

## Introduction

“Road rage” is a potentially dangerous phenomenon that, given our individual proximity to driving or riding in automobiles, has broad ranging personal and societal impacts. As such, road rage has recently been the subject of significant public and media attention, and sensational stories about “road rage” fill the newspapers (Carter, 2007; Eckinger, 2007; Fumento, 1998; Richmond, 2007; Thompson, 2007), magazines (Best & Furedi, 2001; A. Ferguson, 1998; Jenson, 2007; Liu, 2006) and television news (“Best and worst cities for road rage.,” 2006; “Miami Road Rage Fight,” 2006; “Police: Man Pointed Shotgun At Car In Road Rage Incident,” 2007; “Road Rage rears its head,” 2006).

Pervasive public interest in “road rage” has led to a proliferation of websites and blogs that attempt to serve a variety of functions from helping upset drivers vent their anger (“AboveAverageDriver.com”; “Road Rage - A blog about driving in Houston”; “RoadRagers.com”) to electronic vigilantism in which users can report the locations, car makes, and license plate numbers of offending drivers (“PlateRage.com”; “Platewire.com”). Another website offers books of flip-cards with large print—and mostly obscene—statements that tell drivers how their road behavior is affecting the card-waving driver (“RoadRageCards.com”).

Road rage is not unique to America and has been the topic of a great deal of media, research, and government attention in numerous countries across the

globe including the United Kingdom, the Philippines, India, Israel, China, South Africa, Saudi Arabia, and Australia (Alave, 2007; Best & Furedi, 2001; Brewer, 2000; James & Nahl, 2000a; Liu, 2006; Mdletshe, 2007; Muhammad, 2007; Shanthi, 2007; Yagil, 2001). In the U.S. alone, legislation to counter aggressive driving and road rage has been passed in more than one-third of the states (Rathbone, 1999) and governments around the world have made various levels of legislative commitment to managing this problem (Best & Furedi, 2001; Brewer, 2000; Lonero, 2000; Maiuro, 1998; Martinez, 1997; Miles & Johnson, 2003).

The term “road rage” is a relatively new one, reportedly coined by the media itself in 1988 (Best & Furedi, 2001; A. Ferguson, 1998; Fumento, 1998; Glassner, 1999; Roberts & Indermaur, 2005), possibly in response to the much-publicized seemingly viral progression of destructive acts of road violence in Los Angeles in the early 1980’s (Glassner, 1999; Katz, 1999; Novaco, 1991). The phrase “road rage” was only introduced officially into the English language in 1997 (“The Oxford dictionary of new words,” 1997) and did not appear in social science literature until 1998. The first U.S. Congressional hearing on the issue was not conducted until 1997 (Best & Furedi, 2001).

However, considering that driving has been a part of American culture since Henry Ford invented the Model T in 1908 (“Henry Ford,” 2007), it is safe to assume that road rage—or any form of aggressive and violent behavior on the roads—followed not too long after. In fact, researchers in fields such as

transportation, public safety, and psychology have been working to understand and address the problem of dangerous roadway behaviors for more than half a century (Bennett, 1965; Black, 1966; Hobbs & Tillman, 1949; McGuire, 1956; Parry, 1968; Raphael, 1967; H. L. Ross, 1940; Whitlock, 1971). For references of road rage prior to the invention of the modern automobile, one can look as far back as 420 B.C.E. for Sophocles' fictional reference to the right-of-way dispute that led to Laius' death at the hands of Oedipus (Roche, 2001). One of the first non-fictional references to road rage involves the poet Lord Byron who reportedly was involved in numerous roadway confrontations, one of which resulted in him causing bodily injury to the alleged perpetrator (Marchand, 1970).

The relatively recent popularity of the specific term "road rage" is thought by many to be the result of growing media "hype" (Best & Furedi, 2001; Britt & Garrity, 2006; A. Ferguson, 1998; Fumento, 1998; T. E. Galovski, Malta, & Blanchard, 2006; Glassner, 1999; Maiuro, 1998). Road rage publicity not only brought the phrase into western vernacular but most likely enhanced public perception of the prevalence and level of threat of the phenomenon, creating a priming and contagion affect that may foster aggressive retaliatory acts by some drivers (T. E. Galovski et al., 2006; James & Nahl, 2000a; Katz, 1999; Novaco, 1991).

In addition to "road rage" being a new label used to describe an old problem, there are countless inconsistent, contradictory, and inaccurate definitions

of “road rage” in the research literature—many of which confuse the terms “road rage” and “aggressive driving”—a fact that prompted the authors of several prominent literature reviews to argue for the complete elimination of the term “road rage” (Dula & Geller, 2003; T. E. Galovski et al., 2006).

The construct most often used in scientific literature to encompass dangerous driving behavior is “aggressive driving.” However, this term—like road rage—has come to mean many things in the literature. For example, the National Highway Transportation Safety Association (NHTSA) defines aggressive driving as, “The operation of a motor vehicle in a manner that endangers or is likely to endanger persons or property” (NHTSA, 2004, Introduction, ¶2).

Such a definition is too general and by definition includes acts that may be due to: accidental lapses and errors (e.g., equipment errors, dozing off, poor judgment of distance when passing, etc.); inattention and inconsideration (e.g., texting or talking on a mobile phone, using a GPS system, eating, shaving, etc.); sensation-seeking, entitlement or competitiveness (e.g., speeding to “make good time,” tail-gating, passing, running red lights, failing to yield, etc.); or retaliation or self-compensation (e.g., unsafe passing and tailgating, verbal and physical gestures, assault, etc.) for other drivers’ offensive driving behavior (T. E. Galovski & Blanchard, 2004; T. E. Galovski et al., 2006; Katz, 1999; Lajunen &

Summala, 2003; J.A. Larson, 1996; J. A. Larson & Rodriguez, 1999; Novaco, 1991; Parker, Lajunen, & Stradling, 1998).

Other definitions of aggressive driving impose a dizzying array of dichotomies, such as acts that do or do not involve intent to harm; are legal or illegal; are meant to cause either emotional or physical harm; are within the driver's awareness or not; or are emotionally provoked (e.g., anger) or instrumental in nature (e.g., competition, sensation seeking, etc.) (Baron & Richardson, 1994; Berkowitz, 1993; T. E. Galovski et al., 2006; Lajunen, Parker, & Stradling, 1998; Rathbone, 1999; Tasca, 2000). Thus the term "aggressive driving" has come to encompass "just about any crash-producing driver action or inaction" (Shinar, 1998, p. 138). The present study will focus on "driving anger," an intense emotional response to the offensive roadway behavior of others and the gateway to potentially hazardous retaliatory and self-compensating aggressive driving.

Automobiles have provided countless benefits over the past century. For individuals, the rise of the automobile has translated into the development of personal mobility (and thus increased opportunities for economic and social growth), freedom, power, material ownership, status, security, and for many, a sense of territory and personal space (Fong, Frost, & Stansfeld, 2001; Katz, 1999; Lupton, 1999, 2002; P. Marsh & Collett, 1987; Miles & Johnson, 2003). With these increases comes a continual growth of new opportunities for drivers to

become angered by what they may perceive as threats, injustices, and frustrations created by other drivers (Berkowitz, 1990; Lupton, 2002; Miles & Johnson, 2003) and to respond aggressively.

Automobile accidents are responsible for staggering costs to society both in human and economic terms. In the U.S. alone in 2006, there were nearly six-million police-reported motor vehicle traffic accidents that resulted in 1.75 million injuries and 38,588 deaths (NHTSA, 2007). The economic costs for these traffic accidents is estimated at over \$230 billion which translates to nearly 2% of our gross national product (NHTSA, 2007).

Although current official government crash statistics do not make specific attributions regarding the role and prevalence of aggressive driving acts per se causing automobile accidents, top causes of crashes in the U.S. in 2006 include: “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” (NHTSA, 2007, p. 100). All of these are what accident research pioneer H.L. Ross referred to as “human factors” similar to those he found to be responsible for 90% of accidents—many resulting in injury or death—in his ground-breaking study of over 58,000 driving incidents in Michigan in 1940 (H. L. Ross, 1940).

More recent attempts to estimate the role of aggressive driving in U.S. accidents include Ricardo Martinez, administrator of the National Highway Traffic Safety Administration (NHTSA) who reported to Congress that aggressive

driving could be equated with alcohol-impaired driving in its contribution to motor vehicle accidents (MVA's) and estimated that nearly two-thirds of roadway deaths can be blamed on aggressive driving (Martinez, 1997). The prior year, the authors of a study sponsored by the AAA Foundation for Traffic Safety (Mizell, Joint, & Connell, 1997) concluded that for the years spanning 1990-1996 over 1500 people *per year* died as a result of aggressive driving, and countless more suffered injuries—many involving devastating brain damage, limb amputation, and paralysis (T. E. Galovski & Blanchard, 2004; T. E. Galovski et al., 2006; Lonerio, 2000; Mizell et al., 1997). A report by the automobile insurance industry claimed that half of all MVA's are the result of aggressive driving (Snyder, 1997).

Overall there is agreement among researchers that aggressive driving—especially those acts motivated by anger and intended to threaten or harm other drivers—represents a significant proportion of automobile accidents, injuries, and deaths and warrants further study with the goal of developing and implementing effective solutions (Brewer, 2000; Britt & Garrity, 2003; Crimmins & Callahan, 2004; J. L. Deffenbacher, Huff, Lynch, Oetting, & Salvatore, 2000; Fong et al., 2001; T. E. Galovski & Blanchard, 2004; T. E. Galovski et al., 2006; James & Nahl, 2000a; Joint, 1995; Lajunen et al., 1998; J. A. Larson & Rodriguez, 1999; *Lex report of motoring*, 1996; Maiuro, 1998; Novaco, 1991; Parkinson, 2001; Rathbone, 1999; Sharkin, 2004; Shinar, 1998; Tasca, 2000; G. Underwood, Chapman, Wright, & Crundall, 1999).

Aggression, whether acted out on the road or in other venues, is commonly divided into two motivational groupings: *instrumental* and *emotional* (also called “affective,” “angry,” “hostile,” “retaliatory,” and “impulsive” aggression) (Baron & Richardson, 1994; Berkowitz, 1993; Bushman & Anderson, 2001; Geen, 1990; Lajunen et al., 1998; Zillmann, 1979). Examples of instrumental aggressive driving include speeding, failing to yield, taking a parking space another driver was waiting for, and other acts that may have as their goals getting to one’s destination quicker, sensation seeking, preserving one’s self-esteem, or other non-injurious self-serving motivations (Lajunen et al., 1998; Parker, Lajunen, & Summala, 2002). Examples of emotional aggressive driving may include close following (i.e. “tailgating”), unsafe passing (i.e., “cutting off”), shouting, hand gestures (e.g., “flipping the bird”), or other potentially harmful acts that are motivated by anger in response to the perceived offensive acts of other drivers (Lajunen et al., 1998). It is not uncommon for one driver’s instrumental aggressive driving—or driving lapses or errors—to trigger another driver’s emotional aggressive driving. Some acts of aggressive driving—such as horn honking or flashing one’s lights—may have ambiguous motives and may fall into either category of aggressive driving depending on how the acts are perceived by other drivers (Joint, 1995).

The focus of the present study is on emotionally motivated acts of aggressive driving, and specifically on the driving anger that is at their root. It is



in states of high anger arousal that we do our least competent thinking, are more likely to be impulsive, and are the biggest threat to others through acts of aggression (Baron & Richardson, 1994; Berkowitz, 1990, 1993; James & Nahl, 2000a; Novaco, 1991). Indeed, anger is considered by many scholars to be perhaps the main emotion that—depending on which theory one ascribes to—either drives, motivates, mediates, or facilitates many forms of aggression, and most certainly “emotional” aggression (Averill, 1983; Baron & Richardson, 1994; Berkowitz, 1993; Buss, 1961; Geen, 1990; Mohr, Howells, Gerace, Day, & Wharton, 2007; Novaco, 1991).

Driving anger is a well-documented and consistent correlate of aggressive driving (J. L. Deffenbacher, Deffenbacher, Lynch, & Richards, 2003; J. L. Deffenbacher, Filetti, Richards, Lynch, & Oetting, 2003; J. L. Deffenbacher et al., 2000; J. L. Deffenbacher, Lynch, Oetting, & Swaim, 2002; J. L. Deffenbacher, Lynch, Oetting, & Yingling, 2001; J.L. Deffenbacher, Oetting, & Lynch, 1994; T. E. Galovski et al., 2006; Knee, Neighbors, & Vietor, 2001; Lajunen & Parker, 2001; Neighbors, Vietor, & Knee, 2002). Like general anger, driving anger does not inevitably lead to retaliation and other forms of aggression (J.L. Deffenbacher et al., 1994; Dukes, Clayton, Jenkins, Miller, & Rodgers, 2001; T. E. Galovski et al., 2006). Indeed, the intensity of one’s driving anger and how one manages and responds to that anger (e.g., inhibits or suppresses, displaces, expresses, aggresses, assaults, etc.) depends on numerous factors (J. L. Deffenbacher, Lynch

et al., 2002; DePasquale, Geller, Clarke, & Littleton, 2001; Dukes et al., 2001; P. Ellison-Potter, Bell, & Deffenbacher, 2001; T. E. Galovski et al., 2006; Lajunen et al., 1998; Lupton, 2002; Novaco, 1991).

Based on the present review and other studies of driving anger, it is safe to contend that driving anger can, at the minimum, be described as a partial mediator of driving aggression and is thus likely to increase the probability of accidents, violence, injury, and death on the road (J.L. Deffenbacher et al., 1994; DePasquale et al., 2001; P. A. Ellison-Potter, Govern, Petri, & Figler, 1995; T. E. Galovski et al., 2006; Lajunen & Parker, 2001; Lajunen et al., 1998; Lawton & Nutter, 2002; Rathbone, 1999; Tasca, 2000; G. Underwood et al., 1999). Thus, in view of this mediating link between driving anger and aggressive driving, and the prevalence and dangers noted above of aggressive driving, it is critical to further study driving anger.

#### *Contributing Factors to Driving Anger*

*Situational Factors.* In search of answers regarding causes of driving anger and aggression, examiners have considered a wide variety of possible situational factors, including: road congestion (Gulian, Matthews, Glendon, Davies, & Debney, 1989; Hennessy & Wiesenthal, 1999; Shinar & Compton, 2004; G. Underwood et al., 1999); time urgency (Novaco, 1991; Parkinson, 2001; Shinar, 1998; Shinar & Compton, 2004); unnecessary slow driving or delays at intersections (Deaux, 1971; Doob & Gross, 1968; Novaco, 1991; Shinar, 1998);

negative affect (Parkinson, 2001); anonymity (e.g., of self or other drivers) and “deindividuation” (i.e., of other drivers) (P. Ellison-Potter et al., 2001; P. A. Ellison-Potter et al., 1995; Hennessy & Wiesenthal, 1999; Novaco, 1991; Parkinson, 2001; Turner, Layton, & Simons, 1975); “interpersonal insulation” between automobiles (i.e., impeded communication between drivers) (Parkinson, 2001); pre-existing mood (Parkinson, 2001); presence and type of passengers (J.S. Baxter et al., 1990; Shinar & Compton, 2004); near accidents (G. Underwood et al., 1999); stress (Gulian et al., 1989; Hennessy & Wiesenthal, 1999; Lowenstein, 1997; G. Matthews, Dorn, & Glendon, 1991; Novaco, 1991); aggressive stimuli (P. Ellison-Potter et al., 2001); and environmental factors (e.g., temperature, noise, road conditions, pollution, automobile comfort, etc.) (Kenrick & MacFarlane, 1986; Mizell et al., 1997; Novaco, Stokols, & Milanesi, 1990). As one might expect, no one situational factor has been shown to be at the root of driving anger, and overall, “The collective research on situational variables suggests that anonymity, driver comfort, local driving norms, and congestion all influence [anger] responses to frustrating delays...and that multiple influences are at work” (T. E. Galovski et al., 2006, p. 38).

*Demographic Factors.* Another realm for researchers studying driving anger and road violence is demographic variability. Studies exploring gender differences in this area have, in general, found that while female and male drivers tended to report similar levels of driving anger (J. L. Deffenbacher, Filetti et al.,

2003; J. L. Deffenbacher et al., 2000; T. E. Galovski et al., 2006; Lajunen et al., 1998), there are differences in the types of roadway events that are upsetting to females and males (J.L. Deffenbacher et al., 1994) and in their likelihood to respond aggressively (J. L. Deffenbacher et al., 2000; P. Ellison-Potter et al., 2001).

Studies examining the role of age as a factor in driving anger and aggressive driving found an overall tendency for younger drivers—who also tend to be newer to driving—to tolerate stress less well, become angrier more often, and drive aggressively than older—and generally more experienced—drivers (Gulian et al., 1989; Lajunen & Parker, 2001; Lajunen et al., 1998; Parker et al., 2002; Shinar, 1998; Ulleberg & Rundmo, 2003).

Early research into how socio-economic status may impact driving anger and aggression found mixed results (Deaux, 1971; Doob & Gross, 1968), while a more recent study measured differences in the nature of horn honking—an historically popular, observational, yet questionable method for assessing driving anger—based on the income level of the neighborhoods examined (Shinar, 1998). In terms of other cultural factors, while countless authors are in agreement that cultural norms are at play in terms of how anger is expressed (or not) in any given society (James & Nahl, 2000b; Katz, 1999; Lonero, 2000; Lupton, 1999, 2002; Mizell et al., 1997; Shinar, 1998), there is still a paucity of publications in this area (T. E. Galovski et al., 2006; Lupton, 2002).

