). But males, who appear overly confident about their driving abilities, may believe that they are capable of engaging in risky driving behaviours but with a limited likelihood of facing the potential negative consequences of the behaviour. Women, who do not appear to be overly confident in their driving abilities, may be less likely to speed or engage in risky driving behaviours because they may not feel that they have the necessary skills to take such risks and drive in such a manner without increasing the risk of a negative outcome.

Although differences in perceived driving abilities between males and females have emerged in the research (Harré, 2000; Harré et al., 2005) actual gender differences in driving skills has remained largely unexplored in the driving research. A few studies have looked at accident rates, causes of accidents, and licensing patterns to see if any sex-differences in driving abilities may be inferred. A study conducted in Finland in 1998 found that young males in Finland required fewer attempts than young females to pass the driving test (Katila, Keskinen, Hatakka, & Teoriakokeen, 1998). Research in Europe looking at sex-differences in fatal loss-of-control accidents among young drivers found that male crashes tended to occur at night and on weekends and males were more likely to drive too fast and to be under the influence of alcohol (Laapotti & Keskinen, 1998). The study also found that although females had a greater safety orientation than males, young female drivers were more prone to lose control of their vehicles on slippery roads (Laapotti & Keskinen, 1998). The authors of this study concluded that lack of vehicle handling skills may be a crucial factor in accidents involving females while risky and reckless driving practices may be crucial for those involving males.

Interestingly, although a significant gender difference was found for risky driving behaviours in this study, no gender differences emerged in general risk-taking. Males and females did not differ significantly in their willingness to take risks. A general propensity to take risks may not differ between males and females, but the specific domains in which they are willing to engage in risky behaviours may be influenced by gender and perceived competence of the task at hand.

The gender difference found in risky driving may be partially attributable to the level of confidence in driving skills and the perceived ability to handle a potentially hazardous driving situation. Risk-taking behaviour is influenced by the perceived risk of the outcome of the behaviour in question. Perceived probability of an accident or of the severity of an accident may influence the level of perceived risk of a driving behaviour. If speeding or driving along the shoulder is viewed as low risk behaviour then it is more likely to be undertaken. One does not necessarily have to be a risk-taker in order to engage in what by objective standards may be risky, such as speeding or weaving in and out of traffic, but what by subjective evaluation seems manageable and low risk. If one is confident in one's ability to safely navigate through what may be a risky behaviour then the likelihood of undertaking it is also elevated. The combination of males' perceived driving ability, coupled with their likely evaluation of the behaviour being a low risk one for them may increase their tendency to drive in a reckless or risky fashion. Males' belief that they have the necessary skills to handle hazardous driving situations may lead to an increased tendency to engage in such actions. Females, with a lower confidence in their own driving competence, appear to be more reluctant to engage in risky driving

behaviours. Of course, if car crashes are considered a reliable indicator of driving ability then males' misguided and illusory beliefs about their superior driving skills appear to lead to very dangerous and serious consequences. Self-enhancement within the driving arena may not be as benign or innocuous as enhancement in other domains. The previously mentioned statistic of males being three times more likely to die in a car crash than females may be partially explained by their willingness to take driving risks that they may have erroneously evaluated as safe, or at least safe for them.

Conclusion

The results from the current study demonstrated that the addition of other personality factors beyond driving anger improved the prediction of unsafe driving practices. Although driving anger explained the most amount of variance in all types of unsafe driving behaviours, risk-taking and narcissism did provide additional utility in the prediction of risky and vengeful driving.

The issue of intent or motivation behind aggressive driving has emerged as an important distinction in this study. The findings reveal that aggressive drivers are not a homogeneous group. Driving aggressiveness seems to be motivated and triggered by a variety of factors. It appears that different motorists engage in unsafe driving behaviours for different reasons suggesting that there is not one specific or universal profile of the aggressive driver. Personality may influence not only the manner in which an individual tends to drive, but also how an individual responds to various driving situations. The diverse motivations behind speeding or passing or generally driving unsafely brings to

the forefront the difficulty of reaching a consensus on the appropriate definition and measurement of aggressive driving and drivers.

The current study found that narcissists were more likely to engage in vengeful driving behaviours. Their reactive aggression seemed to be motivated by intent to harm or punish perceived transgressors. Although prior research has identified a link between narcissism and revenge seeking behaviours the motivation behind this tendency remains unclear. This may be motivated by narcissists' need to right a perceived wrong, but it remains unclear as to whether the offending behaviour offends them personally or if it offends their greater sense of justice. Narcissists may respond aggressively because they feel personally challenged and thus feel a need to assert themselves to restore their brittle self worth, or they may be retaliating because they are governed by a vigilante attitude and consider retaliation a public service. Their vengeance may be motivated by a belief that the offenders need to be taught a lesson and receive their just desserts. Though a clearer understanding of the motivation behind the aggression is needed, the current study did find that impulsivity mediated the narcissism-vengeful driving relation. The gratification provided for by retaliating against offending motorists seems to be a temptation that narcissists are unable or unwilling to put the brakes on.