*Individual Factors.* A great deal of research has been published along the lines of personality and emotional factors that may impact one's internal experience and actual behavior on the road. Personality constructs examined include: extraversion, psychoticism, and neuroticism (using the Eysenck Personality Questionnaire) (G. Matthews et al., 1991); extraversion, neuroticism, agreeableness, openness to experience, and conscientiousness (using the Big Five model of personality) (Britt & Garrity, 2006; Miles & Johnson, 2003); Type "A" personality style (Lowenstein, 1997); sensation-seeking, aggression, anxiety, and altruism (using the NEO Personality Inventory) (Ulleberg & Rundmo, 2003); narcissism and vulnerability of self-esteem (Britt & Garrity, 2006); competitiveness (Yagil, 2001); irritability (Lowenstein, 1997; Yagil, 2001); locus of control (Gulian et al., 1989; Lajunen & Summala, 1995); motivational orientation (e.g., "controlled" vs. "autonomy") (Knee et al., 2001; Neighbors et al., 2002); impulsivity (J. L. Deffenbacher, Filetti et al., 2003; DePasquale et al., 2001; Lajunen & Parker, 2001); social deviance (Ulleberg & Rundmo, 2003; G. Underwood et al., 1999); attributional style (e.g., "hostile attribution bias") (Britt & Garrity, 2006; P. A. Ellison-Potter et al., 1995; Lawton, Parker, Manstead, & Stradling, 1997; B. A. Matthews & Norris, 2002); and general aggressiveness (Lajunen et al., 1998).

Other individual differences that have been studied in terms of their potential influence on driving anger and aggression include the driver's general

level of stress and method of coping (Gulian et al., 1989; Hennessy & Wiesenthal, 1999; J.A. Larson, 1996; G. Matthews et al., 1991; Novaco, 1991; Novaco et al., 1990); biological responses (e.g., blood pressure and hyper arousal) to others' offensive driving behaviors (Malta et al., 2001); and psychiatric distress (Smart, Asbridge, Mann, & Adlaf, 2003) and pathology (Fong et al., 2001; T. Galovski, Blanchard, & Veazey, 2002).

In search of an “angry driver” personality type, noted anger expert Jerry Deffenbacher and his associates designed a parallel to Spielberger’s “state-trait anger” theory (Spielberger, Jacobs, Russell, & Crane, 1983) in their model of “trait driving anger” (J. L. Deffenbacher, Lynch et al., 2002), which they defined as “the propensity to become angry behind the wheel” (p. 718). Deffenbacher et al. demonstrated that “being high on the personal characteristic of becoming angry behind the wheel predisposes a person to more frequent and intense anger and more frequent aggressive and risky behavior on the road and to more aversive outcomes” (p. 718).

#### *How Driving Anger Develops*

Driving is a social activity consisting of countless subtle interpersonal transactions per mile. However, when elements inherent to the physical nature of the automobile—such as its cocoon-like protective shell, the power and control provided by sophisticated in-car systems, and awesome horsepower—are merged with the many images of autonomy, omnipotence, and safety broadcast by

widespread advertising, drivers gain a false sense that they “own the road” and are entitled to the most efficient, optimal driving experience possible (Katz, 1999; *Lex report of motoring*, 1996; Lupton, 1999, 2002; Maiuro, 1998; Parkinson, 2001). When thousands of individuals on the road are essentially competing at once to meet their own unique, highly valued personal goals, frustration, conflict, and anger are inevitable.

When individuals with competing needs and goals intersect off the road (e.g., in line at a coffee shop), a process of interpersonal interaction ensues that is customarily facilitated by socially sanctioned, culture-bound exchanges of verbal and non-verbal communication (Parkinson, 2001). These exchanges commonly allow for individuals—each with his or her distinct set of appraisals and attributions of the event—to coordinate perspectives in a civil fashion that hopefully leads to a peaceful and agreeable outcome for all of the parties involved (Parkinson, 2001). Of course, some off-road interactions do not end agreeably, such as in documented cases of “supermarket check-out rage” (known as “queue rage” in the United Kingdom), “airline rage,” “ATM rage,” and “gas-station rage” (Fong et al., 2001). For the most part, however, external pressures such as social and legal consequences appear to manage to keep most non-driving conflicts aggression-free (Parkinson, 2001).

When the process of interpersonal communication, perspective coordination, and outcome negotiation is taken to the roads, the physical and

logistical properties inherent in automobiles (e.g., sound insulation, noise, demands on the driver's attention, etc.) and road travel itself (e.g., distance between cars and thus drivers, speed of events, mutual lack of familiarity between drivers, and the complexity of navigating through traffic) get in the way. These impediments result in the inability of drivers in separate vehicles to hear one another's speech or accurately gauge facial and other non-verbal communication and thus make any form of message between drivers ambiguous and subject to interpretation, projection, and other idiosyncratic psychological processes by each party involved (Parkinson, 2001).

The result of such severely impaired interpersonal communication while driving is often the inability of participants to coordinate perspectives that might otherwise facilitate a harmonious outcome. When the individuals involved in such an interaction—especially when one party behaves in a way that is motivationally incongruous to the other, such as in the context of driving—are impeded from coordinating perspectives, they are left with poorly-informed, rapidly created, emotionally-driven appraisals of the situation that can in turn lead to high levels of anger and aggression on the road (Lawton et al., 1997; Parkinson, 2001). Because of its empirically-supported positive associations with enhanced perception of the motives of others (Bernstein & Davis, 1982), increased sympathy (Toi & Batson, 1982), and pro-social behaviors (Davis, 2005; B. Underwood & Moore, 1982), perspective-taking skill may play a significant role



in compensating for the hampered interpersonal communication and negotiation inherent in driving situations.

### *Perspective-Taking*

Empathy is well established in the literature as playing an inhibitory role in the development of aggression (Björkqvist, Östermana, & Kaukiainen, 2000; Davis, 2005; Richardson, Green, & Lago, 1998; Richardson, Hammock, Smith, Gardner, & Signo, 1994). Perspective-taking is generally described as the main cognitive dimension of empathy (Davis, 1983, 2005; Mohr et al., 2007; Richardson et al., 1994). Being able to imagine, consider, and adopt the perspectives of others has long been considered an important developmental evolution in cognitive functioning (Piaget, 1999), moral reasoning (Kohlberg & Hersh, 1977), and social functioning (Davis, 1983, 2005).

Empirically supported results of perspective-taking efforts include a significant array of potentially pro-social outcomes: improved accuracy in judging others (Bernstein & Davis, 1982); greater tendency for benevolent explanations for other's behavior (Regan & Totten, 1975; Takaku, 2001); improved anticipation of others' reactions (Davis, 2005); increased sympathy for others (Toi & Batson, 1982); greater likelihood of forgiveness (Takaku, 2001, 2006); and more frequent acts of altruism (Batson, Early, & Salvarani, 1997; Iannotti, 1978; B. Underwood & Moore, 1982).

Directly related to this study and commonly held concerns about interpersonal conflicts on the road is recent research supporting positive relationships between perspective-taking and decreased aggression (Davis, 2005; Richardson et al., 1998; Richardson et al., 1994) and aggression's frequently preceding emotion, anger (Mohr et al., 2007). Conversely, a lack of perspective-taking effort can provoke anger and aggression in interpersonal encounters, such as while driving (Galinsky & Moskowitz, 2000; Mohr et al., 2007; Richardson et al., 1998). Although there is minimal empirical attention and evidence to demonstrate how perspective-taking inhibits anger and aggressive responses, several models have been proposed.

Richardson, et al. (1994) based their examination of perspective-taking and its relationship to aggressive responses on Zillman's (1988) "cognitive-excitation" model that posits a situational "cognitive incapacitation" that results from high levels of excitation (e.g., from provocation) and leads to aggressive inhibitions (Richardson et al., 1994). The authors hypothesized that "People who are dispositional perspective takers may maintain high-level cognitive functioning in threatening situations, thereby enhancing the probability of aggression inhibition" (p. 277). Their research concluded that indeed, "perspective-taking was related to inhibition of aggressive responding under conditions of moderate threat" (p. 286), a result they attributed to the protective role perspective-taking played in maintaining cognitive functioning in the face of provocative stimuli.

In their unique study of the relationship between perspective-taking and anger arousal, Mohr et al. (2007) confirmed “the relationship between dispositional perspective-taking and the likelihood of anger arousal following an interpersonal provocation” (p. 514). In their attempts to explain this link, the authors considered the previously mentioned “cognitive-excitation” model of Zillmann; a forgiveness model based on Zechmeister and Romero’s (2002) findings that perspective-taking was associated with forgiveness which in turn lead to lower state anger; and an attributional model of anger—based on Ferguson and Rule’s (1983) work on attributions and aggression—in which they proposed that perspective-taking skills “might inhibit anger arousal directly by decreasing the likelihood that provocations will be perceived in ways that lead to blame” (p. 508). The authors made no conclusions, however, about which model explains “the likely mechanic between perspective-taking and angry responding” (p. 515).

Although trait perspective-taking is a developmental skill that humans develop to some extent early in life (Piaget, 1999), factors later in life—such as sharing similar, often difficult experiences with another—increases the probability that one will engage in situational perspective-taking and thus facilitate imagining one’s self in the perspective of the other (Batson et al., 1996; Galinsky & Moskowitz, 2000). On the road, drivers share numerous common general experiences such as trying to get to work or another appointment on time as well as more situational—and frequently frustrating—experiences including

navigating other drivers while entering or exiting a highway, merging, or being slowed by unexpected road work.

It is logical to presume that perspective-taking between drivers plays a common role in successful interpersonal negotiation and navigation on the road and that “individuals who are more inclined to consider things from another person's point of view may be less prone to such [driving-anger] reactions” (Parkinson, 2001, p. 510). Conversely, it is likely that individuals who are shown to demonstrate lower levels of perspective-taking are more prone to trait driving anger and are more apt to express their anger in unconstructive and potentially aggressive ways.

While the vast majority of aggressive driving studies have attempted to identify unique personality profiles and other individual factors that may contribute to dangerous driving behavior, the present study used a quantitative survey design to examine the relationship between perspective-taking and driving anger, which is widely accepted as a significant risk factor for emotionally-based aggressive behaviors on the road. Because perspective-taking can be systematically taught, if the present study were to find support for a relationship between perspective-taking and road anger, more broadly applicable interventions (e.g., enhancement of perspective-taking skills) may be employed to provide important prevention interventions for at risk drivers prior to anger becoming a

problem for them and their fellow drivers in the form of potentially dangerous behavior.

## Literature Review

### *Driving Anger*

Over the years, anger has been defined in the literature in countless ways. There is agreement, however, that anger is an emotional response to a perceived grievance or provocation (1983; Berkowitz, 1990; Geen, 1990). There has also been support in the literature for two very different conceptualizations of the phenomenon of anger (Berkowitz, 1990; T. E. Galovski et al., 2006). One conceptualization regards anger as an internal, subjective experience that features a distinct, negative mood state or feeling that is accompanied by physiological arousal (Spielberger et al., 1983). The other focuses on the observable expressive motor reactions and overt behaviors that signal that a person is angry. These include physical aggression in the absence of an inner experience of anger which is not a requirement (Spielberger et al., 1983).

Another important distinction made in anger literature is that of state versus trait anger (Spielberger, 1983). State anger comprises the physiological, affective, and sometimes, expressive elements of the anger experience discussed above. It is triggered by a stimulus in the environment or it can be triggered internally. Indeed state anger can be thought of as how one experiences anger at a particular moment in time. Trait anger, on the other hand, refers to one's tendency to perceive situations in ways that trigger state anger. Someone who is said to be high in trait anger is more likely than those with low trait anger to become

angered over time and in a wide variety of situations (Spielberger, 1983).

In an attempt to “integrate the various theoretical perspectives and provide a definition that has treatment utility,” Galovski, et al. (2006, p. 18), authors of the recent APA-published book on “Road Rage,” defined anger as a “respondent to stimuli that evoke hostility or inherently signify attack or opposition that is characterized by an interoceptive, negatively valenced, arousal state that functions to facilitate the planning and selection of behaviors to reduce or thwart attack or opposition” (p. 18). Driving anger, therefore, can be defined as a negative, internal response that has cognitive, emotional, and physiological components. These commonly, but not exclusively, lead to anger-specific expressions and behaviors. Nevertheless they are also often context-specific and occur in response to the roadway behaviors of others and other driving-related stimuli (T. E. Galovski et al., 2006).

#### *Measures of Driving Anger*

Research has tried to address the problem of driving anger as it relates to driving aggression, health, and overall driving safety. Numerous studies have endeavored to describe, measure, and propose interventions for driving anger. Methods of measuring driving anger have come in the forms of self-report scales, presenting driving scenarios to elicit responses, driving logs or diaries, laboratory simulation, and observation.

*Self-reports scales.* The study of driving anger began in earnest in 1994 when noted anger scholar Jerry Deffenbacher and his associates at Colorado State University undertook research to describe and quantify what they termed “one personality factor related to drivers’ safety” (J.L. Deffenbacher et al., 1994, p. 83), namely driving anger. They developed a 33-item scale called the Driving Anger Scale (DAS) (J. L. Deffenbacher et al., 2000; J.L. Deffenbacher et al., 1994) in order to measure trait anger that is “more frequent and intense while operating a motor vehicle” (1994, p. 84). They wanted to design a scale that examined driving anger as separate from trait anger. Deffenbacher et al. posited that “those higher in driving anger would be expected to become angry more frequently because more of these (driving) situations arouse anger and to experience a greater intensity of anger in these situations” (J.L. Deffenbacher et al., 1994, p. 84). Thus the DAS measures an “individual’s disposition to become angry while driving” (J. L. Deffenbacher et al., 2000, p. 287).

The DAS was derived from a cluster analysis of 53 items given to over 1500 college freshmen. Each was presented with driving situations that are potentially anger provoking. The final 33-item scale had six reliable subscales: “Hostile Gestures” by other drivers; “Illegal Driving” by other drivers; “Police Presence;” “Slow Driving” by other drivers; “Discourtesy” by other drivers; and “Traffic Obstructions.” The DAS has shown overall internal consistencies of  $\alpha=.90$  and  $.93$ , and ten-week test-retest reliabilities of  $.88$  as well as good face



validity (J. L. Deffenbacher et al., 2000). A short version of the DAS with 14 items was also developed and showed internal consistencies of  $\alpha=.80$  and  $.82$  and a high correlation ( $r=.95$ ) with the long version.

The DAS has been shown to correlate positively with general trait anger, discriminate between low-anger and high-anger drivers, and reliably assess one's propensity for developing maladaptive levels of anger while driving (J. L. Deffenbacher et al., 2000; J. L. Deffenbacher et al., 2001; P. Ellison-Potter et al., 2001; Sharkin, 2004). The total scores on the DAS also correlate "with aggressive and risky behaviors, and with accidents and accident-related outcomes" (J. L. Deffenbacher et al., 2000, p. 289). There were no gender differences on the total DAS score, but "men were more angered by police presence and slow driving whereas women were more angered by illegal behavior and traffic obstructions" (J.L. Deffenbacher et al., 1994, p. 83). The DAS has been used in numerous studies of driving anger and aggressive driving around the globe (Iversen & Rundmo, 2002; Knee et al., 2001; Lajunen et al., 1998; Parker et al., 2002; Sullman, Gras, Cunill, Planes, & Font-Mayolas, 2007; Villieux & Delhomme, 2007)

A second, lesser known scale designed specifically to measure driving anger as a personal characteristic and identify anger-prone drivers is the Propensity for Angry Driving Scale (PADS) (DePasquale et al., 2001). The authors recruited several sample groups, including college students and safety

professionals. The research was done in four phases in order to develop the PADS. Factor analysis identified only one single factor. The PADS demonstrated alpha levels of .88-.89 and test-retest reliability of .91. The scores on the PADS correlated positively with well-validated scales measuring hostility (Buss & Durkee, 1957), state and trait anger (Spielberger, 1983), and (Eysenck, Pearson, Easting, & Allsopp, 1985). However, there has been very little empirical use or validation of the PADS, perhaps because of its uni-dimensional nature. There has also not been a comparison of the PADS with the DAS total or subscale scores.

In order to directly examine the expressive manifestations of driving anger, Deffenbacher's anger research team created another driving anger measure, the Driving Anger Expression Inventory (DAX) (J. L. Deffenbacher, Lynch et al., 2002). The DAX reliably measures various dimensions of anger expression, namely, "Verbal Aggressive Expression" (e.g., yelling at another driver); "Personal Physical Aggressive Expression" (e.g., physically confronting and/or fighting with another driver); and "Use of Vehicle to Express Anger" (e.g., cutting-off or tail-gating another vehicle), and an "Adaptive/Constructive Expression" dimension (e.g., relaxing, positive self-talk, and other positive coping efforts). The aggressive forms of expression in the DAX correlated positively with each other ( $r_s=0.39-0.48$ ) and were either correlated negatively or not correlated with Adaptive/Constructive Expression (i.e., non-aggressive responding) ( $r_s=-.02$  to  $-0.22$ ). Internal consistencies for the four dimensions

ranged from  $\alpha=0.81$  to  $\alpha=0.90$ . Verbal Aggressive Expression and Personal Physical Aggressive Expression both correlated positively with driving anger as measured by the DAS. The authors concluded that the four dimension outcome may “provide a more refined assessment of individuals and outcomes for interventions for the reduction of driving anger and aggressive driving (J. L. Deffenbacher, Lynch et al., 2002, p. 736). The main limitation of the measure’s usefulness is its inability to measure displaced aggression, a construct that appears to be difficult to operationalize.

As discussed in the first chapter, the difficulties with interpersonal communication inherent while driving can lead to an inability to coordinate perspectives, divergent interpretations of driving situations, anger, and aggression. Thus, how drivers think about driving situations is relevant to the study of driving anger and in particular to the current examination of perspective-taking as a potential cognitive mediator of driving anger.

To gauge the cognitive elements of driving anger, Deffenbacher et al. developed the Driver’s Angry Thoughts Questionnaire (DATQ) (J. L. Deffenbacher, Filetti et al., 2003). After using a sample of 272 first year college students to complete a questionnaire, factor analysis resulted in five subscales of driving anger-specific cognitions: “Judgmental/Disbelieving Thinking,” “Pejorative Labeling/Verbally Aggressive Thinking,” “Revenge/Retaliatory Thinking,” “Physically Aggressive Thinking,” and “Coping Self-instruction.”

Internal reliability for the first three subscales were reported to be above .90, and the reliability for the Coping Self-instruction subscale was shown to be .83. The authors reported preliminary validity for the DATQ. In terms of correlations, the Pejorative Labeling/Verbally Aggressive Thinking, Physically Aggressive Thinking, and Revengeful/Retaliatory Thinking subscales correlated positively with one another and with driving anger (DAS), aggressive driving anger expression (DAX), aggression, and risky driving behavior. As one might predict, the Coping Self-instruction subscale correlated negatively with the aggression-oriented variables.

*Personal driving experiences.* In addition to analyzing subjects' responses on validated anger-related scales, idiographic assessments of subjects' anger ratings to their own, unique driving experiences can be informative. In the Personal Driving Anger Situations (J. L. Deffenbacher, Filetti et al., 2003), subjects are asked to describe in detail two situations on the road that give rise to their most intense anger and then rate their anger in each situation (i.e., 0-100). Alpha reliability is not applicable to this measure, because of the unique nature of each situation. However, Deffenbacher et al. note that the Personal Driving Anger Situations instrument "is an adaptation of the Anger Situation measure [(J. L. Deffenbacher, Story, Brandon, Hogg, & Hazaleus, 1988)], which had a 10-week test retest reliability of .81" (J. L. Deffenbacher, Filetti et al., 2003, p. 125). In one study using the Personal Driving Anger Situations, "high anger" drivers reported

more intense anger than “low anger” drivers, however some “low anger” drivers did report surprisingly high levels of anger in the one situation that they deemed to be the most angering for them (J. L. Deffenbacher, Filetti et al., 2003). There is not much attention or support, however, given to this specific measure in the literature.

In his study comparing anger “on the road” versus “off the road,” Parkinson (2001) had his subjects describe in open-ended form two very recent incidents—one while driving and the other in non-driving, “everyday” situations—in which they had become noticeably angry. Participants were asked to include references to a number of situational details, including their purpose for being in the situation or for making the trip; who the target of their anger was, and whether or not they personally knew the person; what actions specifically led their anger; and in the driving situation, what the road and traffic conditions were at the time of the incident. Further questions about the participants’ two situations focused on their internal experience of anger, any affect prior to the encounter, whether communication factors impacted their anger (e.g., desire for the target to provide an apology, acknowledgement, or other feedback), and the participants’ judgment about who was to blame for the incident. The study concluded that “certain features of the road situation differentially predispose drivers to become angry and that the resulting anger tends to take a different form from anger experienced off the road” (p. 507).

Another form of measure used to capture data on individuals' real driving anger experiences is driving logs and diaries. These methods allow anger events to be reported much sooner than in questionnaire or situation recall methods and thus sharply reduce the likelihood of any memory loss or distortions. This near real-time documentation also facilitates a greater level of detail than in recall-based self-report measures. Examples of driving logs include those used by Deffenbacher and his associated in several driving anger studies (J. L. Deffenbacher, Filetti et al., 2003; J. L. Deffenbacher et al., 2000; J. L. Deffenbacher et al., 2001). In one experiment, the Driving Log was used to collect specific details about each participant's driving journeys, anger, aggression, and risky driving behavior over a three-day period. Combined with information gathered from validated questionnaires, including the DAS (J.L. Deffenbacher et al., 1994), the researchers found that "High anger drivers reported more frequent and intense anger and more frequent aggression and risky behavior on the Driving Log" (J. L. Deffenbacher, Filetti et al., 2003).

Using a related form of event reporting, Underwood et al. (G. Underwood et al., 1999) asked participants to record specific data about each individual driving journey on a mobile Dictaphone-type tape recorder. 104 British drivers participated in the study and followed written instructions on how to report the details of every journey over a two-week span with the exception of quick drives (i.e. under a few minutes) to get fuel, etc. In order to provide the subjects with a

template for the types of events to report they were given lists of typically anger-provoking incidents taken from the DAS (J.L. Deffenbacher et al., 1994) as well as a list of “acts of courtesy” so as to “counter-act any tendency to over-report incidents of anger, as the otherwise sole emotion recorded” (G. Underwood et al., 1999, p. 59). The authors’ goal was to gain information about the relationship between near-accidents and anger, which “has the advantage that the frequency of such incidents is comparable to the frequency of anger experienced while driving” (G. Underwood et al., 1999, p. 57) and thus was expected to provide the highest level of accuracy and relevance to the participants’ reporting. Their findings included high levels of anger in response to near-accidents, especially those in which the participant attributed the blame for the incident on the other driver.

In attempt to leave very little reporting accuracy to chance, Hennessy and Wiesenthal (Hennessy & Wiesenthal, 1999) used special hands-free cellular phones to interview sixty drivers during their commute to and from work or school in the Metropolitan Toronto, Ontario area. Although the study focused on driver stress and not driving anger, this method is important to note because of its potential to capture in-vivo emotional and behavioral responses to driving situations similar to a field research environment. The most significant limitation in this study was the use of only one driving trip per subject, rather than a collection of experiences spread over time. Because of numerous trait and situational factors that may contribute to driver stress and emotions, collecting a

driver's data on a single outing limits the opportunity to capture various potential responses for each driver over time.

*Semi-structured interview plus observation.* One rare and elaborate field study of driving anger was used to supply UCLA sociology professor, Jack Katz, with data for the "Pissed off in LA" chapter in his book "How Emotions Work" (Katz, 1999, pp. 18-86). Katz used 150 college students to interview an equal number of drivers in the greater Los Angeles area while being passengers during the subjects' commutes. The interviewers asked open-ended questions in order to inspire the participant-drivers to describe recent "road rage" incidents in which they participated or observed. The in-vivo nature of the interview allowed for the observer to collect not only the subject's recollection of recent events but also real-time data on the driver's immediate experience on the road. Katz' conclusions are many. However, in general he describes the automobile as a unique environment in which social scripts, intrapsychic forces, and the physical aspects of driving lead to intense levels of anger—often infused with shame—that offended drivers attempt to transfer to their targets. Although Katz's work provides important qualitative insight into the emotional and cognitive workings of admittedly angry drivers, the lack of empirical analysis, validity and reliability limits the usefulness of this otherwise fascinating study.

*Laboratory simulations.* In efforts to apply strict controllability and objectivity to quantitative studies of driving behavior, a handful of driving studies



has been done using laboratory simulators to various extents over the years (J. L. Deffenbacher, Deffenbacher et al., 2003; Dorn & Matthews, 1995; P. Ellison-Potter et al., 2001; Heimstra, Ellingstad, & DeKock, 1967; G. Matthews et al., 1998; Stephens & Groeger, 2006). However, only a few of these studies had driving anger as their focus.

Dorn and Matthews (1995) used a driving simulator to measure post-task moods of their subjects, but they did not collect any driving parameters. Stephens and Groeger (2006) had participants rate their emotions while taking a test drive in a driving simulator in which they encountered random interruptions that impeded their journeys (e.g., pedestrians crossing the road, slow drivers ahead, etc.). Results included increased anger and reduced calmness when “drivers” were forced to reduce their speed, however, no interaction was noted between trait measures of anger and driving events. Using a larger sample than they did (n=24) may have an impact on the results of this type of study. In their exploration of the relationship between trait driving anger, driver anonymity, and aggressive driving, Ellison-Potter, Bell, and Deffenbacher (P. Ellison-Potter et al., 2001) found no main or interaction effects of trait driving anger, however participants engaged in more aggressive driving behaviors (e.g., number of red lights run, collisions, speed, breaking) when their anonymity was maintained and when they were exposed to aggressive stimuli in the simulator. In an explanation of the lack of evidence for a trait driving anger link with aggressive driving—a link that has

been clearly demonstrated in several studies by Deffenbacher and his team—the authors suggested that the lack of provocation by other drivers might be responsible.

An example of what appears to be a very successful use of driving simulation is Deffenbacher et al.'s study comparing the behavior of low and high anger drivers (J. L. Deffenbacher, Deffenbacher et al., 2003). The driving simulation method was used mainly to add artificial situational traffic impedance and appears to have yielded useful data for that purpose. However, the authors' confidence in the support given to their multiple hypotheses came from "the fact that support was found across three different methodologies (i.e. self-report surveys, field study diaries, and driving simulations)" (p. 714). The results of the study gave further support for the concept of dispositional driving anger and that those who rate as high trait anger drivers have a greater inclination towards more frequent and intense episodes of driving anger and aggressive behavior on the road.

Aside from the utility of using driving simulators to mimic traffic impedance and certain other roadway conditions, these tools present participants with tasks, stimuli, and risks that are artificial and hypothetical in nature. As such, they cannot adequately reproduce driving situations in which interpersonal, often emotionally charged interactions—including the real sensations of threat,

injustice, and frustration—trigger organic affective, cognitive, and behavioral reactions.

*Observation-based studies.* Observation-based studies are relatively uncommon in the recent literature on driving anger. Some of the earliest driving studies done were created with field observation as the main instrument (Appel, Blomkvist, Persson, & Sjöberg, 1980; Chase & Mills, 1973; Deaux, 1971; Doob & Gross, 1968; Turner et al., 1975). The majority of these and later observational experiments (Diekmann, Jungbauer-Gans, Krassnig, & Lorenz, 1996; Ellison, Govern, Petri, & Figler, 1995; Kenrick & MacFarlane, 1986) were mainly concerned with the role of specific objective, situational factors (e.g., social status, anonymity, or demographic status of drivers, ambient temperature, and roadway conditions) in provoking horn-honking and other relatively mild forms of aggressive roadway behavior. These authors had little interest in drivers' internal experiences of anger, and therefore they generally excluded subjective measures of driving anger, which seem to be exponentially more prominent in recent literature. Perhaps other reasons that observational studies are uncommon in the study of driving anger include the expense of training and using observers, the unobservable nature of subtle acts of aggressive driving, the relative rare occurrence of observable, gross forms of roadway aggression, and the legal and ethical issues surrounding any potential manipulations of drivers or driving

conditions such as were performed in the earliest research (Chase & Mills, 1973; Deaux, 1971; Doob & Gross, 1968; Turner et al., 1975).

### *Perspective-taking*

Perspective-taking can best be defined as “the tendency or ability of an individual to consider a situation from another’s point of view” (Mohr et al., 2007, p. 508). Perspective-taking is commonly accepted in the literature as the sole cognitive dimension of empathy and has been empirically and theoretically distinguished from the emotional dimensions of empathy (Davis, 1980, 1983; Decety, 2005; Hogan, 1969; Richardson et al., 1994)

Perspective-taking is widely accepted as an indispensable cognitive skill in the normal maturation process of human beings (Decety, 2005) and is considered essential for success in most social interactions (Epley, Morewedge, & Keysar, 2004). In their unique elaborations on moral development, both Kohlberg (1976) and Gilligan (1993) emphasized that normal maturation requires increased cognitive functioning along a continuum from an egocentric perspective, to focusing on others’ perspectives, and then finally to integrating the multiple perspectives of self and other.

Although the vast majority of recent literature uses the general term, “perspective-taking,” some rather significant and notable scholarly attention on the topic diverged earlier into two unique aspects of this cognitive skill. Mead’s (1934) observations of children found that they readily assumed the role of

another person. This ability to take on another's point of view in order is important to develop a complete sense of self. In this situation, Mead was referring *conceptual* perspective taking. Piaget (Piaget & Inhelder, 1956) used his "Three Mountain Test" to evaluate what he established as children's normal developmental *perceptual* perspective-taking abilities. In the test, children were assessed based on their demonstrated ability to imagine the perspective of a fictitious other that was said to be looking at a specially constructed mountain scene from an angle different from the child being tested.

Historically, perspective taken was thought to develop around the age of 7, the start of concrete operations (Piaget & Inhelder, 1956). However, later researchers found perceptual perspective-taking in evidence with 3 year-olds (Flavell, 1974; Marvin, Greenberg, & Mossler, 1976) and conceptual perspective-taking with 5 and 6 year old children (Marvin et al., 1976; Mossler, Marvin, & Greenberg, 1976). Children younger than this are believed not to possess an adult-like "theory of mind" and thus generally cannot "distinguish between their own mental states and those of others" (Keysar, Lin, & Barr, 2003, p. 25) or conceive of others' actions as being determined by underlying mental states (Keysar et al., 2003).

In terms of a structural model of developmental perspective taking, it was Robert Selman who established the theory of specific developmental stages of perspective-taking (Selman, 1976; Selman & Byrne, 1974). In Selman's Level

0—thought to occur in children from approximately 3-6 years of age—children recognize that others can have thoughts and feelings different from themselves but often confuse them; in Level 1 (ages 4-9), children notice that people have different perspectives because they are influenced by different information in the environment; in Level 2 (ages 7-12), children develop the ability to view themselves from another person's perspective and know that others can do the same; in Level 3 (ages 10-15), children can imagine how a third, impartial person can view an interpersonal situation involving the child and another person; in Level 4 (14-up), the person recognizes that social values can impact each individual's perspective of a given situation. Selman's theory is particularly relevant to the realm of driving anger, because it is based on how individuals develop the perspective-taking skills that are essential to navigating social dilemmas such as interpersonal conflicts (Selman, 1976).

*Deficits and lapses in perspective-taking.* Like other traits, perspective-taking ability is recognized as developing along a continuum, with some adults having attained higher skill levels than others (Chandler, 1973; Davis, 1980, 1983; Galinsky & Moskowitz, 2000; Leith & Baumeister, 1998; D. T. Marsh, Serafica, & Barenboim, 1980; Richardson et al., 1998; B. Underwood & Moore, 1982). However, having such skill and employing it does not always follow, and thus, having “the ability to distinguish between their own perspective and the perspective of others does not mean that adults reliably and spontaneously use this

ability when reasoning about them” (Decety, 2005, pp. 145-146). How do such lapses occur?

One explanation for lapses in adult perspective-taking is that although as we age we gain perspective-taking skills, we never lose our childhood tendency towards egocentrism and a self-oriented perspective (Barr & Keysar, 2005; Epley et al., 2004). In fact, it has been proposed and supported through empirical research in developmental psychology that “our default mode to reasoning about others is biased towards the self-perspective” (Decety, 2005, p. 146) and that through a combination of mature mental processes—including mental flexibility, emotional sharing, and self-other awareness—adults continually correct their egocentric errors and shift away from their own perspective to the consideration of other’s perspectives (Barr & Keysar, 2005; Decety, 2005; Epley et al., 2004).

This dual-process “egocentric-correction” account of adult perspective-taking suggests that “egocentrism isn’t outgrown so much as it is overcome each time a person attempts to adopt another’s perspective” (Epley et al., 2004, p. 765) and that with increasing age and practice “adults are better able to correct an egocentric interpretation” (p. 766). Thus, along with our perspective-taking abilities, we ideally develop skills in our youth to rapidly detect and correct egocentric errors. Therefore, adults who are less prone to take the perspective of others may have the ability to do so but are deficient in some portion of the complex of cognitive mechanisms that are required in order to trigger the change

in perspective. Further, research in this area suggests that situational factors, such as attentional load, impact our ability to abandon our egocentric biases and correct egocentric interpretations of interpersonal interactions (Epley et al., 2004). This suggests that the environment of the automobile itself—and the ongoing, overlapping demands on drivers' attention—may further inhibit perspective-taking performance and especially so in those found to be dispositionally deficient in this skill.

As stated, persons who demonstrate deficiencies in social perspective-taking skills—or application of those skills—“have been shown to systematically misread societal expectations, to misinterpret the actions and intentions of others, and to act in ways which were judged to be callous and disrespectful of the rights of others” (Chandler, 1973, p. 326). The present study examines the potential link between such deficiencies in perspective-taking and trait driving anger.

*Measures of perspective-taking.* As detailed above, perspective-taking has been the subject of scientific interest and examination for over seven decades. The vast majority of perspective-taking studies has focused on the early developmental processes of this trait and its correlates and have thus engaged children—and in some cases adolescents—as the main source of subjects. Driving, which is almost exclusively an adult endeavor, is the context for the present examination. Therefore, the bulk of the perspective-taking research—



focusing on children and young adolescents—is not relevant to the present study and will be excluded from this review.

Historically, there has been a dearth of empirical literature relying on the measurement of social perspective-taking exclusively in adults. This deficiency was noted by Underwood and Moore (1982) in their very thorough meta-analysis of studies that examined the relationship between perspective-taking and altruism and pro-social behavior. One possible explanation for this deficiency is that the key developmental role perspective-taking plays in childhood and early adolescence had led to a strong bias towards examining this trait during early developmental phases when interventions might be thought have the greatest impact.