The current study added to the literature by demonstrating the importance of combining various predictors and examining their roles in different types of unsafe driving practices. The findings revealed that certain personality variables are likely to contribute to certain unsafe driving practices – but not to others. Risky and reckless

drivers may require different interventions and strategies to reduce dangerous driving practices than those needed by aggressive or vengeful drivers.

It is hoped that the present research will contribute to a better understanding of the specific triggers and personalities that may lead to various aggressive driving behaviours which may be useful for driver training programs and safety campaigns aimed at reducing the occurrence of dangerous driving behaviours. Tailoring driving related programs to the differences in gender, personality and their respective relationships to unsafe driving practices may be beneficial in reducing both the instances of aggressive driving and their costly consequences.

Limitations

The current findings need to be evaluated within the context of several limitations. The gender imbalance (96 women, 21 men) in the present sample places limits on the degree to which the findings can be generalized. This problem was anticipated, but nonetheless, this imbalance does present a problem in the applicability of these findings to the male population.

Another important limitation of this study is that the sample consisted entirely of university students enrolled in psychology courses. Previous research has shown that age is negatively related to driver aggression. Drivers under the age of 30 have been found to be involved in more accidents than other drivers, and drivers under the age of 25 have the highest rate of fatal collisions (Hemenway & Solnick, 1993, Wiesenthal, Hennessy, & Gibson, 2000, NHTSA, 2007). It is clear that the restricted age range of the current

sample has important implications for the generalizability of the findings. It would be important for future research to include a wider age range.

The current study also used retrospective self-report measures instead of alternatives such as performance on a driving simulator or driving logs. This may be problematic in that these results may not accurately reflect the ways in which these individuals might react in an actual driving situation. Envisioning being stuck in a traffic jam, or having another motorist cut in front of you may not bring forth the same emotions or reactions that being in that actual situation would. Similarly, driving simulators may also pose a generalizability problem and may not realistically evoke the feelings of anger or frustration that drivers may feel on the roadways. Risky driving is risky because of the consequences the driving behaviours may have. On driving simulators the consequences of speeding and running stop signs are almost entirely absent. Running into a car or a pedestrian on a simulator in no way accurately reflects the consequences of the same event on the roadways.

Common method variance is another potential concern that must be taken into consideration in the current study. Common method variance refers to variance that is attributable to the measurement method rather than to the constructs the measures represent (Wåhlberg, Dorn & Kline, 2010). In the present study, information on both the predictor and outcome variables were gathered from the same source, through self-report questionnaires. It has been recognized that data collected from a single source can introduce systematic variance into the measures and potentially lead to an artificial increase or decrease of associations between the variables (Wåhlberg, Dorn & Kline,

2010). Social desirability, a desire to maintain consistency in responding as well as the participants' mood at the time of the testing are all factors that may contribute to a systematic bias in response style. However, the findings from the current study revealing that different variables predicted different types of unsafe driving behaviors suggests that the use of self-report questionnaires did not lead participants to respond in a consistently or seemingly systematically biased way. Narcissists were not systematically endorsing all types of unsafe driving behaviours, they only displayed an increased tendency to engage in vengeful driving behaviours but did not indicate a heightened tendency to engage in risky or dangerous ones. This difference between various types of unsafe driving behaviours and various respective predictors suggests that the potential impact of the overlap of the outcome measures, as well as the potential systematic biases associated with single source measurement, was of limited concern in the current study. The various influences of certain predictors on certain outcomes and not others suggest that the outcome variables measured distinct constructs that tapped into different types of unsafe driving practices.

In order to reduce the concern and minimize the potential impact of method variance in driving research, Nesbit, Conger and Conger (2006), have emphasized the importance of studying driving aggression using multiple techniques. Future research may seek to replicate these findings and further explore them using various techniques such as driving simulators, driving logs, voice activated tape recorders, and peer ratings. Driving logs are also retrospective in nature and thus may suffer from the same limitations as self-report measures. With the growing concern of the effects of

distractibility on driving safety, it would not seem prudent to ask drivers to record their behaviours and emotions while on the roadways.

Future Directions

The limited role of impulsivity and sensation seeking in the current study in predicting unsafe driving behaviours was unexpected and surprising. Since many incidents of aggressive driving seem to be impulsive responses to frustrating circumstances it was expected that impulsivity would emerge as a significant predictor. Future research may want to explore the relationship between driving anger, impulsivity and driver aggression with various measures in order to better understand their influence on aggressive driving. Future studies may also want to further explore the link between impulsivity and aggressive driving and examine the potential mediating role of driving anger.

A surprising finding in the current study was that narcissists did not inflate their driving abilities any more so than their non-narcissist counterparts. Narcissists are generally vigilant in maintaining their inflated and grandiose sense of self. Their lack of self-aggrandizing in the driving domain suggests that their self esteem may not be closely linked with their driving ability. It may therefore be the case that their retaliatory aggression on the roadways is not governed by a need to maintain a grandiose sense of self – since within the domain of driving they do not seem to have an inflated sense of competence. Future research may focus on exploring the intentions behind the vengeful driving behaviours and examining whether there is a self-serving or perceived public-serving basis/motivation to the retaliatory response.