Another explanation might be the historical academic and research communities' conventions for labeling and examining empathy, the mother construct from which social perspective-taking has only relatively recently been sifted out and defined as a relevant, unique factor in adult human behavior and thus given academic attention of study. In his groundbreaking introduction of a multidimensional approach to individual differences in empathy, Davis (1980) critically reviewed the history of empathy measurement and cites several prominent studies and popular instruments in which the unique constructs of cognitive and emotional empathy were lumped together resulting in a single “empathy” score, making it impossible to “differentiate between these two types

of individual differences [and presenting] considerable problems in interpreting the effects of “empathy” on human behavior” (p. 4). It appears that only after Davis’ development of this new empathy model—and introduction of perspective-taking as an equally important focus of academic study—did researchers endeavor in earnest to examine perspective-taking in adults

In a review of the limited number of studies available that include a measurement of adult social perspective taking, two methodology groupings emerged: *experimental manipulations* of social perspective-taking conditions; and individuals’ *self-reports* on scales or questionnaires that assess perspective-taking tendencies across time and place. Within the experimental studies, researchers tended to employ one of two types of methods: *exposure to media* with accompanying instructions for subjects to intentionally shift perspectives from themselves to the actors in the media presentation—and respond in various ways to these shifts; and *task manipulations* that involve various forms of masked or altered interpersonal interactions between subjects that were controlled and manipulated by experimenters in order to generate a range of responses from the participants. Following are examples of these categories of perspective-taking studies.

*Experimental manipulations.* In their 2000 exploration of the relationship between perspective-taking and social stereotyping, Galinsky and Moskowitz showed three groups of undergraduate college students the same “black and white

photograph (presented on a computer screen) of an older man sitting on a chair near a newspaper stand” (p. 711). The subjects were then asked to write a brief narrative essay about what they thought was a typical day in the life of the subject in the photograph. While two-thirds of the participants were placed in either a control group or a “suppression” group—told not to let stereotypes influence their essays—the final group was “instructed to adopt the perspective of the individual in the photograph and ‘imagine a day in the life of this individual as if you were that person, looking at the world through his eyes and walking through the world in his shoes’” (p. 711). The results of the study support the idea that perspective-taking diminishes “not just the expression of stereotypes but their accessibility” whereas “stereotype suppression [also] appears to be an effective strategy for reducing the expression of stereotypes, but it not only fails to reduce but can exacerbate bias” (p. 722).

Batson, Early, and Salvarani (1997) examined what they define as two often confused sub-divisions of perspective-taking, “imagining how another feels” and “imagining how you would feel,” with the goal of identifying unique emotional and motivational response patterns from unique groups of participants asked to use these perspective-taking distinctions during the experiment. The subjects—all of whom were “general psychology students” in an undergraduate university—were asked to listen to a bogus radio interview with a university student identified as “in need” because she was “struggling to care for her

younger brother and sister after the death of her parents” (p. 752). Three groups were placed in either the “objective, imagine other, or imagine self” conditions and subsequently given very detailed instructions on how to attend to and interpret the radio interview vis-à-vis the manipulated perspective desired by the examiners. Participants were then asked to complete a reaction questionnaire in order to assess each subject’s emotional state and level of distress while listening to the bogus radio show as well as a measure designed to measure the subjects’ assessments of the “in need” student’s actual need and their ability to follow the specific listening instructions given—to be objective or to consider one of the two distinct perspective types being examined. Results suggested that both forms of perspective-taking produces emotional responses towards those in need, however, imagining how another feels appears to evoke empathic emotions and altruistic motivation, while imagining how you would feel may lead to more personal distress and egoistic motivation.

Perspective-taking studies that use real or fictitious media as the stimuli are limited in their usefulness, because these methods appear to measure an individual’s propensity to take the perspective of an observed, static protagonist rather than one’s ability to consider the perspective of another person in a social interaction as part of an interpersonal relationship. Thus, a media-based experiment would not at all address the type of perspective-taking processes that are involved in sharing the road with other vehicle drivers.

In their multi-study examination of the relationship between perspective-taking and aggression, Richardson et al. (1994) included two studies that involved experimental manipulation of perspective by subjects who were confronted with various levels of threat from confederates with whom they were interacting in highly controlled situations. One study pitted paired off male college students against one another in a contrived reaction time task competition in which mild physical shocks were used as the method of both threat and retaliatory aggression. Another study—using college students of both sexes who were paired off by gender—used a hierarchy of verbally aggressive phrases delivered to each subject through computer screens by their study partners as the mode of aggressive threat and retaliation.

In both studies, experimenters split the participants into groups based on differing perspective-taking conditions and then manipulated each subject's experience in order to look for different responses—aggression or inhibition of aggression--depending on the level of aggressive threat imposed on them. The studies' results "suggest that...perspective-taking can serve as an inhibitor of aggressive responding...under moderate threat; it was an ineffective inhibitor of such behavior when threat was extremely low or extremely high" (Richardson et al., 1994, p. 287). These conclusions are consistent with Zillmann's (1988) cognitive-excitation model of aggression inhibition, discussed in chapter one, and

“suggest that any factor that enhances cognitive processing might decrease aggression” (Richardson et al., p. 287).

The usefulness to the present study of perspective-taking studies that rely on experimental manipulation is questionable. Methodologically, there is a significant amount of scholarly controversy regarding what should be deemed “correct” manipulations of perspective-taking as well as over notably inconsistent effects of manipulations in such studies (Goldstein & Michaels, 1985; Miller & Eisenberg, 1988; Richardson et al., 1994; Wispe, 1986). In terms of the precise construct intended to be measured, perspective-taking studies that exclusively use experimental manipulation are limited to assessing their subjects’ situational perspective-taking, specifically in experimenter-controlled environments in which they are instructed how to focus their attention. Such studies fail to attend to the dispositional tendency—over time and in different situations—of individuals to take on the perspective of another without being directly prompted and guided. It is precisely this dispositional perspective-taking that the present study is concerned with as individual differences in this tendency may be related to one’s propensity to develop significant levels of anger while driving.

*Self-report measures.* As noted above, Mark Davis (1980; 1983) pioneered the contemporary model for empathy as a multidimensional construct. The outcome of Davis’ research was a revolutionary tool for measuring individual differences in empathy—including cognitive empathy, also known as perspective-

taking—the Interpersonal Reactivity Index (IRI) (Davis, 1980, 1983). The IRI “reliably assesses four separate, and relatively independent, qualities of the individual” (1980, p. 16), namely the Fantasy Scale (FS)—tapping one’s “tendency to imaginatively transpose oneself into fictional situations (e.g., books, movies, daydreams)” (p. 11); the Empathic Concern Scale (EC)—that assesses “the degree to which the respondent experiences feelings of warmth, compassion, and concern for the observed individual” (p. 12); the Personal Distress Scale (PD)—that “measures the individual’s own feelings of fear, apprehension, and discomfort at witnessing the negative experiences of others” (p. 12); and the Perspective-taking Scale (PT)—that “taps the tendency of an individual to entertain the psychological point of view of other people (i.e., to put aside temporarily one’s own perspective and attempt to adopt that of another)” (Franzoi, Davis, & Young, 1985, p. 1585).

All four of the IRI subscales have “satisfactory internal and test-retest reliabilities (internal reliabilities range from .71 to .77; test-retest reliabilities range from .62 to .71)” (Davis, 1983, p. 117), and the PT subscale specifically is reported to have “adequate internal reliability ( $\alpha = .75$  for male subjects and .78 for female subjects)” (Franzoi et al., 1985, p. 1585). A significant number of investigations (Bernstein & Davis, 1982; Davis, 1980, 1983; Franzoi et al., 1985; Mohr et al., 2007; Zechmeister & Romero, 2002) reported evidence that the PT scale “indeed measures the individual’s tendency to spontaneously adopt the

psychological point of view of others” (Franzoi et al., 1985, p. 1585) and is thus a valid measure.

Since the creation of the IRI in 1980, literally hundreds of studies have included one or more of its subscales in their investigations. Only a few studies, however, have used the PT scale of the IRI in investigations in to the role of dispositional perspective-taking in the development of anger and/or aggression in adults.

In their exploration of “Empathy as a Cognitive Inhibitor of Interpersonal Aggression,” Richardson et al. (1994) engaged in three distinct studies. One study—discussed above—manipulated perspective-taking among subjects as they engaged in a reaction-time task involving giving and receiving shocks inside of interactions with study confederates. The two other studies included the IRI among their methods. The first study used the IRI along with other self-report measures exclusively. The other study used the IRI in conjunction with another self-report measure and a reaction-time task in which perspective-taking was manipulated in the presence of aggressively verbal stimuli between subjects. In both cases, examiners found ample evidence to support their expectation of a negative relationship between dispositional perspective-taking and aggressiveness, especially when there was a moderate level of threat involved. The authors noted that their research supported the findings of Miller and Eisenberg (1988) who in their meta-analysis of studies examining empathy and



aggressing found that significant relationships between empathy [including perspective taking] and aggression were more likely in studies that assessed empathy with questionnaires than with those that employed empathy manipulation” (Richardson et al., 1994, p. 277). Such findings give further support for the use of the IRI—along with other relevant, reliable self-report measures—in the study of dispositional perspective-taking and its relationship with aggression and anger.

Based on their findings that little research existed prior to 2007 that directly tested the hypothetical—and logically expected—association between perspective-taking deficits and anger arousal, Mohr et al. (Mohr et al., 2007) set “to examine the links between perspective-taking and anger arousal following interpersonal provocation at differing levels of ambiguity of intent” (p. 509) and hypothesized a strong negative relationship between dispositional perspective-taking ability and anger arousal in interpersonally provocative situations. Over 600 adult subjects—all Australian undergraduate student volunteers—were shown two pairs of video vignettes filmed from the perspective of the views and each with a high and low ambiguity of intent acted out by the fictional provocateurs. After watching the videos, subjects were asked to complete a series of self-report questionnaires including Davis’ IRI (1980), the State-Trait Anger Expression Inventory-2 (STAXI-2) (Spielberger, 1999), and a custom questionnaire of attributional and appraisal questions. The authors concluded that “the overall

picture painted of individuals who are relatively indisposed to viewing matters from another person's standpoint is of individuals who are more likely to feel affronted and to blame the aggressor, more prone to anger, and when it happens, more inclined to act it out or be troubled by it" (Mohr et al., 2007, p. 515).

*Attributions, Anger, and Perspective-taking*

A related construct to perspective-taking is the social-psychological construct of "fundamental attribution bias," commonly referred to as "fundamental attribution error" (Heider, 1958; L.D. Ross, 1977). Attributions describe our beliefs about the causes of events that affect us. In turn, our responses—emotional and behavioral—are informed by the attributions we assign to such events. Attributional biases occur in many situations, especially during conflict, when cognitions can be influenced by internal motivations such as the need to protect our self-esteem. The fundamental attribution error is the psychological operation in which one over attributes internal, dispositional causes for another's behavior rather than external, situational causes. The flip side to this cognitive process—also called the "actor-observer effect"—is the tendency to attribute external, situational causes to acts committed by oneself, thus escaping the same blame and responsibility more easily cast onto others. Such self-biased internal attributions tend to permit us to respond negatively—commonly with anger or aggression—especially when we determine that the event was controllable and thus avoidable by the other party (Baxter, Macrae, Manstead, Stradling, & Parker, 1990;

Berkowitz, 1993; Epps & Kendall, 1995; Jones & Harris, 1967; L. D. Ross, Amabile, & Steinmetz, 2005; Weiner, 1985).

Because of the interpersonally-isolative effect of the automobile itself—thoroughly discussed in prior sections—drivers are left with little information to inform their attributions about the behavior they encounter. This is especially the case for behaviors that appear to frustrate one's transit goals, threaten one's person, passengers, and property, or trigger our sense of injustice and outrage. As a result, drivers make lightning quick inferences about other drivers' behavior and the drivers themselves, and these inferences tend to be subject to cognitive biases—such as fundamental attribution error—and thus can trigger emotional and behavioral responses such as driving anger and road rage aggressions (J. S. Baxter et al., 1990; Britt & Garrity, 2006; B. A. Matthews & Norris, 2002).

Although as recently as 2006 Britt and Garrity found that “very little research has been conducted on the role of attributions and road rage” (p. 129), a few notable previous studies have explored the link between cognitive biases and how drivers judge and react to the offensive behaviors of fellow drivers. Knapper and Cropley (1978) concluded that drivers were likely to become aggressive towards other drivers based on biased attributions derived from unsupported inferences made on-the-spot during road altercations. Baxter, Macrae, Manstead, and Parker (1990) found clear evidence of the actor-observer effect in that individuals engaged in offensive driving behaviors attributed situational factors to their

actions, while dispositional factors were given prominence when subjects were asked to explain the provocative actions of another driver. In their own research, Britt and Garrity (2006) found that the “attributions drivers make for anger-provoking incidents are related to the emotional and behavioral components of the road rage response” (p. 145) and that “attributions to a stable cause within the offending driver were related to higher reports of aggressive behavior and anger” (p. 141). Thus it appears, cognitive biases—specially the fundamental attribution error—may play significant roles in drivers’ perceptions of each others’ actions on the road and in their emotional and behavioral responses to those perceptions.

The link between perspective-taking and attributions has been explored by only a few researchers (Betancourt, 1990; Gould & Sigall, 1977; Regan & Totten, 1975). Overall, these cognitive scholars found evidence that paying greater attention to the perspective of others is related to less biased, more accurate attributional assessments of others’ behavior and improved social interactions (e.g., conflict resolution and helping behaviors). Such a relationship between the two cognitive processes suggests there would be empirical value in cross-validating the data on perspective-taking and driving anger with data from the related construct of fundamental attribution error. In this current study, vignettes were used to capture these potential attributional biases.

### *Summary*

In the present review of the literature on driving anger and perspective taking, we have shown that the psychological phenomenon commonly referred to as “road rage” is best examined through the well-established and validated social-psychological construct of driving anger. Driving anger is defined as a negative internal response with cognitive, emotional, and behavioral components that is triggered in response to a variety of behaviors by other drivers that are evaluated to be offensive (e.g., a threat, impeding a goal, or unjust). Driving anger has been shown to lead to retaliatory driving behaviors ranging from tailgating and horn honking to assault and homicide.

Of the many measures of driving anger, the Driving Anger Scale (J.L. Deffenbacher et al., 1994) has been shown to be the most reliable and valid instrument. Additional measures of drivers’ negative experiences on the road include the use of in-vivo driving diaries, logs, and interviews, field observation, laboratory simulators, and hypothetical driving situational vignettes. The present review concluded that using the DAS would yield the most useful data for the purposes of the present study, given limitations such as budget, time, and access to an appropriate sample of willing subjects.

The cognitive constituent of empathy, namely social perspective-taking, was reviewed in terms of its role in normal human individual development and interpersonal functioning. Several explanations were considered to account for

adult deficits in perspective-taking including developmental shortfalls and situational factors (e.g., over-stimulation, distraction, and interpersonal isolation such as in the cocoon-like environment of the automobile). Although there so far has been a relative dearth of empirical investigations regarding adult perspective-taking deficits, several methods were reviewed, including experimental manipulations, exposure to fictional and non-fictional media representations, and self-report instruments. This review found that the perspective-taking (PT) scale of Mark Davis' Interpersonal Reactivity Index (IRI) (Davis, 1980, 1983) is best suited to measure an individual's capacity towards social perspective-taking and has reliability and validity superior to the other methods discussed.

A related social-psychological cognitive construct, dispositional attributional bias, was included in the review of literature because of its similarity to perspective-taking and potential to be a confounding variable in the relationship of driving anger and perspective taking. Recent findings have been supportive of a link between attributional bias and driving anger and aggression (J. S. Baxter et al., 1990; Britt & Garrity, 2006; B. A. Matthews & Norris, 2002). Vignettes were shown to be the near-exclusive method used for measuring dispositional attributional bias and were employed in the present study to cross-validate data from the main two constructs, driving anger and perspective-taking.

*Research Question and Method*

The present study used an on-line survey questionnaire to elicit information from a community sample on the relationship between driving anger and perspective taking. It was expected that individuals who measured higher in social perspective-taking ability would be found to be lower in trait driving anger, and conversely, respondents who showed a lesser tendency towards perspective-taking would be found to rate higher in trait driving anger measures. Dispositional attributional bias data was expected to suggest a negative relationship with perspective-taking and thus a positive relationship to driving anger.

## Method

### *Hypotheses*

1. It was expected that participants who measured higher in social perspective-taking ability would be found to be lower in trait driving anger, and conversely, respondents who showed a lesser tendency towards perspective-taking would be found to rate higher in trait driving anger. Perspective-taking ability was measured using the Perspective-taking (PT) scale of the Interpersonal Reactivity Index (IRI). Trait driving anger was measured using the long form of the Driving Anger Scale (DAS) created by Jerry Deffenbacher and his team.
2. It was expected that those subjects who saw others as more dispositional than situational in their offensive driving behaviors would be likely to be higher in trait driving anger and those who saw others as less dispositional would rate lower in trait driving anger. Participants' attributions of others were determined by the subjects' response to a series of hypothetical driving vignettes, producing a score. Higher scores indicated greater dispositional attributions and lower scores indicated lower dispositional attributions about others. These scores were examined for their correlation to scores on the Driving Anger Scale (DAS).
3. It was expected that those subjects who saw others as more dispositional than situational in their offensive driving behaviors were likely to be lower



in perspective-taking ability and those who saw others as less dispositional would measure higher in perspective-taking ability. Using the same scores generated in response to the attributional hypothetical driving vignettes referred to in hypothesis two, correlations were evaluated with participants' scores on the Perspective-taking scale of the Interpersonal Reactivity Index (IRI).