Future research may also attempt to replicate the current study with samples including a more balanced ratio of males and females and perhaps with a non-college population. Sensation seeking, impulsivity, risk-taking and gender may be factors that influence older drivers differently than college-age drivers. Further research may also seek to examine the motivational aspect of various unsafe driving behaviours. A clearer understanding of the relationship between personality and specific types of unsafe driving is needed in order to better understand the diversity and complexity of dangerous driving behaviours.

In order to achieve the goal of reducing deaths and injuries caused by unsafe driving behaviours driving training programs and safety campaigns may seek to increase the public perception of the risks involved in aggressive driving behaviours. An inflated sense of driving competence may contribute to an increased tendency to engage in risky and dangerous driving behaviours and to feelings of invulnerability. Increasing public perception of the risks involved in unsafe driving behaviours may help drivers develop a more realistic appraisal of the potential consequences of risky and dangerous driving behaviours and help to reduce the dangerously misguided feelings of invulnerability associated with overconfidence in driving skills.

Driving training programs and education campaigns dedicated to reducing aggressive driving behaviors may be more specifically designed to educate motorists and law enforcement as to the various types of aggressive drivers while, emphasizing that there is no universal profile of the aggressive driver. Unsafe driving behaviours make the roadways more dangerous for all users and the diversity of the various motivation and

triggers that may initiate or escalate these behaviors need to be better understood. Driver education programs may expand their defensive driving curriculum to include an understanding of the different profiles of the aggressive driver and incorporate strategies that help promote forgiveness when faced with the frustrating behaviors of other motorists. With the growing number of vehicles and the rising number of drivers on the roadways it follows that the diversity of motorists has also increased. The roadways are not reserved for any one type of driver and promoting an understanding that at one time or another most drivers, even the most skilled, may behave in a seemingly incompetent or frustrating manner may be beneficial to promoting a more forgiving and less confrontational driving environment. The current study revealed the importance of the context in which driving aggression may occur. The various reasons behind why a motorist may have engaged in frustrating driving behaviors seems to be an important consideration both because of the influence the interpretation of the initiating actions may have on the ensuing response and because attempts to reduce or limit aggressive driving can only be successfully achieved with an accurate diagnosis of why the behavior may have occurred in the first place. When motorists believe that other drivers have behaved in an inconsiderate, selfish or pushy manner the need for retaliation seems to be heightened. It appears that in terms of reactive aggression, the behavioural outcome of the initiating transgression is not as important as the perceived intent behind the action. Driving education programs may focus on teaching motorists to think of alternative explanations to the transgressions of other drivers besides explanations centered on the inherent incompetence or inconsiderate nature of the offending motorist. Explanations

that are more forgiving such as potential situational reasons for the mistakes or an understanding that perhaps the driver may have been temporarily overwhelmed or in unfamiliar territory may reduce the desire to lash out at perceived offenders.

In summary, the present research added to the literature by demonstrating the utility of combining driving anger, narcissism, impulsivity, sensation seeking and risk taking in the prediction of various unsafe driving behaviours. Although driving anger emerged as the strongest predictor of all types of aggressive driving behaviours, it was interesting to note that certain personality factors contributed to some types of driver aggression but not to others. This study revealed the importance of further understanding the diverse profile of the aggressive driver and the significance of the underlying motivations and various triggers that lead to the occurrence of such potentially dangerous behaviours.

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Table1
Means and Standard Deviations for Demographic Variables

Variables	N	Mean	Standard Deviation
Age	118	22.46	5.87
Years Driving	118	4.5	5.41
Driving Ability	118	67.48	23.34

Table 2
Means and Reliability Coefficients of Measures

Variable	Mean	Standard Deviation	Alpha Reliability	Number of Items
DVQ	27.46	6.65	.78	15
DAS	40.36	10.65	.88	14
AD	13.96	5.45	.88	7
RD	19.73	6.94	.87	11
DDDI	54.74	15.31	.93	28
NPI	14.75	6.37	.82	40
Impulsivity	62.74	10.30	.81	19
SS	16.69	2.82	.74	11
RPS	40.00	5.97	.78	7
Conscientiousness	28.61	4.63	.72	9
Neuroticism	23.96	5.30	.76	8

Note. DVQ = Driving Vengeance Questionnaire, DAS = Driving Anger Scale, AD = Aggressive Driving, RD = Risky Driving, DDDI = Duala Dangerous Driving Index, NPI = Narcissistic Personality Inventory, SS = Sensation Seeking, RPS = Risk Propensity Scale.