4. It was expected that male respondents would show a tendency greater than females towards driving anger. This was explored by comparing scores on the DAS to the responses to gender on the demographic questionnaire.
5. It was expected that respondents who drive more hours of the week than others would rate higher in driving anger. This was explored by correlating scores on the DAS to the responses to the number of driving hours per week question on the demographic questionnaire.
6. It was expected that subjects who have more years of driving experience would rate lower in driving anger. This was explored by comparing scores on the DAS to the responses to the number of driving years question on the demographic questionnaire.
7. It was expected that subjects who reported higher levels of monthly alcohol consumption as reported on the demographic questionnaire would rate higher in driving anger.

### *Recruitment of Participants*

Subjects were recruited electronically through emails, social networking websites, and driving and “road rage” blogs. Inclusion criteria included a) Being at least 18 years of age; b) Having a valid driver’s license; c) Operating a motor vehicle at least one time per month. Exclusion criteria included never having operated a motor vehicle.

### *Procedure*

Subjects who agreed to participate and accepted the terms of informed consent provided responded to a survey questionnaire that included six sections: 1) demographic questions; 2) driving experience questions; 3) a driving anger measure (“Driving Anger Scale”) (J.L. Deffenbacher et al., 1994); 4) a perspective-taking measure (“Perspective-taking” scale from “The Interpersonal Reactivity Index”) (Davis, 1980, 1983); 5) hypothetical driving scenarios that allowed subjects to identify their attributions regarding other drivers’ propensity to behave dispositionally on the road; and 6) “road rage” questions that collected collateral data regarding subjects’ perceptions regarding the term “road rage” and related driving behaviors by themselves and other drivers.

*Driving Anger Scale (DAS).* The Driving Anger Scale (DAS) (J. L. Deffenbacher et al., 2000; J.L. Deffenbacher et al., 1994) was designed to measure driving anger as separate from trait anger. The 33-item DAS thus assesses an “individual’s disposition to become angry while driving” (J. L.

Deffenbacher et al., 2000, p. 287). The DAS was derived from a cluster analysis of 53 items given to 1526 college freshmen (average age=18). Each was presented with driving situations that are potentially anger provoking. The final 33-item scale has six reliable subscales: “Hostile Gestures” by other drivers ( $\alpha=.87$ ); “Illegal Driving” by other drivers ( $\alpha=.80$ ); “Police Presence” ( $\alpha=.79$ ); “Slow Driving” by other drivers ( $\alpha=.81$ ); “Discourtesy” by other drivers ( $\alpha=.81$ ); and “Traffic Obstructions” ( $\alpha=.78$ ). The DAS has shown overall internal consistencies of  $\alpha=.90$  and  $.93$ , and ten-week test-retest reliabilities of  $.88$  as well as good face validity (J. L. Deffenbacher et al., 2000). In Maltby et al.’s commissioned review of the DAS (Maltby, Lewis, & Hill, 2000), they found that “total scores on the DAS correlate positively with the frequency and intensity of anger while driving, with the tendency for different driving conditions to elicit anger, with aggressive and risky behaviors, and with accidents and accident-related outcomes” (Maltby et al., 2000). A short version of the DAS with 14 items was also developed and showed internal consistencies of  $\alpha=.80$  and  $.82$  and a high correlation ( $r=.95$ ) with the long version.

*Perspective-taking Scale.* As noted in the previous chapter, Mark Davis (1980; 1983) pioneered the contemporary model for empathy as a multidimensional construct. The outcome of Davis’ research was a revolutionary tool for measuring individual differences in empathy—including cognitive empathy, also known as perspective-taking—the Interpersonal Reactivity Index

(IRI) (Davis, 1980, 1983). The IRI Perspective-taking Scale (PT) “measures the tendency to adopt the point of view of other people in everyday life” (Davis, 1983, p. 117).

All four of the IRI subscales have “satisfactory internal and test-retest reliabilities (internal reliabilities range from .71 to .77; test-retest reliabilities range from .62 to .71)” (Davis, 1983, p. 117), and the PT subscale specifically is reported to have “adequate internal reliability ( $\alpha = .75$  for male subjects and .78 for female subjects)” (Franzoi et al., 1985, p. 1585). A significant number of investigations (Bernstein & Davis, 1982; Davis, 1980, 1983; Franzoi et al., 1985; Mohr et al., 2007; Zechmeister & Romero, 2002) reported evidence that the PT scale “indeed measures the individual's tendency to spontaneously adopt the psychological point of view of others” (Franzoi et al., 1985, p. 1585) and is thus a valid measure. Means for the PT subscale were shown to be 16.78 ( $sd=4.72$ ) for Males ( $N=579$ ) and 17.96 ( $sd=4.85$ ) for Females ( $N=582$ ) (Davis, 1980).

*Additional survey questions.* The survey included several sets of questions developed specifically for the purposes of this inquiry. Standard demographic questions (e.g., age, education, ethnic and cultural background, and employment status) provided typical demographic data used for statistical purposes such as testing hypotheses regarding how differences in drivers related to responses to the main construct measures (i.e., driving anger and social perspective-taking).

Questions regarding the subjects' driving experience (e.g., reasons for driving, types of routes taken, quantity of weekly driving, and number of years of driving) provided valuable data for evaluating possible interactions between subjects' driving experience and the main constructs. A brief section examining drivers' perceptions about "Road Rage" as a social phenomenon distinct from the main construct of "Driving Anger" provided additional data regarding how drivers make evaluations of their own and other drivers' behaviors as anger-provoking and offensive or not. Additionally, this data was expected to add to the understanding about subjects' propensity to engage in dispositional attributional bias, the third construct examined in the present study.

Finally, the investigator created hypothetical driving scenarios to which subjects were asked to respond in terms of their evaluation of the driving behaviors highlighted. Evaluations were made regarding how likely the behavior would anger the respondent and the likelihood that the behavior was motivated by dispositional or situational factors. The data from these responses made it possible to evaluate participants' predilection to engage in dispositional attributional bias and for purposes of cross-validation with driving anger, perspective-taking, demographic, and driving experience data.

*Procedure for data gathering.* Subjects were directed to a specific website (<http://www.surveymonkey.com/drivingsurvey>) in order to participate in the study. Subjects began by reading and agreeing to the online informed consent

form (see Appendix B). The form described the study, the inclusion and exclusion criteria, confidentiality, the right to withdraw at any time and debriefing procedures. Inclusion criteria included a) being at least 18 years of age; b) having a valid driver's license; and c) operating a motor vehicle at least one time per month. Exclusion criteria included never having operated a motor vehicle. Subjects were informed that they could stop participating in the study at any time and not answer questions that made them uncomfortable. In back of the informed consent form, subjects responded to the survey questionnaire as described above (and provided in Appendix C). Participants who completed the survey were provided with debriefing information explaining the general areas of concern of the study (see Appendix D). Data was collected until an adequate number of responses were received. The ideal sample size was planned to be between 120-200 subjects, with a minimum of 100 subjects. Once data collection was completed, data was exported into the proper format for importation into SPSS for statistical processing.

#### *Data Analysis*

*Hypothesis 1.* Participants who measured higher in social perspective-taking ability were expected to be found to be lower in trait driving anger, and conversely, respondents who showed a lesser tendency towards perspective-taking were expected to be found to rate higher in trait driving anger. *Statistic planned to be used: Pearson's R correlation analysis.*

*Hypothesis II.* Subjects who saw others as more dispositional than situational in their offensive driving behaviors were expected to measure higher in trait driving anger and those who saw others as less dispositional were expected to rate lower in trait driving anger. *Statistic planned to be used: Pearson's R correlation analysis.*

*Hypothesis III.* Subjects who saw others as more dispositional than situational in their offensive driving behaviors were expected to be measure lower in perspective-taking ability and those who saw others as less dispositional were expected to measure higher in perspective-taking ability. *Statistic planned to be used: Pearson's R correlation analysis.*

*Hypothesis IV.* Male respondents were expected show a tendency greater than females towards driving anger. *Statistic planned to be used: T-test.*

*Hypothesis V.* Respondents who drive more hours of the week than others were expected to rate higher in driving anger. *Statistic planned to be used: Pearson's R correlation analysis.*

*Hypothesis VI.* Subjects who have more years of driving experience were expected to rate lower in driving anger. *Statistic planned to be used: Pearson's R correlation analysis.*

*Hypothesis VII.* Subjects who reported higher levels of monthly alcohol consumption were expected to rate higher in driving anger. *Statistic planned to be used: Pearson's R correlation analysis.*

## Results

### *Sample Descriptive Data*

*Demographic data.* The original sample consisted of 436 respondents, of which 39 did not complete the survey, leaving 397 (91%) as the working sample size. In terms of gender identification within the sample, 254 (64%) participants identified themselves as female and 142 (35.8%) as male, while 1 participant declined to respond.

There was a very wide range of ages represented in the sample; the youngest was 19 years old and the oldest 88. The mean age was 47.9 years old (SD=15.2). The age distribution across the sample was as follows: 6.1% of the sample were in the 18-25 year old age group; 16.2% were in the 26-35 year old age group; 28.0 % were in the 36-45 year old age group; 16.4% were in the 46-55 year old age group; 16.7% were in the 55-65 year old age group; and 16.6% were over the age of 65.

In terms of ethnic, cultural, or national identification, 83.1% of the sample endorsed “White (Non-Hispanic);” 4.5% selected one of “Asian,” “Asian-Indian,” “Chinese,” “Filipino,” “Japanese,” “Korean,” or “Vietnamese;” 4.0% either endorsed “Mixed Race” or made multiple endorsements crossing over ethnic clusters; 3.5% chose “Latin American,” “Latino/Hispanic,” or “Mexican;” 1%



endorsed “African” or “African American or Black;” 1.3% selected one of “Arab,” “Armenian,” or “Persian;” and 2.5% did not respond to this question.

Regarding relationship status, the sample data was as follows: 67.9% was either married or living with a partner; 21.5% selected “never married;” 9.1% endorsed either divorced or separated; 1.5% were widowed; and 1 person did not respond. While in regards to family size, 41.8% of the sample have no children, while 26.7% have two children, 14.9% have one child, 11.4% have three children, and 4.5% have more than three.

In terms of highest level of education attained by the sample, only 2.8% had never attended any form of college, 23.7% earned a Bachelor’s degree, 43.1% completed a graduate degree, and 16.1% earned a doctorate (Ph.D., Psy.D., J.D., or M.D.). Additionally, current annual household income ranges for the sample are as follows: 5.3% of the sample earns less than \$10,000/year; 5.5% earns \$10-30,000/year; 7.1% makes \$31-50,000/year; 12.3% selected \$51-75,000/year; 17.1% earns \$76-100,000/year; 20.2% makes \$101-150,000/year; and 27.5% of the sample households earn more than \$150,000/year.

A relationship between monthly levels of alcohol consumption and trait driving anger was hypothesized, therefore information about alcohol consumption was reported for the sample as follows: 134 respondents (33.8% of the sample) reported no monthly alcohol consumption; 71.1% of those who reported monthly consumption (or 48.4% of the total sample) reported consuming between 5 and 30

alcoholic beverages each month, or approximately one drink per day or less; 20.2% of those who reported monthly consumption (or 13.7% of the total sample) consume 31-60 beverages per month, or between one and two drinks per day on average; 1.9% of those who reported monthly consumption (or 1.3% of the total sample) consume between 61 and 90 alcoholic beverages a month, or between two and three per day on average; 5.7% of those who reported monthly consumption (or 3.9% of the total sample) report drinking between 91 and 120 beverages each month, or approximately three to four each day; .8% of those who reported monthly consumption (or .5% of the sample) report drinking between 121 and 150 drinks per month, or approximately four each day on average.

*Automobile and driving data.* The sample indicated driving a wide range of vehicle types (see Table 1). The two largest categories reported were Sedan (37.0%) and SUV (15.6%). Regarding vehicle make, the sample data shows a very wide spread of automobile manufacturers. The brands with the largest percentage of drivers in the sample were: Toyota (20.9%), Honda (17.4%), VW (5.8%), Ford (5.3%), Lexus (4.5%), and BMW (4.3%).

In terms of the length of time that a respondent reported driving his main vehicle, 29.5% of the sample endorsed two or fewer years; 31.2% endorsed three to five years; 38.1% indicated six or more years. Six individuals (1.5%) did not respond. Additionally, participants indicated that they do the majority of their

driving in the following types of region: suburban (47.6%), urban (42.1%), and rural (7.1%). Thirteen participants (3.3%) did not respond.

Whether respondents considered themselves “commuters” or not, 64% indicated yes and 35.8% responded no. One person did not respond. Of the segment of the sample who indicated they were commuters, the shortest commute time was 45 minutes per week (nine minutes per day) and the longest 21 hours per week (4.2 hours per day). The mean commute time per week was 5.2 hours (1.04 hours per day).

In terms of total weekly miles driver for the entire sample—commuters and non-commuters combined—the mean was 149.4 miles per week with a range from less than one mile per week to as many as 1050 miles in one week. The mean number of days per week driven by the sample is 5.45 with the range being from one to seven days per week.

In terms of moving violations, 11.8% (n=47) of the sample reported never receiving a ticket in their lifetimes; 18.1% (n=72) received either one or two tickets; 38% (n=151) received three or four; 27.2% (n=108) received between five and ten tickets; and 4% of the sample (n=16) received greater than 10 tickets in their lifetime. Three subjects (.8%) did not respond.

As for history of being involved in a motor vehicle accident, 13.9% (n=55) of the sample said they have never been in an accident; 24.7% (n=98) have been in one accident; 44.8% (n=178) have been involved in 2 or 3 accidents;

16.4% (n=65) have been in 4 or more accidents. One person (.3%) did not respond.

Table 1.

*Vehicle Types Driven By Sample*

Vehicle type	n	Percent
Convertible	17	4.3%
Coupe	27	6.8%
Crossover	8	2.0%
Hatchback	41	10.3%
Hybrid	25	6.3%
Luxury	14	3.5%
Motorcycle	4	1.0%
Pick-up Truck	10	2.5%
Sedan	147	37.0%
SUV	62	15.6%
Van/Minivan	27	6.8%
Wagon	14	3.5%
Total	397	100.0%

*Primary Hypotheses*

Hypothesis 1 predicted that participants who measure higher in social perspective-taking ability would be found to be lower in trait driving anger, and conversely, respondents who showed a lesser tendency towards perspective-taking will be found to rate higher in trait driving anger. Although visual evaluation and cursory review of descriptive statistics for the distribution for perspective-taking suggested a normal distribution, the Kolmogorov-Smirnov (Lilliefors Significance Correction) test for normality showed significance ( $\alpha$

(397)=.068,  $p < .001$ ) indicating that perspective-taking was not normally distributed. Therefore the originally proposed use of Pearson's Product Moment statistic was inappropriate, and the non-parametric statistic, the Spearman's rho was used instead. A significant correlation was found in the predicted direction using the non-parametric rank correlation statistic Spearman's rho ( $\rho (397) = -.106, p < .05$ ).

Hypothesis 2 predicted that subjects whose attributional style leads them to see others as more dispositional than situational in their offensive driving behaviors were likely to be higher in trait driving anger and those who see others as less dispositional would be lower in trait driving anger. Based on visual and descriptive statistical evaluation and the Kolmogorov-Smirnov (Lilliefors Significance Correction) test for normality, the results for attributional style showed significance ( $\alpha (397)=.208, p < .001$ ) indicating a non-normal distribution. Again, this made the originally proposed use of Pearson's Product Moment statistic inappropriate. Using instead Spearman's rho, a significant correlation between the tendency towards a dispositional attributional style and driving anger was found to be significant in the predicted direction ( $\rho (395) = .181, p < .01$ ).

Hypothesis 3 predicted that subjects who see others as more dispositional than situational in their offensive driving behaviors would likely be lower in perspective-taking ability, and those who see others as less dispositional would be

higher in perspective-taking ability. No evidence of a significant relationship between these two variables was detected.

Hypothesis 4 predicted that Male respondents would show a tendency greater than females towards driving anger. No evidence of a significant relationship between these two variables was detected.

Hypothesis 5 predicted that respondents who drive more hours of the week than others would rate higher in driving anger. No evidence of a significant relationship between these two variables was detected.

Hypothesis 6 predicted that subjects who have more years of driving experience would rate lower in driving anger. Quantification of subjects' "years of driving experience" was not included in the survey; therefore the stated physical age of respondents in the sample was used as the independent variable. As such, no evidence of a significant relationship between these two variables was detected.

Hypothesis 7 predicted that subjects who report higher levels of monthly alcohol consumption would rate higher in driving anger. No evidence of a significant relationship between these two variables was detected.