Table 3
Skewness and Kurtosis Values

Variable	Skewness	Standard Error	Kurtosis	Standard Error
DVQ	.53	.22	-.26	.44
DAS	-.05	.22	-.63	.44
AD	1.10	.22	.62	.44
RD	1.02	.22	1.05	.44
DDDI	.53	.22	.24	.44
NPI	.02	.22	-.22	.44
Impulsivity	-.37	.22	.57	.44
SS	.15	.22	-.14	.44
RPS	-.26	.22	-.33	.44
Conscientiousness	-.09	.22	-.46	.44
Neuroticism	-.29	.22	.24	.44

Note. DVQ = Driving Vengeance Questionnaire, DAS = Driving Anger Scale, AD = Aggressive Driving, RD = Risky Driving, DDDI = Duala Dangerous Driving Index, NPI = Narcissistic Personality Inventory, SS = Sensation Seeking, RPS = Risk Propensity Scale.

Table 4
Bivariate Correlations Among All Variables

	1.	2.	3.	4.	5.	6.	7	8	9	10
1. DVQ										
2. DDDI	.51**									
3. RD	.51**	.76**								
4. AD	.67**	.77**	.78**							
5. DAS	.43**	.54**	.37**	.41**						
6. NPI	.21*	.15	.16	.17	.06					
7. Impul.	.29**	.35**	.26**	.28**	.28**	.19*				
8. RPI	.13	.21*	.29**	.28**	.08	.10	.14			
9. Cons.	-.29**	-.12	-.26**	-.23*	-.12	.07	-.08	-.25**		
10. Neur.	.26**	.17	.06	.13	.28**	-.22*	.14	.01	-.24**	
11. SS	.23**	.26**	.26**	.25**	.11	.27**	.57**	.20*	-.15	-.10

Note: DVQ = The Driving Vengeance Questionnaire, DDDI = The Dula Dangerous Driving Index, RD = Risky Driving, AD = Aggressive Driving, DAS = Driving Anger Scale, NPI = Narcissistic Personality Inventory, RPS= Risk Propensity Scale, Conscient. = Conscientiousness, Neurotic = Neuroticism, SS = Sensation Seeking.

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

Table 5
Gender Differences Among all Variables

	Males (n=21)		Females (n=96)			
	Mean	SD	Mean	SD	t	p
Driving Ability	79.90	12.67	64.81	24.27	-.270	.008
DVQ	31.14	7.93	26.66	6.09	-2.89	.005
RD	23.00	8.38	19.02	6.41	-2.43	.017
AD	17.81	5.70	13.11	5.04	-3.78	.000
DDDI	60.29	17.98	53.53	14.49	-1.85	.067
DAS	43.81	12.26	39.62	10.19	-1.65	.103
NPI	14.71	5.87	14.75	6.50	.023	.98
Impulsivity	60.43	13.77	63.24	9.40	1.13	.259
RPS	42.14	8.04	40.16	8.95	-1.81	.073
Neurotic	25.67	5.27	23.59	5.26	-1.64	.103
Conscient.	27.43	5.28	28.86	4.46	1.29	.198
SS	17.71	2.04	16.15	2.16	.42	.673

Note. DVQ = The Driving Vengeance Questionnaire, RD = Risk Driving, AD= Aggressive Driving, DDDI = The Dula Dangerous Driving Index, RD = Risky Driving, AD = Aggressive Driving, DAS = Driving Anger Scale, NPI = Narcissistic Personality Inventory, RPS= Risk Propensity Scale, Conscient. = Conscientiousness, Neurotic = Neuroticism, SS = Sensation Seeking.

Table 6
Summary of Multiple Regression Analysis for Variables Predicting Vengeful Driving (DVQ)

	<i>B</i>	SE	β	t	p
Gender	3.20	1.38	.19	2.33	.022
Narcissism	.21	.09	.20	2.42	.017
Impulsivity	.07	.07	.11	1.07	.289
Driving Anger	.18	.05	.29	3.47	.001
Risk-taking	.01	.09	.01	.12	.904
Sensation Seeking	.12	.15	.08	.78	.438
Conscientiousness	-.28	.12	-.19	-2.35	.021
Neuroticism	.18	.11	.14	1.65	.103

Table 7
Summary of Multiple Regression Analysis for Variables Predicting Risky Driving.

	<i>B</i>	SE	β	<i>t</i>	P
Gender	3.49	1.52	.19	2.33	.023
Narcissism	.08	.09	.07	.83	.409
Impulsivity	.08	.07	.13	1.17	.244
Driving Anger	.18	.05	.28	3.14	.002
Risk-taking	.22	.10	.19	2.21	.029
Sensation Seeking	.10	.17	.07	.64	.524
Conscientiousness	-.24	.13	-.16	-1.83	.069
Neuroticism	-.11	.12	-.08	-.88	.381

Table 8
Summary of Multiple Regression Analysis for Variables Predicting Dangerous Driving

	<i>B</i>	SE	β	<i>t</i>	P
Gender	4.57	3.14	.12	1.45	.149
Narcissism	.18	.20	.07	.91	.365
Impulsivity	.23	.15	.16	1.58	.118
Driving Anger	.63	.12	.44	5.24	.000
Risk-taking	.41	.24	.14	1.74	.085
Sensation Seeking	.28	.36	.08	.77	.444
Conscientiousness	.04	.27	.01	.13	.895
Neuroticism	.11	.25	.04	.45	.655

Table 9
Summary of Multiple Regression Analysis for Variables Predicting Aggressive Driving.

	<i>B</i>	SE	β	t	P
Gender	4.23	1.14	.30	3.78	.000
Narcissism	.08	.07	.09	1.15	.250
Impulsivity	.08	.05	.15	1.47	.144
Driving Anger	.14	.04	.28	3.31	.001
Risk-taking	.17	.08	.19	2.27	.025
Sensation Seeking	.08	.13	.07	.64	.523
Conscientiousness	-.12	.09	-.10	-1.22	.225
Neuroticism	-.02	.09	-.02	-.19	.845

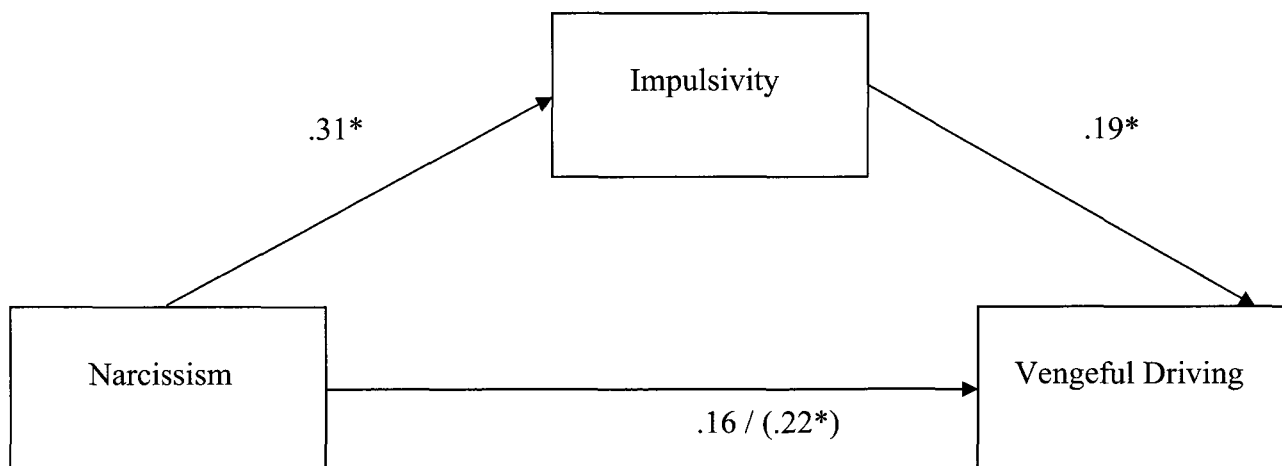
Table 10
Regression Analysis for Variables predicting Driving Anger.

Variable	<i>B</i>	SE	β	t	p
Gender	5.10	2.48	.18	2.06	.061
NPI	.02	.16	.01	.15	.883
Impulse	.34	.11	.33	3.05	.003
SS	.20	.27	.08	.75	.454
Risk-taking	.09	.16	.05	.55	.583

Note. SS= Sensation Seeking

Figure 1

Path model of the relations between narcissism, impulsivity and vengeful driving. The path coefficients are standardized regression coefficients. The value before the slash represents the direct effect of narcissism on vengeful driving. The value after the slash, in parentheses, is the total effect of narcissism on vengeful driving. $*p < .05$.



Appendix A

Narcissistic Personality Inventory (NPI)

Sex: _____

Age: _____

INSTRUCTIONS: The NPI consists of a number of pairs of statements which you may or may not identify. Consider this example: A "I like having authority over people", verses B "I don't mind following orders". Which of these two statements is closer to your own feelings about yourself? If you identify more with "liking to have authority over other people", then with "not minding following orders", then you would choose option "A".

You may identify with both "A" and "B". In this case you should choose the statement which seems closer to your personal feelings about yourself. Of, if you do not identify with either statement, select the one which is least objectionable or remote. In other words, read each pair of statements and then choose the one that is closer to your own feelings. Indicate your answer by writing the letter ("A" or "B") in the space provided to the right of each item. Please do not skip any items.

1. A I have a natural talent for influencing people.
B I am not good at influencing people.
2. A Modesty doesn't become me.
B I am essentially a modest person.
3. A I would do almost anything on a dare.
B I tend to be a fairly cautious person.
4. A When people compliment me I sometimes get embarrassed.
B I know that I am good because everybody keeps telling me so.
5. A The thought of ruling the world frightens the hell out of me.
B If I ruled the world it would be a much better place.
6. A I can usually talk my way out of anything.
B I try to accept the consequences of my behaviour.
7. A I prefer to blend in with the crowd.
B I like to be the center of attention.