#### *Supplemental Analyses*

*Driving anger results.* Results for the hypothetical relationships between driving anger and other constructs (i.e., perspective-taking, attributional style, gender, weekly drive time, driving experience, and alcohol consumption) were

discussed in detail in the prior section. Descriptive statistics for the Driving Anger Scale total score (J.L. Deffenbacher et al., 1994)—the principal measure of driving anger in the present study—and its subscales deserve review as well. For the scale total, the mean was 95.8 and standard deviation 20.6. The DAS subscale results are shown in order of high-to-low mean score: Discourtesy ( $M = 30.0$ ,  $SD = 6.4$ ); Traffic Obstructions ( $M = 18.9$ ,  $SD = 5.5$ ); Slow Driving ( $M = 15.8$ ,  $SD = 4.3$ ); Illegal Driving ( $M = 13.2$ ,  $SD = 3.7$ ); Police Presence ( $M = 9.1$ ,  $SD = 3.6$ ); and Hostile Gestures ( $M = 8.9$ ,  $SD = 3.2$ ). All subscales were significantly correlated to the total score as follows: Discourtesy,  $r(395) = .90$ ,  $p < .001$ ; Traffic Obstructions,  $r(395) = .85$ ,  $p < .001$ ; Slow Driving,  $r(395) = .75$ ,  $p < .001$ ; Police Presence,  $r(395) = .71$ ,  $p < .001$ ; Hostile Gestures,  $r(395) = .67$ ,  $p < .001$ ; and Illegal Driving,  $r(395) = .63$ ,  $p < .001$ .

*Perspective-taking results.* Dispositional perspective-taking was measured using the Perspective-Taking Scale (PT) of the Interpersonal Reactivity Index (Davis, 1980, 1983). The mean score for the sample ( $n=397$ ) was 25.04 and standard deviation 4.3. There were some differences noted between males ( $n=142$ ,  $M=24.0$ ,  $SD=4.3$ ) and females ( $n=254$ ,  $M=25.7$ ,  $SD=4.1$ ).

*Attribution bias results.* Respondents were presented with a measure authored for this study that featured four driving scenarios in which they were asked to determine whether the hypothetically offensive driving behaviors by other the drivers were likely caused by “Situational factors” (i.e. external) or

“Something about them, like their personality” (i.e. internal, dispositional). For each of the four scenarios, more than half of the respondents made the dispositional attribution. When faced with the idea of having another driver take a parking space the respondents felt that they had arrived at first, 76.4% selected the dispositional attribution. When imagining being stuck behind a cell-phone chatting driver who fails to proceed with driving when a traffic light turns green, 65.1% felt the driver’s dispositional traits were responsible. When thinking about not being given the opportunity to turn onto a street in which the respondent did not have any legal right of way—and seeing a tangentially oncoming car speed up rather than slow down—54% chose the dispositional explanation. When imagining being held back by a driver who was blocking respondents from going the speed limit or faster in the highway fast lane, 53% of the sample made the dispositional attribution.

Overall, 32 respondents (8.1%) never endorsed the dispositional attribution, meaning they always endorsed the situational; 45 respondents (11.3%) chose the dispositional attribution only once and the situational attribution 3 times; 105 (26.4%) selected dispositional and situational twice each; 127 (32%) made the dispositional attribution 3 out of 4 times and the situational attribution only once; 88 (22.2%) endorsed the dispositional attribution for every scenario and never selected the situational one.



Using the above-mentioned grouping data for attribution style, a one-way ANOVA was used to test for possible effects of attribution style on perspective-taking and driving anger. No significant effect was found for perspective-taking. However, there was a very significant effect of attribution on driving anger,  $F(4, 392) = 4.44, p = .002$ , therefore those with a more dispositional attributional style in terms of ratings on the vignettes were higher in driving anger, and those who saw the driving scenarios as more situationally-explainable were lower in driving anger.

Another important aspect of examining attributions involves measuring whether acts by others are considered stable or instable. In the present study, stability attributions were assessed by asking participants to project the frequency with which other drivers are likely to engage in the offensive behaviors represented in the hypothetical situations. There was a significant relationship,  $\rho(377) = .530, p < .01$ , between the sample's scores on dispositional attributions and stability attributions.

Although the Driving Anger Scale was the principal measure of driving anger in the present study, a separate anger scale was created by this author and included in the hypothetical situations attributions section. For each of the above-mentioned driving scenarios used to assess attributional style, participants were asked if the offensive driving behavior described would make them angry or not with a simple sum resulting in the score. This measure was positively correlated

with the Driving anger scale ( $\rho(384) = .424, p < .01$ ), the attributional frequency (stability) scores ( $\rho(373) = .267, p < .01$ ), and the dispositional attributional scores ( $\rho(384) = .189, p < .01$ ). Table 2 is included to provide a comparison for the two possible attributional responses and the anger scale for each of the hypothetical situations. The parking scenario is the one situation that earned the highest score in dispositional attribution, prediction of frequency of behavior, and anger response.

Table 2.

*Frequency and Percentage Of Responses To Hypothetical Driving Scenarios*

Situation	Dispositional (score)	Dispositional (%)	Frequency (score)	Frequency (%)	Anger (score)	Anger (%)
Parking Space	79	31.6	255	27.1	92	32.3
Fast lane block	54	21.6	236	25.1	74	26.0
Stoplight block	64	25.6	233	24.8	68	23.9
Left turn yield	53	21.2	227	24.1	56	19.6

*Road Rage results.* Although the term “Road Rage” is not commonly used as a construct in scholarly literature, it remains the construct most commonly used in conventional social discourse and the public media. For that reason, participants were asked a series of questions in order to illuminate participants’

conceptualizations of road rage, including their personal experiences, understandings about the phenomenon, and assumptions about the roles of both actors and observers in road rage encounters. These questions were asked at the conclusion of the survey in order not to confuse participants or contaminate their responses to the primary, validated measure of driving anger.

In this section, participants were asked to endorse which roadway behaviors they believe define road rage. The complete definition list provided was the result of culling the relevant literature for the most prevalent offensive driving behaviors and salient emotional states. The list included observable, obviously hostile, violent behavior (e.g., ramming with one's car and threatening another driver with a weapon), observably hostile but not necessarily violent gestures (flipping off another driver or Yelling at another driver), observable but ambiguous behavior (e.g., tail-gating, honking, and flashing the lights), and internal emotional states that are felt by participants or inferred to be felt by other drivers (e.g., feeling anger or feeling frustrated). Results (Table 3) show the top three definitions as ramming with one's car, threatening another driver with a weapon, and flipping off another driver. The three least endorsed behaviors include honking, flashing the lights, and feeling frustrated.

Table 3.

*Road Rage Definitions Endorsed By Participants*

Behavior	(n)	(% of respondents)
Ramming with one's car	320	81.8
Threatening another driver with a weapon	313	80.1
Flipping off another driver	310	79.3
Assaulting another driver	298	76.2
Yelling at another driver	295	75.5
Vehicular homicide	272	69.6
Tail-gating	263	67.3
Feeling anger while driving	236	60.4
Slamming on the breaks	212	54.2
Honking	171	43.7
Flashing the lights	128	32.7
Feeling frustrated	111	28.4

The second question in the road rage section asked participants to identify which offensive roadway behaviors they felt they have been victim to. The list provided included nine of the definitions from the previous question and excluded Vehicular Homicide—for obvious reasons—and the two feeling states (e.g.,

frustration and anger). Results are shown in Table 4. The most commonly endorsed behaviors were Honking, Tail-gating, and Flipping off another driver. The least frequent were slamming on the breaks, threatening another driver with a weapon, and ramming with one's car.

Table 4.

*Road Rage Behaviors Done To Participants*

Behavior	(n)	(% of respondents)
Honking	344	89.6
Tail-gating	323	84.1
Flipping off another driver	247	64.3
Yelling at another driver	223	58.1
Flashing the lights	190	49.5
Slamming on the breaks	104	27.1
Threatening another driver with a weapon	13	3.4
Ramming with one's car	9	2.3
Assaulting another driver	4	1.0

The third and final road rage questions asked participants to disclose which of the driving behaviors they have themselves committed in the past. The list provided was the same as in the previous question. The most frequent

responses for this sample include honking, tail-gating, and flipping another driver off. The least frequent were threatening another driver with a weapon, ramming with one's car, and assaulting another driver. See Table 5 for the complete results.

Table 5.

*Road Rage Behaviors Performed By Participants*

Behavior	(n)	(% of respondents)
Honking	323	89.0
Tail-gating	94	25.9
Flipping off another driver	115	31.7
Yelling at another driver	134	36.9
Flashing the lights	175	48.2
Slamming on the breaks	43	11.8
Threatening another driver with a weapon	4	1.1
Ramming with one's car	4	1.1
Assaulting another driver	1	0.3

*Gender.* Although no significant differences were discovered between women's and men's scores for driving anger, there was a significant effect for gender for perspective-taking,  $t(280) = 3.80$ ,  $p < .001$ , with women receiving higher scores ( $M = 25.66$ ,  $SD = 4.12$ ) than men ( $M = 23.97$ ,  $SD = 4.31$ ). There

was also a significant difference found in attributional style  $t(314) = 2.68, p < .05$ , with men receiving higher scores ( $M = 2.70, SD = 1.11$ ) than women ( $M = 2.37, SD = 1.22$ ), meaning that men in the sample attributed others' offensive driving behavior to personality factors more than did women in the sample. In terms of self-reports of number of days per month subjects witness or feel "road rage" themselves, significant gender effects were found with women scoring higher than men in both cases. For frequency of witnessing road rage,  $t(379) = 2.12, p < .005$ , women scored higher ( $M = 4.74, SD = 12.03$ ) than men ( $M = 1.50, SD = 3.70$ ); for frequency of feeling road rage,  $t(313) = 3.20, p < .005$ , women scored higher ( $M = 4.22, SD = 12.3$ ) than men ( $M = 1.50, SD = 3.7$ ).

As reported, there was a significant relationship demonstrated between attributional style (i.e. dispositional vs. situational) and driving anger for the sample. Those who showed a more dispositional attributional style reported higher levels of driving anger. When examined by gender, however, no correlation was found for men alone. Nevertheless there was a significant positive correlation between higher dispositional attributional style and higher scores on driving anger for both women ( $\rho(253) = .219, p < .01$ ) and for the entire sample ( $\rho(395) = .181, p < .01$ ).

Although no evidence was found within the sample for a significant relationship between monthly alcohol consumption and driving anger, the data does demonstrate a significant relationship between monthly alcohol consumption

and attributional style, ( $\rho(394) = .110, p < .05$ ). Higher monthly alcohol use was correlated with a higher dispositional attribution style. However, the relationship appears to only be significant for the women in the sample ( $\rho(252) = .130, p < .05$ ), while no significant correlation is evident for the males in the sample. This is especially notable given the significant difference ( $t(232) = 3.00, p < .05$ ) in the mean consumption of alcohol reported by the men ( $M = 23.01, SD = 28.8$ ) and the females ( $M = 14.63, SD = 22.1$ ). A similar gender difference was found when the relationship between the lifetime number of moving violation tickets and attributional style was examined. Women in the sample who reported a higher number of moving violations were significantly more likely to report a more dispositional attributional style, while the men in the sample were not.

*Anecdotal data.* Anecdotal data comes from email communications from participants after taking the survey. The more common comments made include a sense that they learned a lot about their own anger reactions on the road through taking the survey; some felt their understanding of what “road rage” is was dramatically impacted by the survey; and, most impressive, some realized that instead of their prior self-description as road rage victims (i.e., other drivers were the exclusive perpetrators of offensive driving behaviors and expressions of rage), they realized that they too, at least occasionally, drive in ways that offend other drivers, and that they express anger in the car more often than they had thought. Several participants said that their experience taking the survey was “therapeutic”



and predicted that they would change the way they thought about and reacted to other drivers by increasing their attention to perspective-taking.

## Discussion

### *Summary of Key Findings*

The present study set out to explore the nature of the relationship between social perspective-taking—also referred to as cognitive empathy—and trait driving anger. Driving anger has been linked in the literature to aggressive driving, roadway violence, and numerous negative consequences to individuals and society such as stress-related health problems, property damage, bodily injury, and death (J. L. Deffenbacher, Deffenbacher et al., 2003; T. E. Galovski et al., 2006; Martinez, 1997; Mizell et al., 1997; NHTSA, 2004; Novaco, 1991). Survey data, along with demographic and driving experience data, was collected in order to examine participants' dispositional driving anger and perspective-taking. In addition, a series of vignettes and questions about them examined cognitive attributions across different challenging driving situations. Relationships among these variables were studied in the hope that the study's findings might add to the scholarly understanding of what is popularly called “Road Rage” and provide insight leading to clinical approaches to reduce this high-cost societal phenomenon.

*Perspective-taking and driving anger.* Participants who measured higher in social perspective-taking ability were found to be lower in trait driving anger, and conversely, respondents who endorsed lower levels of perspective-taking

were found to rate higher in trait driving anger. Although this finding was expected, it is discrepant with what appears to be the only study to examine the relationship between these two specific variables, and the only study to use the same measures used in the present study (i.e., Driving Anger Scale (DAS) (J.L. Deffenbacher et al., 1994) and the Perspective-taking Scale (PT) of the Interpersonal Reactivity Index (IRI) (Davis, 1980, 1983). In his *Anger on and off the road*, Brian Parkinson (2001) examined the relationship between driving anger and both the perspective-taking (PT) and Empathic Concern (EC) scales of the IRI. The author found no reliable correlation between perspective-taking and driving anger. However, he was surprised to find a positive correlation between empathic concern and driving anger ( $r(113) = .19, r < .05$ ), where he expected a negative one. To explain this, Parkinson hypothesized that the offended driver, rather than focusing his empathy on the other offending driver, concerns himself with the potential feelings of his fellow drivers (e.g., fear, anger, worry). According to this hypothesis, Parkinson speculates that they are impacted by the offending driver's behavior as well. As a result, the offended driver's anger is triggered by his empathy for the community of drivers sharing the road with him. In this way he or she experiences a kind of protective bond with other victims of offensive and potentially dangerous roadway behaviors.

One possible explanation for the discrepant results between the present study and Parkinson's study include differences in the sample. Parkinson's study

involved a British sample. Driving norms in Britain may be considerably different compared to norms on the roads in large metropolitan areas in the U.S. Also there was an age difference between the two samples. The mean age was 30 for the British study compared to 47.9 for the present study. This age discrepancy may have led to differences in the findings. For example, as drivers who are older may gain in both driving and life experience, perspective-taking may also increase as driving anger decreases with age. This may result in a significant negative correlation between the two constructs in this older sample compared to the younger British sample.

The unexpected empathic concern correlation in the Parkinson study discussed above indicates a cultural difference that again might suggest a collectivistic concern for fellow drivers in the British sample that counteracted any potential anger-mediating impact by perspective-taking towards the offending driver. This collectivistic concern would then contrast with what might be labeled a more individualist cultural norm within the American sample for the present study. Collectivism has been noted to be valued in mainstream British culture (Beer, 1958, 1969; Burton, 2003; Greenleaf, 1983). On the other hand, the mainstream United States is more renowned for being a prototypical individualist culture (Bellah, 1985; Hofstede, 1980; Kim, 1994; Tocqueville, 1985; Triandis, 1994). Given this, the U.S. drivers may be more individualistic in their attitudes and behavior. This might lower their potential to experience empathic

identification with other drivers. Such a hypotheses, focusing on the individualism-collectivism dimension as related to multiple dimensions of empathy (i.e., empathic concern and perspective-taking), would be an important source of study in future research.

Finally, by Parkinson asking his participants questions from both the Empathic Concern and the Perspective-taking scales of the IRI, the similarity and transparency of these constructs as well as the number of items involved may have sensitized these participants to endorse higher empathy across the sample. In contrast, this current study included only the PT scale and so there were many fewer questions resulting in lower likelihood that clients would uniformly respond with higher PT. The reasoning behind this hypothesis is that many of the empathic concern items suggest an actively altruistic, collectivistic, and protective response to others in distress, e.g. “When someone gets hurt in my presence, I feel sad and want to help them” and “When I see someone being taken advantage of, I feel kind of protective toward them.” Such items pulled for an endorsement of emotional empathy over the perspective-taking items which reflect a more passive, individualistic, cognitive response to interpersonal conflict for these participants given that driving anger can be such an emotional experience. Given this, future research in this area would benefit from more careful examination of the roles of both emotional and cognitive dimensions of empathy as they relate to the genesis of driving anger.

Although his study was not specifically concerned with anger in the context of operating an automobile, Mohr et al. (2007) found significant evidence of a general “relationship between dispositional perspective-taking and the likelihood of anger arousal following an interpersonal provocation” (p. 514). Interestingly, Mohr used two hypothetical interpersonal scenarios in his study, one of which involved one driver being “cut off for a parking space by another driver” (p. 514). Although he did not express any conclusions about driving anger per se, Mohr did find a negative correlation between perspective-taking and anger in his driving scenario which provided some additional support for this study’s correlation between the two.

*Attribution bias and driving anger.* Participants in the study whose attributional style led them to see others as more dispositional than situational in the hypothetical offensive driving situations measured higher in trait driving anger, and those who saw others as less dispositional and more situational measured lower in trait driving anger. Self-biased dispositional attributions have been shown to foster anger and aggression across situations (J. S. Baxter et al., 1990; Berkowitz, 1993; Epps & Kendall, 1995; Jones & Harris, 1967; L. D. Ross et al., 2005; Weiner, 1985), so having evidence of a similar relationship between dispositional attributions and driving anger is consonant with this research.

Britt and Garrity (2006) examined the relationships between the different types of attributions made about offensive driving behaviors (i.e., locus, stability,

and globality) and anger and aggression. They found that “higher levels of aggressive behavior and anger were associated with attributing causality for the event to a stable factor within the individual” such as personality (p. 135).