Appendix A (cont'd)

8. A I will be a success.
B I am not too concerned about success.
9. A I am no better or no worse than most people.
B I think I am a special person.
10. A I am not sure if I would make a good leader.
B I see myself as a good leader.
11. A I am assertive.
B I wish I were more assertive.
12. A I like having authority over people.
B I don't mind following orders.
13. A I find it easy to manipulate people.
B I don't like it when I find myself manipulating people.
14. A I insist upon getting the respect that is due me.
B I usually get the respect that I deserve.
15. A I don't particularly like to show off my body.
B I like to display my body.
16. A I can read people like a book.
B People are sometimes hard to understand.
17. A If I feel competent I am willing to take responsibility for making decisions.
B I like to take responsibility for making decisions.
18. A I just want to be reasonably happy.
B I want to amount to something in the eyes of the world
19. A My body is nothing special.
B I like to look at my body.
20. A I try not to be a show off.
B I am apt to show off if I get the chance.
21. A I always know what I am doing.
B Sometimes I'm not sure of what I'm doing.

Appendix A (cont'd)

- 22. A I sometimes depend on people to get things done.
B I rarely depend on anyone else to get things done.
- 23. A Sometimes I tell good stories.
B Everybody likes to hear my stories.
- 24. A I expect a great deal from other people.
B I like to do things for other people.
- 25. A I will never be satisfied until I get all that I deserve.
B I take my satisfactions as they come.
- 26. A Compliments embarrass me.
B I like to be complimented.
- 27. A I have a strong will to power.
B Power for its own sake doesn't interest me.
- 28. A I don't very much care about new fads and fashions.
B I like to start new fads and fashions.
- 29. A I like to look at myself in the mirror.
B I am not particularly interested in looking at myself in the mirror.
- 30. A I really like to be the center of attention.
B It makes me uncomfortable to be the center of attention.
- 31. A I can live my life in any way I want to.
B People don't always live their lives in terms of what they want.
- 32. A Being an authority doesn't mean that much to me.
B People always seem to recognize my authority.
- 33. A I would prefer to be a leader.
B It makes little difference to me whether I am a leader or not.
- 34. A I am going to be a great person.
B I hope I am going to be successful.
- 35. A People sometimes believe what I tell them.
B I can make anybody believe anything I want them to.

Appendix A (cont'd)

36. A I am a born leader.
B Leadership is a quality that takes a long time to develop.
37. A I wish someone would someday write my biography.
B I don't like people to pry into my life for any reason.
38. A I get upset when people don't notice how I look when I go out in public.
B I don't mind blending into the crowd when I go out in public.
39. A I am more capable than other people.
B There is a lot that I can learn from other people.
40. A I am much like everybody else.
B I am an extraordinary person.

Appendix B

The Driving Vengeance Questionnaire (DVQ)

The following are some common situations encountered by drivers. Please indicate the response that you would most likely make in that situation. If you choose "Other," please state an example.

1. After stopping at a STOP sign, a motorist fails to yield the right of way to you when it is your turn to proceed through the intersection. You would:

- a) Pull out quickly to block their way. _____
- b) Give the driver an obscene gesture (e.g. the finger). _____
- c) Honk your horn. _____
- d) Do nothing. _____

2. While driving on an expressway a vehicle cuts in front of you, forcing you to apply the brakes. You would:

- a) Cut in front of their vehicle forcing them to apply the brakes. _____
- b) Give the driver an obscene gesture. _____
- c) Honk your horn. _____
- d) Do nothing. _____

3. A driver passes you and makes an obscene gesture at you. You would:

- a) Force the other vehicle off the road. _____
- b) Give the driver an obscene gesture. _____
- c) Honk you horn. _____
- d) Do nothing. _____

4. Immediately after passing you, the driver slows down or applies his brakes. You would:

- a) Pull in front of their vehicle and slow down. _____
- b) Give the driver an obscene gesture. _____
- c) Honk your horn. _____
- d) Do nothing. _____

5. While driving at night, the vehicle immediately behind you has its high beam headlights on. You would:

- a) Let the vehicle pass and turn on your high beams. _____
- b) Apply your brakes. _____
- c) Honk your horn. _____
- d) Do nothing. _____

Appendix B (cont'd)

6. A driver persistently honks at you. You would:

- a) Force the other vehicle off the road. _____
- b) Give the driver an obscene gesture. _____
- c) Honk your horn. _____
- d) Do nothing. _____

7. A driver gets out of his vehicle at a traffic signal and approaches you in a threatening manner. You would:

- a) Get out of your vehicle and confront him/her. _____
- b) Give the driver an obscene gesture. _____
- c) Honk your horn. _____
- d) Drive away. _____

8. A vehicle bypasses a queue of vehicles and remains in the merge lane until the lane ends, and then tries to cut in front of your vehicle. You would:

- a) Block the vehicle so that it can't get in. _____
- b) Give the driver an obscene gesture. _____
- c) Honk your horn. _____
- d) Do nothing. _____

9. A slowly moving vehicle is occupying the left lane on an expressway, slowing traffic. You would:

- a) Tailgate the vehicle until it moves. _____
- b) Give the driver an obscene gesture. _____
- c) Honk your horn. _____
- d) Do nothing. _____

10. A vehicle directly in front of yours frequently applies the brakes, although no vehicle or pedestrian is in front of it. You would:

- a) Pass the vehicle and apply your brakes. _____
- b) Give the driver an obscene gesture. _____
- c) Honk your horn. _____
- d) Do nothing. _____