Baxter, Macrae, Manstead, and Parker (1990) found clear evidence in the driving arena of the “actor-observer effect”—an attributional construct closely-related to the fundamental attribution error. This posits that individuals engaged in offensive driving behaviors would be more likely to attribute situational factors to their actions, while dispositional factors were given prominence when subjects were asked to explain the provocative actions of another driver. Although anger was not the focus of their study, Baxter and associates hypothesized in their discussion section a potential causal relationship between such an attributional bias and the increased likelihood of frustration and anger behind the wheel.

*Attribution bias and Perspective-taking.* Participants whose attributional style led them to see others as more dispositional than situational in the hypothetical offensive driving situations did not rate lower as expected in perspective-taking ability, and likewise, those who saw others as less dispositional (i.e., more situational) did not measure higher in perspective-taking ability.

The link between perspective-taking and attributions has been explored by only a few researchers (Betancourt, 1990; Gould & Sigall, 1977; Regan & Totten, 1975). Overall, these cognitive scientists found evidence that paying greater attention to the perspective of others is related to less biased, more accurate and

situational attributional assessments of others' behavior. These individuals were also likely to have more positive social interactions with others (e.g., conflict resolution and helping behaviors). However, none of these studies focused on social perspective-taking (i.e., cognitive empathy) per se; rather, the authors referred to perspective-taking interchangeably with being empathic so there was no obvious differentiation between emotional and cognitive empathy.

Betancourt (1990), found that “the perspective of a potential helper (empathic vs. objective) influenced the perception of controllability of the causal attribution” (p. 573). In other words, lower levels of empathy were shown to be correlated with the perception that the offending party had full control and thus volition over the offending behavior. Higher levels of empathy therefore were related to more accidental or situational causal attributions. Regan and Totten (1975) found, as they predicted, “taking the perspective of the target through empathy resulted in attributions that were relatively more situational and less dispositional than attributions provided by standard observers” (p. 850).

In light of the outcomes of the two empathy studies discussed above, the lack of evidence in the present study to support a negative correlation between social perspective-taking (i.e. cognitive empathy) and dispositional attribution bias may be a result of a number of factors. One possible explanation is that the measure used to examine attributional bias may have been weak. Using driving vignettes to look at attributions only measures it in this limited context whereas



using a more comprehensive measure of attribution bias such as the attributional style questionnaire might have provided a stronger correlation here. Also, it may be that the emotional elements of empathy play a significant role in shaping attributions, whereas the cognitive empathy elements measured in perspective-taking may be less impactful to attributional bias. In this way, measuring emotional empathy and attributional bias may have resulted in a more significant relationship between the two compared to perspective taking.

*Gender differences in trait driving anger.* There was no evidence shown for a significant relationship between participants' gender and their tendency towards driving anger. This finding is consistent with the bulk of the studies that have examined trait driving anger (J. L. Deffenbacher, Filetti et al., 2003; J.L. Deffenbacher et al., 1994; P. Ellison-Potter et al., 2001; Lajunen et al., 1998; Lawton & Nutter, 2002; Parkinson, 2001).

*Driving volume and driving anger.* There was no evidence shown for a significant relationship between the weekly number of hours driven by participants and their tendency towards driving anger. This finding is consistent with the vast majority of the driving anger literature that included driving quantity—expressed in mileage or time—as an independent variable (Bjorklund & Aberg, 2005; J. L. Deffenbacher, Lynch et al., 2002; J. L. Deffenbacher, White, & Lynch, 2004; Lajunen et al., 1998; Lawton & Nutter, 2002). One explanation for the lack of correlation between driving volume and driving anger is that

people who drive a lot every week might be commuters or drive for a living, and thus tend to become accustomed to driving delays and offensive driving behaviors and, as a result, are less emotionally reactive. Another explanation is that people who drive in commute traffic tend to be going slower and are in close proximity with other drivers. Therefore there might be fewer opportunities to tail-gate, cut-off, or make any gains vis-à-vis other drivers stuck in traffic too. There is also greater visibility and thus less driver anonymity in denser driving situations, which means there are fewer routes to escape. Thus the risk of retaliation for inciting others' driving anger is higher, making conditions less favorable for committing offensive driving behaviors.

*Age and driving anger.* There was no significant relationship between a participant's age—assumed to strongly correlate with years of driving experience—and her tendency towards driving anger. The driving anger literature that included driver age or years of driving experience as an independent variable has mixed results in terms of finding relationships between these two variables. At least one study found no significant relationship between driver age and trait driving anger (Bjorklund & Aberg, 2005), while several did find evidence for such a relationship (Lajunen & Parker, 2001; Lajunen et al., 1998; Sullman et al., 2007).

*Alcohol consumption and driving anger.* There was no evidence for a significant relationship between reported levels of monthly alcohol consumption

and tendency towards driving anger. No other studies appear to have considered this relationship yet there is substantial evidence in the literature identifying alcohol consumption as a risk factor for impaired driving ability, aggressive driving behavior, and accident involvement (J. L. Deffenbacher et al., 2001; Richardson et al., 1994; Sharkin, 2004; Shinar, 1998; Stephens & Groeger, 2006; G. Underwood et al., 1999). It may be that participants in this study tended to underreport their alcohol consumption in an effort to “look good” to the researcher which would make these null findings more likely.

#### *Supplemental Results*

*Driving anger scale.* For the present study, the Driving Anger Scale total mean score (and standard deviation) for women and men, respectively, was 96.8 (20.6) and 94.1 (20.7). In comparison, the total mean score for women and men, respectively, in the original validity study for the DAS (J.L. Deffenbacher et al., 1994) was 109.2 (17.3) and 108.8 (18.4).

One likely explanation for the significantly lower mean driving anger score in the present study compared to the original validity study is the variance in the age of the samples. The mean age for the present study was 47.9 years old ( $SD=15.2$ ). The sample for the original validity study was made up of freshman undergraduate students with an average age of 18 years old—no  $SD$  was reported. This vast difference in sample age, along with the difference in mean driving anger, suggests a potential correlation between age—generally correlated with

years of driving experience—and driving anger score. As mentioned above, no evidence for such a correlation was found in the present study. Yet, with only 6.1% of the current sample reporting an age under 25 years-old, it is likely that the results for any age-driving anger comparison was skewed. This hypothesis merits further exploration in future research with an age distribution that better represents drivers under 25 and especially drivers in the first years of legal experience, 16-18 years old.

Another possible explanation for the discrepant results is the vast difference in the socio-cultural contexts in which the two samples drove, lived, and developed habits for driving, thinking about driving, and responding emotionally to the behaviors of other drivers. Since 1994, when the original Driving Anger Scale validity study was published, the volume of media attention to “Road Rage” and driving anger has steadily increased. In addition, the development and growth of the Internet in the past 15 years has been exponential. With that tremendous growth has come stunning increases in the amount of information we all have access to, including news reports, blogs, and social-networking posts about “Road Rage.” It is possible that as more drivers have become Internet users, the overall social awareness of anger-inducing driving behavior has been paralleled by a growing self-awareness of driving emotions. Perhaps out of this insight has come an increase in efforts to manage one’s anger on and off the road. Further, online venting of anger about driving is rampant

("AboveAverageDriver.com,"; "PlateRage.com,"; "Platewire.com,"; "Road Rage - A blog about driving in Houston,"; "RoadRagers.com,") and has likely served to displace a certain volume of rage from the road to cyberspace. This temporal factor would be important, however difficult, to examine in future investigation into driving anger.

*Perspective-taking results.* Dispositional perspective-taking was measured using the Perspective-Taking Scale (PT) of the Interpersonal Reactivity Index (IRI) (Davis, 1980, 1983). The mean score for the sample ( $n=397$ ) was 25.04 and standard deviation 4.3. There were some differences noted between males ( $n=142$ ,  $M=24.0$ ,  $SD=4.3$ ) and females ( $n=254$ ,  $M=25.7$ ,  $SD=4.1$ ), with females in the present study rating higher than males. In his original validity study of the IRI, Davis gave the empathy questionnaire to 1,161 “students from introductory psychology classes.” Although no mean age was given, one can safely assume his subjects were in the undergraduate age range of 18-21. Like the present study, the 1980 study, too, showed differences between males ( $n=579$ ,  $M=16.8$ ,  $SD=4.7$ ) and females ( $n=582$ ,  $M=18.0$ ,  $SD=4.85$ ), with females rating higher. For both males and females, the mean scores for perspective-taking in the present study were over 40% higher than for the 1980 validity study. Possible explanations for this substantial difference in means are similar to those discussed above regarding driving anger. First the sample in this study was considerably older so higher perspective-taking was developmentally appropriate for this older group

compared to the undergraduates in Davis' study. Also the Davis study was done in 1980 and there have been significant social and cultural changes that have taken place since then. These include the growth of information access due to the internet which may also result in some of the differences in means between these two samples.

*Attributional style scenarios.* When faced with the hypothetical situation in which another driver took a parking space the respondents imagined they had arrived at first, 76.4% attributed the offensive driving behavior to dispositional factors, such as the other driver's personality. This percentage is the highest for all four of the hypothetical situations. When asked to predict the frequency with which the offensive driver commits this behavior, the parking space situation ranked once again with the highest percentage of all four scenarios, with 63.5% of respondents predicting "Most of the time." The parking space scenario also ranked highest for anger responses among the four situations with 23.2%. Thus the parking space scenario had the highest score for all three "attributional" elements: dispositional bias, predicted frequency of the offensive behavior, and anger. None of the other three situations rank nearly as high and with any such consistency over the three ratings. These results suggest that the parking space situation had a higher emotional valence for the sample than the other situations and was more salient in their process of responding to the attribution questions.

One explanation for the saliency of the parking space scenario relates to a key theory about how anger is generated. As previously mentioned, most anger—both on and off the road—can be considered to be a reaction to perceived threat, injustice, and frustration (Berkowitz, 1990; Lupton, 2002; Miles & Johnson, 2003). There appears to be little threatening about the blocked fast lane and stoplight situations, and although one might feel threatened by the oncoming vehicle in the non-yielding left-turn scenario, it is the responsibility of the offended driver to determine when it is safe to enter the intersection, so the threat is somewhat self-inflicted. The parking scenario is the only situation in which the two drivers are in such close proximity within their own vehicles and even more so when they are outside the safety of the parked automobile and heading towards their potentially mutual destination, such as a place of business. Such closeness to the offending driver might seem threatening, depending on past similar experiences and the imagination of each respondent resulting in higher anger responses. In any case, the parking situation may present the most likely case among the four scenarios for experiencing feelings of threat.

While it can be argued that all four of the scenarios represent some form of injustice vis-à-vis the implied “rules of the road,” the fast lane, stoplight, and left turn scenarios imply a lack of courtesy and consideration by the offending driver but stop short of describing behaviors in which one driver is taking something from the other. Even if one considers a lack of yielding by another

driver as offensive, we are all guilty of doing this to some extent, whether purposely or unintentionally.

The parking space situation, on the other hand, involves a concrete, stable, delineated piece of real estate that, although we consciously know is “owned” by the business or other venue we are visiting, feels like it “belongs” to us once we have spotted it and claimed it in our own minds. When another driver “steals” our space, it likely triggers a sense of violation and injustice akin to having one’s actual physical property stolen. It is possible, too, that seeing the face of the offending driver take our parking space within feet of us facilitates attributions of intent that add to one’s feeling of victimization and injustice. In contrast, these types of attributions on the road might be less prevalent and poignant because of the higher level of ambiguity in these situations. Measuring for such attributions of intent might be useful in future, related research.

All four driving scenarios, no doubt, are likely to engender a sense of frustration, especially in terms of our goals, such as an appointment or tasks, or sense of personal power, as in wanting to be first or ahead of others. In the fast lane scenario, our offended driver is going fast enough and will soon be able to pass the slower driver in another lane if he waits a moment or two. The stoplight blocker talking on the cell phone eventually moves. In the left turn situation, the driver was able to make the turn, although he did not feel he was given the space and courtesy to safely do so. Therefore, one may argue that although anyone



might feel some momentary frustration in these three scenarios, the frustrating stimuli are most likely very short-lived.

In comparison, in the parking space scenario, there is likely a sense of frustration on many levels. First, unless there are other parking spots obviously nearby and close at hand, we may feel frustrated that now that the parking space we identified as solving our parking problem has been taken away and we are faced once again with the problem and associated anxieties of parking our car and getting to our destination. Second, we are forced to spend additional time to find another spot, which might put us in jeopardy of being late to one or more appointments. Third, parking is usually at the end of a journey, so once we spot “our” parking space, we have already been through traffic and other driving rigors, and are looking forward to shutting off, exiting our cars, and getting to the next thing we have planned. Faced with having to prolong this journey and stay at the driving task even longer, it would be reasonable to feel jarred and concerned by the set-back, and very frustrated. Finally, in contrast to the continually rolling asphalt in the other situations, the parking space we had our mind set on is a specific, static, delineated space to which we may feel entitled. Whether we have concerns about the proximity of this space to our destination, the safety for our car or our self the space provides, or other characteristics of this space, when someone takes our space, we are thus deprived of the attributes and meanings of this unique space. Whatever it is that we want in this particular parking space at

this precise time, we are being forced by another driver to find it elsewhere, a process that understandably would provide frustration in itself.

#### *Limits of the Present Study*

The results in the present study are limited by several demographic factors. The sample is heavily skewed towards female respondents who account for 64% of the current sample, compared to 50% of all licensed drivers in the U.S. ("Highway Statistics 2007," 2008). In addition, 48% of the sample reported an annual household income level over \$100,000, vastly higher than the national average of \$50,740 ("2008 American Community Survey Data," 2009). Further, 44% of the sample reported earning a graduate or professional degree, whereas less than 10% of the adult national population has attained such a degree ("2008 American Community Survey Data,"). Thus the sample in the present study features a disproportionately female, highly educated, high income earning group of individuals who by no means adequately represent the larger population of adult, American drivers, and consequently generalizing these findings to this greater population should be done with caution.

Additional limitations in the present study are related to methodology. The present study relied on a single sample methodology where respondents were surveyed at one point in time. It therefore lacks the statistical and conceptual strength offered by the use of longitudinal studies. The study is also limited by its

reliance on self-report data related to potentially socially unacceptable behavior, such as road rage, with no objective data for corroboration.

The use of a survey format with hypothetical questions limits respondents to thinking imagined, sometimes-vague situations. This method lacks the experiential elements found in in-vivo research or log or diary-type studies that solicit reactions to real events during or soon after the event when emotional saliency remains present. The Driving Anger Scale (J.L. Deffenbacher et al., 1994) may be a well-validated measure of how much felt anger participants think they would have in hypothetical, sometimes overly general driving situations, however, it is limited in its usefulness because the scale does not capture any of the cognitive processes involved in driving anger (i.e., what thoughts people have when driving that make them angry) or the behavioral results of the anger (i.e., how people act on or displace their anger). Similarly, the Perspective-taking scale of the Interpersonal Reactivity Index (Davis, 1980, 1983) may successfully measure how people choose to represent their use of perspective-taking skills in very general terms, but it does not ask participants to rate their likely perspective-taking performance in specific, everyday situations; nor does it consider the unique context of driving.

The attributional questionnaire in the present study succeeded in measuring a participant's tendency to make dispositional rather than situational attributions for the offensive behavior of other drivers. However, it failed to truly

examine what is called the “Fundamental Attribution Error,” because respondents were not asked to evaluate their attributions for their own behavior, and as such, no exploration for an “actor-observer effect” was made. Including in future studies a more comprehensive attributional style questionnaire may serve to corroborate the attributional data collected here. Relying on an internet-based electronic study provides several limitations. While growing numbers of the general population have access to the internet, there are likely a smaller proportion of individuals who are comfortable—technically or emotionally—with participating in an on-line survey, leaving out potential respondents who might be more likely to complete a survey mailed to their homes or handed to them in person. For technical reasons, settings for the on-line survey used in the study allowed for multiple, anonymous responses from the same computer. Therefore no checks were in place to prevent individual respondents from completing the survey multiple times and skewing the data. Using email and social-media websites to recruit participants succeeded in the rapid growth of the number of participants, however, “viral” invitations may have lead to socio-economic clustering and the loss of the elements that foster “random” sampling.

#### *Suggestions for Future Research*

The results for the present study, the dearth of research on the relationship between perspective-taking and driving anger, and the significant response to the present survey indicate there is a need for further research in this area.

Suggestions for such future research include an improved, less viral, recruiting method that ensures a more demographically diverse sample than in the present study. A study might incorporate surveying participants at multiple points in time. Also use of a diary or log method in order to capture participants' reactions to "fresher," real experiences in their individual lives could provide a richer understanding of road rage and perspective taking. For example, a weekly survey with suggested categories of roadway encounters for participants to reflect upon could serve this purpose. Another option would be using an in-vivo instrument, such as a hands-free mobile phone for participants to report driving anger in real-time (Hennessy & Wiesenthal, 1999). An additional approach would be to expand the operational definition of driving anger in order to include cognitive and behavioral elements (e.g., adding the Driving Anger Expression Inventory (J. L. Deffenbacher, Lynch et al., 2002) and the Drivers' Angry Thoughts Questionnaire (J. L. Deffenbacher, Petrilli, Lynch, Oetting, & Swaim, 2003)). Another option for improving the research in this area would be to replace the Perspective-taking scale with perspective-taking questions related specifically to the participant's real-life driving situations in his diary or log, or related to hypothetical driving scenarios such as those in the present study. In order to enhance the usefulness of examining potential attributional biases, future research should include both "actor" and "observer" perspectives. Finally, additional research in this area would benefit from including a pen-and-paper

version of any surveys to be distributed separately from any electronic versions to survey those who don't have easy access to the Internet.