Appendix B (cont'd)

11. Garbage thrown from another vehicle hits your vehicle. You would:

- a) Throw garbage at the offending vehicle. _____
- b) Give the driver an obscene gesture. _____
- c) Honk your horn. _____
- d) Do nothing. _____

12. Another driver takes a parking space that you have been waiting for. You would:

- a) Get out of your vehicle and tell the driver to move his/her vehicle. _____
- b) Give the driver an obscene gesture. _____
- c) Honk your horn. _____
- d) Do nothing. _____

13. The car in front of you doesn't proceed on an advanced green signal. You would:

- a) Bump into the other car. _____
- b) Give the driver an obscene gesture. _____
- c) Honk you horn. _____
- d) Do nothing. _____

14. You want to turn right at a red light and the car in front of you, also making a right turn, does not proceed when the way is clear. You would:

- a) Bump into the other car. _____
- b) Give the driver an obscene gesture. _____
- c) Honk your horn. _____
- d) Do nothing. _____

15. A vehicle stops on the roadway to pick up, or let out, a passenger causing a traffic delay. You would:

- a) Stop and tell the driver off. _____
- b) Give the driver an obscene gesture. _____
- c) Honk your horn. _____
- d) Do nothing. _____

Appendix C

Deffenbacher Driving Anger Scale

Instructions: Imagine that each situation described below was actually happening to you and rate the amount of anger that would be provoked.

none at all(1)

a little (2)

some (3)

much(4)

very much (5)

1. Someone is weaving in and out of traffic.
2. A slow vehicle on a mountain road will not pull over and let people by.
3. Someone backs right out in front of you without looking.
4. Someone runs a red light or stop sign.
5. You pass a radar speed trap.
6. Someone speeds up when your try to pass him/her.
7. Someone is slow in parking and is holding up traffic.
8. You are stuck in a traffic jam.
9. Someone makes an obscene gesture toward you about your driving.
10. Someone honks at you about your driving.
11. A bicyclist is riding in the middle of the lane and is slowing traffic.
12. A police officer pulls you over.
13. A truck kicks up sand or gravel on the car you are driving.
14. You are driving behind a large truck and you cannot see around it.

Appendix D

Eysenck-Impulsivity Scale

This questionnaire lists a series of statements about various topics. Read each statement and decide whether you agree or disagree with each statement as follows:

Never	Very Rarely	Rarely	Occasionally	Often	Always
0	1	2	3	4	5

Mark the alternative that best describes your opinion. There are no right or wrong answers so do not spend too much time deciding on an answer. The first thing that comes to mind is probably the best response. There is no time limit, but work as quickly as possible.

1. Do you often buy things on impulse? _____
2. Do you generally do and say things without stopping to think? _____
3. Do you often get into a jam because you do things without thinking? _____
4. Are you an impulsive person? _____
5. Do you usually think carefully before doing anything? (R) _____
6. Do you often do things on the spur on the moment? _____

Appendix C (cont'd)

7. Do you mostly speak before thinking things out? _____
8. Do you often get involved in things you later wish you could get out of? _____
9. Do you often get so 'carried away' by new and exciting ideas that you never think of possible snags? _____
10. Do you need to use a lot of self-control to keep out of trouble? _____
11. Would you agree that almost everything enjoyable is illegal or immoral? _____
12. Are you often surprised at people's reactions to what you do or say? _____
13. Do you think an evening out is more successful if it is unplanned or arranged at the last moment? _____
14. Do you usually work quickly, without bothering to check? _____
15. Do you often change your interests? _____
16. Before making up your mind, do you consider all the advantages and disadvantages? (R) _____
17. Do you prefer to 'sleep on it' before making decisions? (R) _____
18. When people shout at you, do you shout back? _____
19. Do you usually make up your mind quickly? _____

Appendix E

Sensation Seeking Scale

Please complete the following questions. There are no right or wrong answers, everyone is an individual, just respond to the statement. For each statement, choose either true or false. If you do not like either choice, mark the choice you dislike the least.

1. I like to have new and exciting experiences and sensations even if they are a little frightening.
2. I would like to take off on a trip with no preplanned or definite routes or timetables.
3. I tend to change interests frequently.
4. I sometimes like to do things that are a little frightening.
5. I'll try anything once.
6. I would like the kind of life where one is on the move and traveling a lot, with lots of change and excitement.
7. I sometimes do "crazy" things just for fun.
8. I like to explore a strange city or section of town by myself, even if it means getting lost.
9. I prefer friends who are excitingly unpredictable.
10. I like "wild" uninhibited parties.
11. I like doing things just for the thrill of it.

Appendix F

Risk Propensity Scale

Please indicate the extent to which you agree or disagree with the following statement by putting a circle around the option you prefer. Please do not think too long before answering; usually your first inclination is also the best one.