### *Clinical Implications*

While there are several clinician-administered, psychosocial treatment protocols that are reportedly successful in addressing chronic aggressive driving behaviors, these interventions for the most part are targeted at court-referred or self-referred aggressive and high-anger drivers (J. L. Deffenbacher, Filetti, Lynch, Dahlen, & Oetting, 2002; J. L. Deffenbacher et al., 2000; T. E. Galovski et al., 2006; J.A. Larson, 1996). Such drivers have been identified by courts, friends and family, or themselves as having participated in aggressive driving behaviors, such as tailgating, cutting other drivers off, making obscene gestures, honking in anger, making verbal insults, or worse. Successfully intervening in such aggressive roadway behaviors is no doubt highly valuable and necessary. However, these interventions tend to be clinically administered, require significant time and financial commitment, and involve various forms of cognitive restructuring, relaxation and coping skill building, as well as behavioral modification techniques. In short, there are very involved treatment programs for people who have serious problems with anger management and aggressive acting out on the roadways even when they have experienced legal consequences for their behavior.

The present study was designed with a broader population in mind, spanning from those with infrequent subjective experiences of driving anger to those with potentially more serious anger problems such as those described above. The study focused specifically on driving anger rather than aggressive driving per se, because driving anger is widely accepted as a significant risk factor for anger-triggered aggressive behaviors on the road. Implicit in the study is the intention of intervening earlier in the anger-aggression cycle with a more generally targeted, non-clinically administered brief treatment protocol. Such a protocol would focus on improving social perspective-taking skills and/or attributional flexibility and might be applied in a wide range of settings. These might include beginning driver education programs, defensive driving classes, anger management groups, automobile club and drivers' insurance literature, drivers license renewal materials, and driving-related social networking forums. The outcome goals of these interventions include prevention for all drivers so that they don't escalate to more aggression-triggering driving incidents. Another goal would be remediation for drivers whose emotionality on the roads currently put them at risk for dangerous behavior. Future outcome research would be required to determine the efficacy of a stand-alone intervention protocol that focuses on perspective-taking and/or attributions. One would want to see how well such a treatment generalizes to driving behaviors. Other studies could focus on the utility of weaving in one or

both of these constructs into extant interventions such as the well-regarded self-help driving anger guides by Larson (1996) and James and Nahl (2000a).

### *Conclusion*

The results of the present study support the use of multiple predictors in understanding the genesis of driving anger. Evidence was found to support the hypothesis that drivers who habitually engage more frequently in social perspective-taking or situational attributions are less prone to become angered by the roadway behavior of other drivers. Conversely, those who are less likely to employ perspective-taking skills or tend to make more dispositional attributions can be expected to experience higher frequencies and intensities of driving anger.

While the results of the present study do not suggest that trait perspective-taking ability or attributional style account for a significant proportion of the explanations for driving anger, they do deserve their place in the literature as partial predictors of driving anger and merit further examination. Future research in this arena would benefit from a methodology that relied less on self-report, imagined situations, and recall than the present study and included measures that captured the full experience of driving anger including subjective emotional experience, cognition, expression, or displacement of anger in the car. Improving the examination of trait social perspective-taking by including it in response sets to actual or hypothetical-driving situations would improve upon the psychometrics used in the present study, as would the inclusion of a measure of



emotional empathy. The use of a broader-based sampling technique is indicated in order to ensure a more heterogeneous sample than in the present study.

Additional research to determine the most effective interventions to enhance social perspective-taking skills and attributional styles is clearly needed.

Anger is a common human emotion. However, the subjective experience of anger while operating a fast moving, potentially lethal automobile has been shown in the literature to all-too-often lead to retaliatory and punitive actions fueled by aggression that injure, maim, and kill. "Road Rage" is well known through the media as a social menace perpetrated by "others" who lose control, rather than "us." The research community has mostly focused on assessment and interventions targeted at the most aggressive of drivers, a group that includes recently licensed teen drivers, thrill-seekers, and violent offenders. The present study not only set out to explore the relationships between developmentally ordinary cognitive processes such as perspective-taking and attribution bias and trait driving anger but also did so with a wider community sample in mind. In this way the results of the study have the potential to be more generalizable to the larger population of drivers than previous studies that focused on aggressive drivers many of whom had been convicted of roadway violations. The study accomplished these intended goals. Also, qualitative data gathered in the survey indicated that the experience of participating in this study resulted in the development of significant insights for many of the respondents. These included

awareness of their vulnerabilities as victims of road rage, their role as unaware perpetrators of offensive road-rage provoking behaviors, as well as their own anger-induced acts of aggression. In short, these participants discovered that we are all part of the road rage “system” and therefore each of us must be responsible for our part of the solution. While the present study has its previously mentioned place in the literature and implications for future research and clinical applications, participation in the study in itself appears to have potentially therapeutic properties that might be translated to future studies.

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## Appendix A – Participant Recruitment Email-Letter

Dear colleagues (*Alternate: “friends” for non-colleague list*)

I hope this email finds you well.

I am researching people’s emotional experiences while driving, for my dissertation as part of my doctorate degree in clinical psychology at The Wright Institute in Berkeley, California. You are invited to participate in my voluntary and completely anonymous online survey located at:

<http://www.surveymonkey.com/drivingsurvey>

The only requirements for participating in this study are that you 1) are at least 18 years of age; 2) hold a valid driver’s license; and 3) currently drive a motor vehicle at least one time per month.

If you choose to participate, the total length of time for this survey will be approximately 15 minutes. You will have the option to quit at any time.

Please feel free to forward this invitation to any colleagues, friends, or family whom you feel may wish to participate.

Thank you very much and take care.

Bob Nemerovski, MA  
The Wright Institute  
Doctoral Candidate  
415-459-5999 ext. 418  
rnemerovski@wi.edu

## Appendix B - Informed Consent Text for Online Survey

### Introduction and Informed Consent

#### Welcome to the Driving Emotion Research Project

You are invited to participate in a voluntary, anonymous research study on people's emotional experiences while driving that I am currently conducting as a part of my doctorate degree in clinical psychology at The Wright Institute in Berkeley, California.

You are eligible to participate in the study if:

- You are at least 18 years of age and
- You hold a valid driver's license and
- You currently drive a motor vehicle at least one time per month.

If you choose to participate, please note:

- The questionnaire will take approximately 15 minutes to complete.
- The study is completely anonymous. No identifying information will be collected about you, nor can your answers be linked to you in any way.
- This study is completely voluntary. If you choose to participate, you may end your participation at any time without consequences of any kind. You may end your participation by closing your web browser or directing your browser to another site. Alternatively, you may choose to skip certain questions.
- Participation involves minimal risk at most. Some people may feel uncomfortable making disclosures about their emotional experiences, however you will have the right and ability to withdraw your consent and discontinue your participation at any time.
- There are minimal individual benefits from participating in this study. Some people may develop increased awareness of and insight about their experience with emotions while driving.
- You may request a copy of the results of this study when the research project has been completed.

Please contact me at [rnemerovski@wi.edu](mailto:rnemerovski@wi.edu) for further information.

If you have any questions about the research, please feel free to contact the Principal Investigator, Bob Nemerovski, MA, or the Faculty Sponsor, Patricia Wood, Ph.D.

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This project has been approved by The Wright Institute Committee for the Protection of Human Subjects. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have any questions regarding your rights as a research subject, please contact:

Committee for the Protection of Human Subjects  
The Wright Institute  
2728 Durant Avenue  
Berkeley, CA 94704

I have read and understand the above information on this page, and I give my consent to participate in this study.

I AGREE (select this option, then click "Next" to proceed.)

I DO NOT agree (Close your browser window OR click "Exit this survey" at the top right of this page to exit)

## Appendix C - Survey Questions

## 1. Demographic Information:

The following demographic data will be used only to describe the characteristics of the responses made by the entire group of participants. They will not be used to identify individual responses.

1. In which country do you live?

[Pull-down list of countries]

2. State of residence (U.S. respondents only)

[Pull-down list of states]

3. Zip Code (U.S. respondents only)

[Box: Enter Zip Code]

4. What is your gender?

Female

Male

Other

No response

5. What is your age?

Age in years [Box: Enter age]

6. What racial, ethnic, cultural, or national background describes you best? Select one or more that apply.

African

African American or Black

American Indian or Alaskan Native

Arab

Asian Indian

Chinese

Filipino

Japanese

Korean

Thai

Vietnamese

Other Asian

- Latin American
  - Mexican
  - Puerto Rican
  - Other Latino/Hispanic
  - Persian
  - Native Hawaiian
  - Guamanian or Chamorro
  - Samoan
  - Other Pacific Islander
  - White (Non-Hispanic)
  - No response
- Other (please specify) [Box: Enter other text]

7. What is your Marital Status?

- Never Married
- Married/Living with Partner
- Divorced/Separated
- Widowed

8. How many children do you have?

- None
- 1
- 2
- 3
- more than 3

9. Which best describes your political views?

- Very Liberal
- Liberal
- Moderate
- Conservative
- Very Conservative

10. What is your current net family income (in \$US)?

- Less than \$10,000/year.
- \$10,000 to \$30,000/year
- \$31,000 to \$50,000/year
- \$51,000 to \$75,000/year
- \$76,000 to \$100,000/year
- \$101,000 to \$150,000/year
- Over \$150,000/year

11. What is your highest level of education completed?

- 8th grade or below
- Some high school
- High school graduate
- Some college or university
- A.A./A.S.
- B.A./B.S.
- Some graduate school
- M.A./M.S.
- Ph.D./Psy.D.
- J.D.
- M.D.
- Other postgraduate or professional degree

12. What is your current living situation?

- Own
- Rent
- Occupy with no rent or payment

13. What is your current employment status?

- Employed
- Under-Employed
- Unemployed
- Student
- Retired
- Disabled
- Other

14. On average how many days a week do you drink alcoholic beverages?

- None
- 1
- 2
- 3
- 4
- 5
- 6
- 7

15. On average, how many alcoholic beverages do you consume each day you drink?

- None
- 1-2
- 3-4
- 5-6
- 7-8
- 9-10
- 11-12
- More than 12

16. How did you hear about this study?

- Friend
  - Colleague
  - Website (enter below)
  - Group ListServ/Newsletter (enter below)
- Website/ListServe: [Box: Enter text]

## 2. Driving Routine and Vehicle Information:

The following driving and vehicle data will be used only to describe the characteristics of the responses made by the entire group of participants. They will not be used to identify individual responses.

1. Do you drive for a living (e.g. delivery company, taxi service, bus company?)

- Yes
- No

2. Do you commute to work?

- Yes
- No

3. If you commute to work, how long does it usually take to get TO WORK?

Average daily commute time TO WORK (in minutes): [Box: Enter minutes]

4. If you commute to work, how long does it usually take to get HOME?

Average daily commute time TO HOME (in minutes): [Box: Enter minutes]

5. How many miles total per day do you usually drive (on average)?

- Less than 10 miles
- 10-30 miles
- 31-50 miles
- 51-75 miles



- 76-100 miles
- 100-200 miles
- More than 200 miles

6. How many days a week do you drive (on average)?

- 1 or less
- 2
- 3
- 4
- 5
- 6
- Everyday

7. How often do you have passengers in your vehicle?

- Never
- Less than half the time
- Half the time
- Most of the time
- All the time

8. In which type of area do you do the majority of your driving?

- Rural
- Suburban
- Urban

Other (please specify) [Box: enter other]

9. On which type of roads do you do the majority of your driving?

- Freeway/highway
- Streets

10. How many traffic tickets did you receive in the past year?

- None
- 1
- 2
- 3
- More than 3

11. How many traffic tickets have you received in your lifetime?

- None
- 1
- 2-3

- 4-6
- 7-9
- 10
- More than 10

12. How many auto accidents have you been involved with in your lifetime?

- None
- 1
- 2
- 3
- More than 3

13. What type of vehicle do you drive most often?

- Motorcycle
- Sedan
- Hatchback
- Van/Minivan
- Coupe
- Luxury
- Convertible
- Crossover
- Hybrid
- Wagon
- SUV
- Pick-up Truck
- Semi-truck
- Commercial Van

14. What make of vehicle do you drive?

- Acura
- BMW
- Buick
- Cadillac
- Chevrolet
- Dodge
- Ford
- GMC
- Honda
- Hummer
- Hyundai
- Infinity

- Jaguar
- Jeep
- Kia
- Land-Rover
- Lexus
- Lincoln
- Mazda
- Mercedes-Benz
- Mercury
- Mini
- Nissan
- Oldsmobile
- Pontiac
- Porsche
- Saab
- Saturn
- Scion
- Subaru
- Toyota
- Volvo
- VW

Other (please specify) [Box: enter other]

15. How long have you had your vehicle?

Number of years: [Box: enter number]

16. What is the ownership status of your vehicle?

- Own
- Finance
- Lease
- Borrow

3. Driving Emotion Questions:

See Driving Anger Scale (J.L. Deffenbacher et al., 1994).

4. Thought Process Questions:

See Perspective-taking Scale (PT) in the Interpersonal Reactivity Index (Davis, 1980, 1983).

### 5. Driving Beliefs Questions:

Directions: Below are several situations you may encounter when you are driving. Try to imagine that the incident described is actually happening to you, then indicate the extent to which you agree to the statements that follow.

1. You are late for a doctor's appointment and driving on the highway in the fast (far left) lane. The car in front of you is going the just below the speed limit but you want to go faster in order to get to your appointment on time. The car in front doesn't speed up or move over for you, even when you flash your lights, and traffic in the lane to your right keeps you from changing lanes or passing.

1. This event would make me angry:

- Yes
- No

2. The other driver's behavior is based mostly on:

- Situational factors
- Something about them, like their personality

3. The other driver most likely behaves this way:

- Almost never
- Some of the time
- Most of the time

2. You are on your way home from a long day at work. You get to a red light and have to wait behind one car for the light to change. When the light turns green, the car in front of you doesn't move. You notice that the driver is talking on a cell phone and paying no attention to the traffic lights. You honk your horn and the driver of the car in front looks angrily at you in the rear-view mirror and waves his arms at you then finally drives off.

1. This event would make me angry:

- Yes
- No

2. The other driver's behavior is based mostly on:

- Situational factors
- Something about them, like their personality

3. The other driver most likely behaves this way:

- Almost never
- Some of the time
- Most of the time

3. You are on your way to pick up a friend to go to the movies. In order to get to your friend's house, you need to make a left turn onto a busy street where cross-traffic does not have to stop. None of the other drivers acknowledge you or slow down to let you make your turn. After several minutes, you see a small break in the traffic and make your turn only to be honked at repeatedly by a car whose driver appears to speed up and nearly run into you.

1. This event would make me angry:

- Yes
- No

2. The other driver's behavior is based mostly on:

- Situational factors
- Something about them, like their personality

3. The other driver most likely behaves this way:

- Almost never
- Some of the time
- Most of the time

4. You are in a very busy parking lot at your local supermarket trying to get a parking space in order to get dinner to bring home after a difficult day. You see someone get into her car and start to pull out. While you wait patiently for the driver to pull out and let you in, another car that was not waiting like you were speeds around the corner and takes the parking space. No other spaces are open.

1. This event would make me angry:

- Yes
- No

2. The other driver's behavior is based mostly on:

- Situational factors
- Something about them, like their personality

3. The other driver most likely behaves this way:

- Almost never
- Some of the time

Most of the time

6. "Road Rage" Questions:

1. How do you define road rage? (Select all that apply)

- Feeling frustrated
- Feeling anger
- Honking
- Yelling
- Flipping off
- Flashing Lights
- Tail-gating
- Slamming the breaks
- Ramming with your car
- Threaten with a weapon
- Assault
- Homicide

2. How often do you *witness* road rage?

- Never
- Once a month
- Once a week
- Once a day
- Multiple times a day

3. Which of these behaviors have other drivers done *to you*? (Mark all that apply)

- Honking
- Yelling
- Flipping off
- Flashing Lights
- Tail-gating
- Slamming the breaks
- Ramming with your car
- Threaten with a weapon
- Assault

4. How often do you *feel* road rage?

- Never
- Once a month
- Once a week
- Once a day

Multiple times a day

5. Which of these behaviors have *you done* to other drivers? (Mark all that apply)

- Honking
- Yelling
- Flipping off
- Flashing Lights
- Tail-gating
- Slamming the breaks
- Ramming with your car
- Threaten with a weapon
- Assault

6. What is your main “pet peeve” that other drivers do?

[Box: Open text box]

## Appendix D – Debriefing Form for Online Survey

Thank you for your participation!

This research is generally concerned with people's experiences with emotions while driving and specifically examines the relationship of driving anger and social perspective taking—also known as cognitive empathy. As a participant in this research, you were asked to respond to a series of questions about your experiences with anger while operating a motor vehicle, your self-perceptions about your capacity to take the perspective of others, and ways in which you explain the reasons for certain types of offensive driving behavior by others on the road.

The information that you provided is completely anonymous. You were not asked to provide your name or any other information that could be used to personally identify you with the information presented in the research study material.

If you know others who may be participating in this study, please refrain from discussing its contents with them. It is important that everyone respond to the survey without others inadvertently influencing their answers.

If you would like a copy of the results of this study when the research project has been completed, please contact me at [rnemerovski@wi.edu](mailto:rnemerovski@wi.edu) for further information. Your name and email address cannot and will not be connected in any way with the responses you gave during your participation.

Thank you once again,

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