1. Safety first.

totally disagree 1 2 3 4 5 6 7 8 9 totally agree

2. I do not take risks with my health.

totally disagree 1 2 3 4 5 6 7 8 9 totally agree

3. I prefer to avoid risks.

totally disagree 1 2 3 4 5 6 7 8 9 totally agree

4. I take risks regularly.

totally disagree 1 2 3 4 5 6 7 8 9 totally agree

5. I really dislike not knowing what is going to happen.

totally disagree 1 2 3 4 5 6 7 8 9 totally agree

6. I usually view risks as a challenge.

totally disagree 1 2 3 4 5 6 7 8 9 totally agree

7. I view myself as a . . .

risk avoider 1 2 3 4 5 6 7 8 9 risk seeker

Appendix G

Dula Dangerous Driving Index

Note. Subscale items are denoted as follows: AD = aggressive driving; NE = negative emotions while driving; RD = risky driving; O = item omitted from subscales.

Please answer each of the following items as *honestly* as possible. Please reach each item carefully and then fill in the bubble/circle of the answer you choose on the form. If none of the choices seem to be your ideal answer, then select the answer that comes *closest*. THERE ARE NO RIGHT OR WRONG ANSWERS. Select your answers quickly and do not spend too much time analyzing your answers.

A = never (=1)

B = rarely (=2)

C = sometimes (=3)

D = often (=4)

E = always (=5)

1. I drive when I am angry or upset. (NE)
2. I lose my temper when driving. (NE)
3. I consider the actions of other drivers to be inappropriate or “stupid.” (NE)
4. I flash my headlights when I am annoyed by another driver. (AD)
5. I make rude gestures (e.g., giving “the finger,” yelling curse words) toward drivers who annoy me. (AD)
6. I verbally insult drivers who annoy me. (AD)
7. I deliberately use my car/truck to block drivers who tailgate me. (AD)
8. If another driver *seriously* threatens my safety, I would defend myself. (O)
9. I would tailgate a driver who annoys me. (AD)
10. I “drag race” other drivers at stop lights to get out front. (RD)
11. I will illegally pass a car/truck that is going *too* slowly. (RD)
12. I feel it is my right to strike back in some way, if I feel another driver has been aggressive toward me. (AD)

Appendix G (cont'd)

13. When I get stuck in a traffic jam, I get *very* irritated. (NE)
14. I will race a slow moving train to a railroad crossing. (RD)
15. I will weave in and out of slower traffic. (RD)
16. I will drive if I am only *mildly* intoxicated or buzzed. (RD)
17. When someone cuts me off, I feel I should punish him/her. (AD)
18. I get impatient and/or upset when I fall behind schedule when I am driving. (NE)
19. Passengers in my car/truck tell me to calm down. (NE)
20. I get irritated when a car/truck in front of me slows down for no reason. (NE)
21. I will cross double yellow lines to see if I can pass a slow moving car/truck. (RD)
22. I feel it is my right to get where I need to go as quickly as possible. (RD)
23. I am an aggressive driver. (O)
24. I feel that *passive* drivers should learn how to drive or stay home. (NE)
25. I keep some type of weapon in my car/truck. (O)
26. I will drive in the shoulder lane or median to get around a traffic jam. (RD)
27. When passing a car/truck on a 2-lane road, I will barely miss on-coming cars. (RD)
28. I will drive when I am drunk. (RD)
29. I feel that I may lose my temper if I have to confront another driver. (NE)
30. I consider myself to be a risk-taker. (RD)
31. I feel that most traffic "laws" could be considered as suggestions. (RD)

Appendix H

The Big Five Inventory (BFI)

Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who likes to spend time with others? Please write a number next to each statement to indicate the extent to which you agree or disagree with that statement.

Disagree strongly: 1

Disagree a little: 2

Neither agree nor disagree: 3

Agree a little: 4

Agree strongly: 5

1 2 3 4 5

I see Myself as Someone Who...

1. Is talkative
2. Tends to find fault with others
3. Does a thorough job
4. Is depressed, blue
5. Is original, comes up with new ideas
6. Is reserved
7. Is helpful and unselfish with others
8. Can be somewhat careless
9. Is relaxed, handles stress well
10. Is curious about many different things
11. Is full of energy
12. Starts quarrels with others
13. Is a reliable worker
14. Can be tense
15. Is ingenious, a deep thinker
16. Generates a lot of enthusiasm
17. Has a forgiving nature
18. Tends to be disorganized
19. Worries a lot
20. Has an active imagination
21. Tends to be quiet
22. Is generally trusting
23. Tends to be lazy
24. Is emotionally stable, not easily upset
25. Is inventive

Appendix H(cont'd)

26. Has an assertive personality
27. Can be cold and aloof
28. Perseveres until the task is finished
29. Can be moody
30. Values artistic, aesthetic experiences
31. Is sometimes shy, inhibited
32. Is considerate and kind to almost everyone
33. Does things efficiently
34. Remains calm in tense situations
35. Prefers work that is routine
36. Is outgoing, sociable
37. Is sometimes rude to others
38. Makes plans and follows through with them
39. Gets nervous easily
40. Likes to reflect, play with ideas
41. Has few artistic interests
42. Likes to cooperate with others
43. Is easily distracted
44. Is sophisticated in art, music, or literature